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Corresponding author\*  
E-mail: parkjs@kmu.ac.kr

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## Sports Injury Status Survey by Gender and Career of the Taekwondo Poomsae Athletes

Wookwang Cheon<sup>1</sup>

Keimyung University, Daegu, Republic of Korea

Jusik Park<sup>2\*</sup>

Keimyung University, Daegu, Republic of Korea

### Abstract

**Purpose:** The purpose of this study is to provide basic data for the prevention of sports injuries in Taekwondo Poomsae athletes by investigating and analyzing sports injuries.

**Method:** This study, a survey was conducted to study the condition of sports injuries targeting Taekwondo Poomsae players. A total of 144 subjects were included in the study, including 72 males and 72 females. The experience was classified into 55 people with less than 3 years of experience, 42 people with 4-5 years of experience, and 47 people with more than 6 years of experience. As a research tool, questionnaires were obtained from participating athletes registered with the Korea Taekwondo Association and used to investigate the actual sports injuries of Taekwondo Poomsae athletes. The questionnaire was constructed and used for demographic characteristics and sports injuries.

**Results:** As a result of examining Taekwondo Poomsae athletes' experience with sports injuries within the past year, 121 out of 144 athletes answered that they had experienced, and 23 athletes answered that they had never experienced it. As a result of cross-analysis between the sexes concerning whether the athletes experienced sports injuries, there was a significant( $p=.000$ ) difference. As a result of analyzing sports injuries that occurred during competition and training, by gender, 10 male(100%) and 14 female(58.3.4%) athletes experienced injuries during training, respectively, and both during training and competition. The number of experienced players was 48 male(45.3%) and 58 female(54.7%). As a result of cross-analysis, there was a significant difference( $p=.001$ ). As a result of analyzing the frequency of sports injuries according to the gender of Taekwondo athletes, it was found that both male and female athletes suffered the most sports injuries in the order of ankle, knee, waist, and foot. As a result of analyzing the frequency of sports injuries according to the gender of Taekwondo athletes, the hamstring and waist were the most damaged in both male and female athletes.

**Conclusion:** Taekwondo Poomsae athletes experienced sports injuries, and it was found that injuries occurred a lot during training. In addition, the injured joints were found in the order of ankle, knee, and waist in both men and women, and the hamstring was the most common muscle in both men and women.

**Keywords:** Taekwondo, Sports Injuries, Poomsae, Joint and Muscle Injuries, Career

## 1. Introduction

Taekwondo is a martial art sport that has been widely distributed around the world, and more than 70 million people in 206 countries are practicing taekwondo[1]. Taekwondo's sparring event was adopted as an official event from the 2000 Summer Olympics in Sydney and was also held at the Tokyo Summer Olympics in 2021. In the Poomsae event, the competition started later than in the Gyeonggi event. The Taekwondo Poomsae event started with the Taekwondo Hanmadang hosted by the Korea Taekwondo Association in 1992, and now many national-scale competitions are being held. The World Taekwondo Poomsae Championships have been held

every year since 2006, and detailed competitions in 36 categories including men's and women's individual events, team events, pairs, and freestyle are held. In addition, recently, the Poomsae and Breaking(demonstration) competitions have been recognized as official events by the Korea Taekwondo Association, and the number of participating athletes is increasing, and the scale is gradually increasing[2][3][4].

Unlike the martial arts event, the Poomsae event is non-contact and there is no contact between the players. In particular, it is an event that evaluates the sophistication and artistry of the technical system by expressing various and complex movements to hone attack and defense skills against a virtual opponent[5][6]. To achieve the advancement of this technical system, athletes suffer injuries due to more intense training[7].

Various studies have been reported on the incidence rate of injuries in a martial arts event, and various studies have been reported on the injury site, occurrence situation, treatment method, and prevention method[1][8]. Looking at the research contents related to taekwondo injuries, the main focus is on the time of occurrence, major causes, weight class, athlete's career, and injury prevention[9][10][11][12].

Most Taekwondo players are reported to be injured due to excessive training, and it has been shown that injuries are caused by lack of skills, overtraining, lack of concentration, lack of warm-up exercises, facilities, or the environment during training or competition[13][14][15]. These injuries cause a decrease in performance and psychological anxiety[16]. In addition, the problem of sports injuries not only deteriorates performance but also causes physical damage to the players, resulting in a state in which they can no longer sustain their athlete life[17]. Studies on the prevention of such damage have been reported on epidemiologic and physical aspects[18][19], and recently, on the psychological state of athletes[20]. However, studies related to sports injuries related to the Poomsae event so far are insufficient, and a more detailed investigation of the actual condition of injuries according to the diversification and subdivision of the Poomsae event is needed.

Therefore, in this study, the presence, occurrence, and condition of sports injuries according to gender and career were investigated for Taekwondo Poomsae players. The purpose of this investigation is to provide basic information on the causes of injuries and prevention of injuries to athletes and coaches.

## 2. Research Method

### 2.1. Research subjects

This study, a survey was conducted to study the condition of sports injuries targeting Taekwondo Poomsae players. A total of 144 subjects (72 males, 72 females) were included in the study. According to the classification of experience, 55 people with 3 years or less, 42 people with 4-5 years, and 47 people with 6 years or more. The details of the gender and career history of the study participants are shown in <Table 1>.

**Table 1.** Gender and experience of the research subjects.

Group		Age (years)	Career (years)	Career classification			Total n(%)
				3 years or less n(%)	4~5 years n(%)	6 years or longer n(%)	
Gender	Male	20.83±0.99	4.42±2.43	28(50)	22(52.4)	22(46.8)	72(50)
	Female	21.01±1.08	5.55±4.03	27(50)	20(47.6)	25(53.2)	72(50)
Total		20.92±1.04	4.98±3.36	55(100)	42(100)	47(100)	144(100)

## 2.2. Research tools and variables

The survey tool of this study was used by receiving questionnaires from participating athletes registered with the Korea Taekwondo Association to investigate the actual sports injuries of Taekwondo Poomsae athletes. The questionnaire was constructed and used for demographic characteristics (gender, career) and sports injuries (experience of injury, injury site, occurrence situation, national competition experience).

## 2.3. Data processing

In this study, collected data were analyzed using the Windows SPSS 27.0 version statistical program. The collected data were divided by gender and career. The frequency and percentage of joint and muscle injuries were calculated. A cross-analysis Chi-square ( $\chi^2$ ) was performed to examine the differences in sports injuries by gender and career, national competitions, and sports injuries during training and competition. The statistical significance level of this study was set to  $p < .05$ .

## 3. Results

The results of a survey on sports injuries by gender and career for Taekwondo Poomsae athletes are as follows.

### 3.1. Differences in the presence or absence of sports injuries by gender and career

The results of analyzing the difference in the presence or absence of sports injury according to gender and career of Taekwondo Poomsae athletes are shown in <Table 2>.

**Table 2.** Differences in sports injuries by gender and career.

	Group	Sport injured N(%)			$\chi^2$ (p)
		IG	NG	Total	
Gender	Male	60(45.5)	12(100)	72(50)	13.091 (.000***)
	Female	72(54.5)	0(0)	72(50)	
Career	3 years or less	50(37.9)	5(41.7)	55(38.2)	8.132 (.017*)
	4~5 years	35(26.5)	7(58.3)	42(29.2)	
	6 years or longer	47(35.6)	0(0)	47(32.6)	
Total (n=144)		121(100)	23(100)	144(100)	

Note: N: number, IG: injured group, NG: non-injured group.

### 3.2. National competition experience by gender and career

The results of analyzing the difference in the presence or absence of national competition experience according to gender and career of Taekwondo Poomsae athletes are shown in <Table 3>.

**Table 3.** National competition experience by gender and career.

	Group	National competition experience			$\chi^2$ (p)
		Presence	Absence	Total n(%)	
Gender	Male	38(47.5)	34(53.1)	72(50)	.450
	Female	42(52.5)	30(46.9)	72(50)	(.502)

	3 years or less	10(12.5)	45(70.3)	55(38.2)	
Career	4~5 years	29(36.3)	13(20.3)	42(29.2)	53.312 (.000***)
	6 years or longer	41(51.2)	6(9.4)	47(32.6)	
Total		80(100)	64(100)	144(100)	

Note: N: number, IG: injured group, NG: non-injured group.

### 3.3. Differences between training and competition in terms of the occurrence of injuries

<Table 4> shows the results of analyzing the difference in the presence or absence of injury between the training and competitions of Taekwondo Poomsae athletes.

**Table 4.** Differences between training and competition in terms of the occurrence of injuries.

	Group	N(%)					x <sup>2</sup> (p)
		Not	During the match	During the training	Both	Total	
Gender	Male	13(100)	1(100)	10(41.7)	48(45.3)	72(50)	15.610 (.001***)
	Female	0(0)	0(0)	14(58.3)	58(54.7)	72(50)	
Career	3 years or less	4(30.8)	0(0)	7(29.2)	44(41.5)	55(38.2)	12.199 (.058)
	4~5 years	8(61.5)	1(100)	8(33.3)	25(23.6)	42(29.2)	
	6 years or longer	1(7.7)	0(0)	9(37.5)	37(34.9)	47(32.6)	
Total		13(100)	24(100)	1(100)	106(100)	144(100)	

### 3.4. Joint area and frequency of sports injuries by gender and career

<Table 5> shows the results of comparing the damaged joint area and the frequency of occurrence according to gender and career in Taekwondo Poomsae athletes.

**Table 5.** Joint area and frequency of sports injuries by gender and career.

Part	Joint injury number(%)					Total
	Gender		Career			
	Male	Female	3 years or less	4~5 years	6 years or longer	
Neck	3(2.50)	2(1.16)	1(0.88)	1(1.43)	3(2.75)	5(1.71)
Shoulder	7(5.83)	9(5.20)	8(7.02)	2(2.86)	6(5.50)	16(5.46)
Elbow	7(5.83)	10(5.78)	5(4.39)	7(10.00)	5(4.59)	17(5.80)
Wrist	7(5.83)	10(5.78)	9(7.89)	3(4.29)	5(4.59)	17(5.80)
Finger	4(3.33)	1(0.58)	3(2.63)	0(0)	2(1.83)	5(1.71)
Waist	14(11.67)	27(15.61)	15(13.16)	9(12.86)	17(15.60)	41(13.9)
Hip	6(5.00)	14(8.09)	8(7.02)	6(8.57)	6(5.50)	20(6.83)
Knee	27(22.50)	38(21.97)	22(19.30)	19(27.14)	24(22.02)	65(22.18)
Ankle	31(25.83)	45(26.01)	32(28.07)	18(25.71)	26(23.85)	76(25.94)
Foot	14(11.67)	17(9.83)	11(9.65)	5(7.14)	15(13.76)	31(10.58)
Total	120(100)	173(100)	114(100)	70(100)	109(100)	293(100)

Note: Multiple selections possible.

### 3.5. Sports injury-related muscle areas and frequency by gender and career

<Table 6> shows the results of comparing the damaged muscle areas and the frequency of occurrence according to gender and career for the Taekwondo demonstration athletes.

**Table 6.** Sports injury-related muscle areas and frequency by gender and career.

Part		Muscle injury number(%)				Total	
		Gender		Career			
		Male	Female	3 years or less	4~5 years		6 years or longer
Neck		4(3.85)	2(1.68)	2(2.27)	0(0)	4(4.94)	6(2.69)
Side Ribs		4(3.85)	3(2.52)	4(4.55)	0(0)	3(3.70)	7(3.14)
Abdomen		0(0)	2(1.68)	1(1.14)	0(0)	1(1.23)	2(0.90)
Back		4(3.85)	3(2.52)	5(5.68)	0(0)	2(2.47)	7(3.14)
Waist		16(15.38)	27(22.69)	15(17.05)	13(24.07)	15(18.52)	43(19.28)
Hip		6(5.77)	4(3.36)	6(6.82)	1(1.85)	3(3.70)	10(4.48)
Upper arms		3(2.88)	3(2.52)	2(2.27)	1(1.85)	3(3.70)	6(2.69)
Forearm		2(1.92)	2(1.68)	1(1.14)	2(3.70)	1(1.23)	4(1.79)
Thigh	Anterior	5(4.81)	10(8.40)	2(2.27)	6(11.11)	7(8.64)	15(6.73)
	Posterior	36(34.62)	47(39.50)	34(38.64)	24(44.44)	25(30.86)	83(37.22)
Calf	Anterior	13(12.50)	11(9.24)	9(10.23)	5(9.26)	10(12.35)	24(10.76)
	Posterior	11(10.58)	5(4.20)	7(7.95 )	2(3.70)	7(8.64)	16(7.17)
Total		104(100)	119(100)	88(100)	54(100)	81(100)	223(100)

Note: Multiple selections possible.

## 4. Discussion

This study investigated the condition of sports injuries among 144 university taekwondo Poomsae majors(72 males, 72 females) who had completed the registration of athletes with the Korea Taekwondo Association.

### 4.1. Differences in the presence or absence of injuries by gender and career

As a result of a survey on the presence or absence of sports injuries in Taekwondo Poomsae athletes, 121 out of 144 athletes answered that they had experienced sports injuries within the last year. 23 players answered that they had never experienced it. As a result of cross-analysis between genders regarding whether or not athletes experienced sports injuries, there was a significant( $p=.000$ ) difference. In cross-analysis by experience, 55 players(38.2%) who responded that they had experienced sports injuries were 55(38.2%), 42(29.2%) 4-5 years old, and 47 players(32.6%) more than 6 years old. They answered that they had experienced it. As a result of cross-analysis, it was found that there was a significant( $p=.017$ ) difference in the experience of sports injuries by career. These results indicate that Taekwondo Poomsae players are likely to get injured due to excessive training despite being the only non-contact training event in Taekwondo. Worldwide, literature on the prevalence of chronic overuse injuries in Taekwondo Poomsae athletes is rare, and most of them focuses on competition. A study of



Korean Poomsae athletes reported a prevalence of 71%, and a similar study conducted in Alberta, Canada reported a prevalence of 73%[\[21\]\[22\]](#).

#### **4.2. National competition experience by gender and career**

As a result of a survey on whether or not Taekwondo Poomsae athletes won the national competition, 80 out of 144 athletes answered that they had experienced winning a national competition within the past year. 64 players answered that they had never experienced it. As a result of cross-analysis between the sexes concerning whether or not the athletes won the national championship, there was no significant difference. In the cross-analysis by experience, 10 players(12.5%) who said that they had won a national championship were 10 players(12.5%), 29 players(36.3%) in 3-5 years, and 41 players(51.2%) over 6 years. They answered that they had experienced standing. As a result of cross-analysis, it was found that there was a significant( $p=.000$ ) difference in the experience of winning national competitions by career. These results show that Taekwondo Poomsae athletes have better skills as they have more experience in national competitions. It is thought that Poomsae may require a long period of training, unlike gyeonggi<sup>2</sup>[\[23\]\[24\]](#).

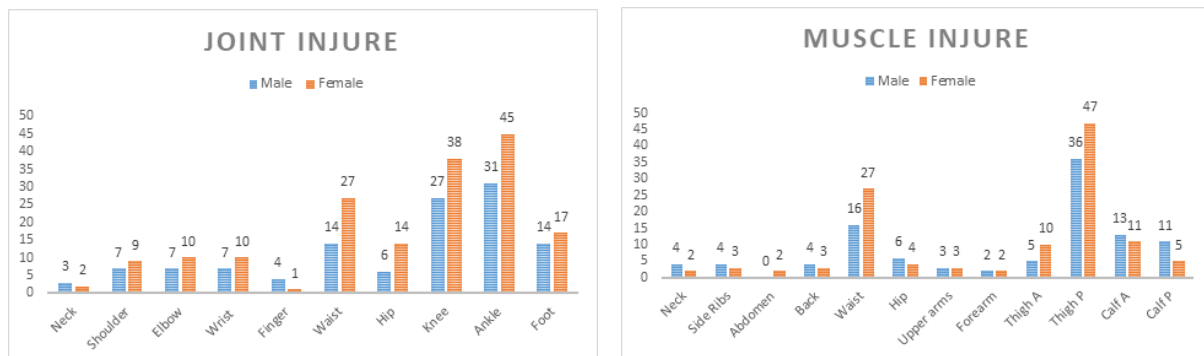
#### **4.3. Differences between training and competition in terms of the occurrence of injuries**

As a result of analyzing sports injuries occurring during competition and training among athletes who experienced sports injuries between competitions and training, 10 male(100%) and female athletes, respectively, experienced injuries during training. There were 14 players(58.34%), 48 men(45.3%), and 58 women(54.7%) who experienced both training and competition. As a result of cross-analysis, there was a significant difference( $p=.001$ ). By experience, 7 players(29.2%) under 3 years of experience experienced sports injuries during training, 8 players(33.3%) for 4-5 years, and 9 players(37.5%) for 6 years or more, both during training and competition. The number of experienced players was 44 players under 3 years(41.5%), 25 players in 4-5 years(23.6%), and 37 players(34.9%) over 6 years. As a result of cross-analysis, there was no significant difference in the experience of sports injury by career. These results indicate that more injuries occur during training, and the lower the experience, the more injuries [\[25\]](#).

#### **4.4. Joint area and frequency of sports injuries by gender and career**

As a result of analyzing the frequency of sports injuries according to the gender of Taekwondo players, the injured parts of the male athletes were the ankle 31 times(25.83%), knee 27 times(22.50%), waist 14 times(11.67%), foot 14 times(11.67%), and female athletes suffered the most injuries in the order of 45 ankles(26.01%), 38 knees(21.97%), 27 waists(15.61%), and 17 feet(9.83%). In terms of experience, 32 ankles(28.07%), 22 knees(19.30%), 15 waists(13.16%), and 11 feet(9.65%) in less than 3 years of experience, 4 to 5 years old, 19 knees It was found in the order of times(27.14%), ankle 18 times(25.71%), and waist 9 times(12.86%). Also, in the 6-year-old group, 26 times(23.85%) in the ankle, 24 times in the knee(22.02), 17 times in the waist(15.60%), and 15 times in the foot(13.76%) were found in that order. These results show that the Taekwondo Poomsae technique is divided into the upper and lower body, but injuries occur a lot in the ankle and knee of the lower extremities, which are subjected to a lot of weight. In addition, it is considered that the reason for the occurrence of back injuries is that there is a possibility of injury when the stability of the lower extremities and the balance of the core are inconsistent. The most common cause of injuries in the ankle joint is the possibility of damage to the ligaments and muscles due to the anatomical shape and structure around the ankle joint and the action with the joint surface [\[26\]\[27\]](#).

**Figure 1.** Joint and muscle injury frequency.



#### 4.5. Sports injury-related muscle areas and frequency by gender and career

As a result of analyzing the frequency of sports injury muscle parts according to the gender of Taekwondo players, male athletes had 36 hamstrings(34.62%), waist 16 times(15.38%), and female athletes 47 hamstrings(39.50%), waist 27 times(22.69%), followed by damage. In terms of experience, those with less than 3 years of experience were 34 hamstrings(38.64%), 15 waists(17.05), 4-5 years 24(44.44%), 15 waists(24.07%), and 25 hamstrings in 6 years or more(30.86%) and waist 15 times(18.52%). This result is thought to be caused by the kick movement of the lower extremities, which is one of the characteristics of the Taekwondo Poomsae competition. Excessive extension of the knee occurs during kicking, which causes hamstring injuries[28][29][30].

## 5. Conclusion

Taekwondo Poomsae athletes experienced sports injuries, and it was found that injuries occurred a lot during training. In addition, the injured joints were found in the order of ankle, knee, and waist in both men and women, and the hamstring was the most common muscle in both men and women

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## 7. Appendix

### 7.1. Authors contribution

	Initial name	Contribution
Lead Author	WC	-Set of concepts <input checked="" type="checkbox"/> -Design <input checked="" type="checkbox"/> -Getting results <input checked="" type="checkbox"/> -Analysis <input checked="" type="checkbox"/> -Make a significant contribution to collection <input checked="" type="checkbox"/> -Final approval of the paper <input checked="" type="checkbox"/> -Corresponding <input checked="" type="checkbox"/>
Corresponding Author*	JP	-Play a decisive role in modification <input checked="" type="checkbox"/> -Significant contributions to concepts, designs, practices, analysis and interpretation of data <input checked="" type="checkbox"/> -Participants in Drafting and Revising Papers <input checked="" type="checkbox"/> -Someone who can explain all aspects of the paper <input checked="" type="checkbox"/>

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Corresponding author\*  
E-mail: shc0601@hanmil.net

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## Influence of the Taekwondo Leader's Leadership on the Leader's Image and Trust

Hochul Shin

Kyungmin University, Uijeongbu, Republic of Korea

### Abstract

**Purpose:** The purpose of this study is to explore the appropriate qualities of the Taekwondo Demonstration Team leader, identify the effect of the leader's leadership style on the leader's image and trust, and provide the basic data for the research promoting the development of the Taekwondo Demonstration Team.

**Method:** As for the subjects of this study, 7 universities that operate the Taekwondo Demonstration Team were selected, 217 copies were collected by using the convenience sampling method from university students who are participating in the Demonstration Team. In response, 210 copies of data were analyzed except for 7, which had low reliability. Two hundred and ten copies of the collected data were analyzed by using SPSS 23.0. Frequency analysis was performed to examine and understand the general characteristics of the participants, and the exploratory factor analysis and factor-specific reliability (Cronbach's alpha) were calculated to verify the validity and reliability of the measurement tool.

**Results:** A total of 29 questions were used, and the response form of the questionnaire was measured on a Likert 5-point scale. As illustrated in <Table 2>, the reliability of sub-factors (Cronbach's  $\alpha$ ) was calculated through the training and directive behavior of .944, democratic behavior .938, positive reward behavior .914, tyrannical behavior .936, social support behavior .881, respectively. Multiple regression analysis was performed on the effect of leader's image on the leader's trust, and the results are as illustrated in <Table 7>. As for the results of multiple regression analysis performed on the effect of leader's image on the leader's trust, it turned out that leader's image had no statistically significant effect on the leader's trust.

**Conclusion:** Multiple regression analysis was conducted on the effect of the leadership style of the Taekwondo Demonstration Team leader on the leader's image. As a result, it turned out that training and instruction had a positive(+) effect on the leader's image, and as a result of the multiple regression analysis performed on the image of democratic behaviors of leaders, it turned out that democratic actions had a positive effect on the leader's image.

**Keywords:** Leadership, Taekwondo, Leader's Image, Trust, Taekwondo Demonstration

## 1. Introduction

It may be claimed that the Taekwondo Demonstration Team is demonstrating the excellence and splendor of Taekwondo techniques at home and abroad, and may also be claimed to be the origin of the Korean Wave[1]. The breaking techniques of the Taekwondo Demonstration Team are constantly developing and are presented in various ways through several assistants and breakers[2]. The Taekwondo Demonstration Team is consisted of a large number of members, and there is a leader who can lead the Team. The leader leads an organization with leadership

and can be claimed to be an essential element in guiding the Taekwondo Demonstration Team in which many members are active[3].

The leader's leadership is a process of influencing the members to successfully achieve organizational goals in the field of sports, and it has been reported that it can influence the function and potential of members[4]. Furthermore, it strengthens organizational motivation, influences performance improvement, and plays an important role in the interaction between the athletes and leaders[5]. Furthermore, a leader must have high professionalism, and various types of leadership related to the athlete's psychology and character education are required.

Since there are various types of leadership, the image of the leader is expected to emerge across various aspects, and it is determined to be the grounds for exploring the qualities of a leader who can lead the Taekwondo Demonstration Team.

A leader is a person who provides the means for the achievement of the group's goals and helps them to achieve their maximum capability, and it is important that the members have an impact on their psychological, social, and emotional growth depending on how they view the leader[6]. Image is a factor which includes characteristics, emotions, beliefs, and personality of an object. The image of a leader is claimed to be a belief in a specific target, which can be a factor in shaping the attitude of others, and refers to the image expressed by the subjective evaluation of each individual, such as the leader's professionalism, professional consciousness, and qualities[7]. Most of the studies on the image of Taekwondo leaders have been conducted on Taekwondo practitioners and parents, and there is a need for research related to the image of university Taekwondo leaders. Seongwoo Jeong and Naesook Pyo reported that the studies on the university Taekwondo leaders should be conducted because the university Taekwondo leaders are helping the university students majoring in Taekwondo become Taekwondo leaders following graduation[8].

Trust is an important factor to have among the qualities of a successful leader, and various efforts are required to enhance the relationship of trust between the leader and members. Trust means trusting and relying on someone else, and trust is grown based on mutual openness, driving force, truthfulness, and fairness through the interpersonal interaction. Leadership can operate as a variable influencing the trust of leaders because such trust in the leaders contributes to cooperation and performance within an organization according to the leadership[9].

Examining the previous studies related to the leadership of a leader, in general, studies have been conducted on the effects of factors such as exercise commitment, exercise continuity, athlete satisfaction, and group cohesion[10][11][12]. There is insufficient research on the relationship or influence between the leader's image and trust. Furthermore, the studies on how the leadership style of the leader influences the image and trust of the leader in the Taekwondo Demonstration Team to date is very insufficient. Accordingly, the purpose of this study is to explore the appropriate qualities of the Taekwondo Demonstration Team leader, identify the effect of the leader's leadership style on the leader's image and trust, and provide the basic data for the research promoting the development of the Taekwondo Demonstration Team.

## **2. Research Method**

### **2.1. Research subject**

As for the subjects of this study, 7 universities that operate the Taekwondo Demonstration Team were selected, 217 copies were collected by using the convenience sampling method from university students who are participating in the Demonstration Team. In response, 210 copies of data were analyzed except for 7, which had low reliability. It turned out that the general characteristics of the 210 copies were 165 males(78.6%) and 45 females(21.4%), and in terms

of their grade year following the survey from the first through the fourth years, there were 89 students(42.4%) in the first year, 52 students(24.7%) in the second year, 42 students(20.0%) in the third year, and 27 students(12.9%) in the fourth year. As for the training period, it turned out that there were 5 students(2.4%) for 1 year to less than 2 years, 22 students(10.5%) for 2 years to less than 4 years, 30 students(14.2%) for 4 years to less than 7 years, and over 153 students(72.9%) for 7 or more years, and as for the demonstration career, 29 students(13.8%) had less than 1 year, 71(33.8%) had over 1 year and less than 2 years, and 71(33.8%) had over 4 and less than 7 years of experience, and 39(18.6%) had over 7 years. The general characteristics of the study subjects are as illustrated in <Table 1>.

**Table 1.** General characteristics of study participants.

Classification		Number of cases(people)	Percentage(%)
Gender	Male	165	78.6
	Female	45	21.4
Grade year	1st	89	42.4
	2nd	52	24.7
	3rd	42	20.0
	4th	27	12.9
Training period	1-2 years	5	2.4
	2-4 years	22	10.5
	4-7 years	30	14.2
	7 years or longer	153	72.9
Demonstration career	Less than 1 year	29	13.8
	1- less than 4 years	71	33.8
	4- less than 7 years	71	33.8
	7 years or longer	39	18.6

## 2.2. Measuring tool

### 2.2.1. Measure for the leader's leadership type

A total of 29 questions were used, and the response form of the questionnaire was measured on a Likert 5-point scale. As illustrated in <Table 2>, the reliability of sub-factors(Cronbach'  $\alpha$ ) was calculated through the training and directive behavior of .944, democratic behavior .938, positive reward behavior .914, tyrannical behavior .936, social support behavior .881, respectively.

**Table 2.** Validity and reliability analysis of the leadership types.

Factor	Question	Factor 1	Cronbach' $\alpha$
Psychological happiness	Leader's image 6	.884	.969
	Leader's image 8	.884	
	Leader's image 14	.868	
	Leader's image 19	.853	
	Leader's image 3	.853	
	Leader's image 15	.851	
	Leader's image 12	.849	

	Leader's image 5	.849	
	Leader's image 10	.848	
	Leader's image 11	.842	
	Leader's image 7	.838	
	Leader's image 2	.835	
	Leader's image 4	.828	
	Leader's image 1	.752	
	Leader's image 13	.715	
Inherent		10.529	
Dispersive		70.191	
Cumulative		70.191	

### 2.2.2. Measure of the leader's image

This questionnaire was consisted of a total of 15 questions and was modified and supplemented for use according to the situation. The response form of the questionnaire was measured on the Likert's 5-point scale. As illustrated in <Table 3>, the reliability of the sub-factor(Cronbach'α) was calculated as .969 of the leader's image.

**Table 3.** Validity and reliability analysis of the leadership types.

Factor	Question	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Cronbach' α
Training and instruction behavior	Training and instruction behavior3	.764	.254	.369	-.047	.149	.944
	Training and instruction behavior2	.758	.314	.292	.013	.108	
	Training and instruction behavior5	.755	.307	.025	.002	.328	
	Training and instruction behavior1	.754	.348	.274	-.038	.106	
	Training and instruction behavior9	.671	.459	.240	.029	.155	
	Training and instruction behavior4	.659	.415	.283	-.106	.126	
	Training and instruction behavior6	.637	.406	.053	-.042	.252	
	Training and instruction behavior8	.628	.338	.387	-.015	.040	
	Training and instruction behavior7	.535	.456	.388	-.063	.213	
Democratic	Democratic 4	.243	.793	.175	-.082	.194	.938
	Democratic 1	.401	.748	.210	-.037	.058	
	Democratic 3	.321	.693	.346	-.126	.144	
	Democratic 6	.386	.687	.205	.017	.151	
	Democratic 8	.320	.677	.295	.069	.077	
	Democratic 2	.407	.672	.159	-.063	.352	
	Democratic 7	.347	.663	.349	-.052	.174	
	Democratic 5	.350	.620	.279	-.037	.202	



Positive	Positive 2	.213	.269	.836	-.068	.118	.914
	Positive 1	.256	.185	.769	-.077	.275	
	Positive 4	.165	.302	.768	.001	.265	
	Positive 5	.317	.416	.693	-.085	.096	
	Positive 3	.386	.245	.601	-.021	.286	
Despotic	Despotic 2	-.042	-.025	-.062	.941	.035	.936
	Despotic 3	-.043	.035	-.116	.928	-.059	
	Despotic 4	.017	-.067	-.053	.923	.001	
	Despotic 1	-.025	-.075	.055	.863	-.052	
Social	Social 1	.224	.214	.248	.052	.810	.881
	Social 3	.203	.235	.316	-.083	.809	
	Social 2	.365	.286	.470	-.118	.597	
Inherent		5.866	5.749	4.412	3.443	2.513	
Dispersive		20.229	19.825	15.213	11.871	8.667	
Cumulative		20.229	40.054	55.267	67.138	75.805	

## 2.3. Data collection

The data collection of this study was carried out for a total of 30 days from October 1, 2021 through October 30, 2021, and 7 university Taekwondo Demonstration Teams led by the demonstration team leader were selected and the purpose and purpose of the study were adequately explained to the leaders in advance, while the questionnaire was distributed with prior cooperation. The subjects who agreed to participate in the study were asked to accurately communicate the purpose and method of the study and prepared them.

## 2.4. Data processing

Two hundred and ten copies of the collected data were analyzed by using SPSS 23.0. Frequency analysis was performed to examine and understand the general characteristics of the participants, and the exploratory factor analysis and factor-specific reliability(Cronbach's alpha) were calculated to verify the validity and reliability of the measurement tool. Thereafter, the multiple regression analysis was performed after the correlation analysis to investigate the influence between the leadership type of the leader, the leader's image, and the variables of leader's trust, while the significance level was set at 0.05.

# 3. Results

## 3.1. Correlation analysis

Correlation analysis was conducted to examine and understand the correlation between each factor of leadership type, leader's image, and leader's trust of the Taekwondo Demonstration Team leader, and the Pearson correlation coefficient was calculated. The lowest correlation turned out between the despotic behavior and leader's image( $r = -.257$ ,  $p < .01$ ), and the highest correlation turned out between training and directive behavior and democratic behavior( $r = .833$ ,  $p < .01$ ). The results are as illustrated in <Table 4> as follows.

**Table 4.** Results of correlation analysis between variables.

Classification	1	2	3	4	5	6	7	8	9
1. Training and instruction behavior	1								
2. Democratic behavior	.833**	1							
3. Despotic behavior	-.089	-.105	1						
4. Social support behavior	.631**	.623**	-.100	1					
5. Positive reward behavior	.700**	.702**	-.123	.685**	1				
6. Leader's image	.722**	.689**	-.257**	.591**	.694**	1			
7. Cognitive trust	-.050	-.018	-.007	.000	-.090	.023	1		
8. Behavioral trust	-.013	.031	.063	.007	-.067	-.049	.592**	1	
9. Emotional trust	-.022	-.010	-.027	.032	-.058	-.041	.651**	.647**	1

Note: \*\*p&lt;.01.

### 3.2. Influence of the leader's leadership style on the leader's image

Multiple regression analysis was performed on the effect of the leadership style of the leader on the leader's image, and the results are as illustrated in <Table 5>. The results demonstrated that training and instructional behavior( $p=.000$ ), democratic behavior( $p=.000$ ), despotic behavior( $p=.000$ ), and positive reward behavior( $p=.000$ ) were statistically significant, and were found to have a positive effect. Influence turned out in the order of training and directive behavior(.348), positive reward behavior(.281), democratic behavior(.136), and despotic behavior(-.170). Furthermore, in terms of the trend, the regression model demonstrated an F value of 69.304 at  $p < .001$ , and for the regression equation,  $R^2=.629$ , demonstrating an explanatory power of 62.9% of the total variance.

**Table 5.** The effect of the leader's leadership style on the leader's image.

	Leader's image		
	<i>B</i>	<i>Beta</i>	<i>t</i>
(Constant)	.223		3.732***
Training and instruction behavior	.087	.348	4.270***
Democratic behavior	.079	.136	1.676
Despotic behavior	.025	-.170	-3.950***
Social support behavior	.051	.077	1.252
Positive reward behavior	.071	.281	4.111***
	$R^2=.629$ , $F=69.304$ ***		

Note: \*= $p<.05$ , \*\*= $p<.01$ , \*\*\*= $p<.001$ .

### 3.3. Influence of leader's leadership style on the leader's trust

Multiple regression analysis was conducted on the effect of leadership style on the leader's trust, and the results are as illustrated in <Table 6>. The results of multiple regression analysis performed on the effect of the leadership style of the leader on the trust of the leader demonstrated that the leadership style of the leader did not have a statistical effect on the trust of the leader.

**Table 6.** The effect of the leader's leadership style on the leader's trust.

	Cognitive trust			Behavioral trust			Emotional trust		
	<i>B</i>	<i>Beta</i>	<i>t</i>	<i>B</i>	<i>Beta</i>	<i>t</i>	<i>B</i>	<i>Beta</i>	<i>t</i>
(Constant)	.348		13.720 ***	.355		12.154 ***	.381		11.448 ***
Training and instruction behavior	.135	-.083	-.628	.138	-.083	-.629	.148	-.033	-.251
Democratic behavior	.124	.114	.861	.126	.191	1.448	.136	.045	.341
Despotic behavior	.038	-.014	-.206	.039	.060	.861	.042	-.032	-.456
Social support behavior	.079	.109	1.085	.081	.075	.750	.087	.132	1.312
Positive reward behavior	.110	-.187	-1.686	.112	-.187	-1.685	.121	-.160	-1.438
	R <sup>2</sup> =.019, F=.791			R <sup>2</sup> =.024, F=.998			R <sup>2</sup> =.015, F=.607		

Note: \*= $p < .05$ , \*\*= $p < .01$ , \*\*\*= $p < .001$ .

### 3.4. Influence of leader's image on the leader's trust

Multiple regression analysis was performed on the effect of leader's image on the leader's trust, and the results are as illustrated in <Table 7>. As for the results of multiple regression analysis performed on the effect of leader's image on the leader's trust, it turned out that leader's image had no statistically significant effect on the leader's trust.

**Table 7.** The effect of the leader image on the leader's trust.

	Cognitive trust			Behavioral trust			Emotional trust		
	<i>B</i>	<i>Beta</i>	<i>t</i>	<i>B</i>	<i>Beta</i>	<i>t</i>	<i>B</i>	<i>Beta</i>	<i>t</i>
(Constant)	.281		15.308 ***	.287		15.422 ***	.307		13844 ***
Leader's image	.066	.0023	.334	.068	-.049	-.705	.073	-.041	-.592
	R <sup>2</sup> =.001, F=.112			R <sup>2</sup> =.002 F=.497			R <sup>2</sup> =.002 F=.350		

Note: \*= $p < .05$ , \*\*= $p < .01$ , \*\*\*= $p < .001$ .

## 4. Discussion

The purpose of this study is to explore the appropriate qualities of the Taekwondo Demonstration Team leader, identify the effect of the leader's leadership style on the leader's image and trust, and provide the basic data for the research that promotes the development of the Taekwondo Demonstration Team. In this study, the correlation analysis between variables and the multiple regression analysis were performed to achieve the purpose, and the discussion to be carried out is as follows.

### 4.1. Effect of taekwondo demonstration team leader's leadership style on the leader's Image

As a result of the multiple regression analysis performed to examine and understand how the leadership style of the Taekwondo Demonstration Team leader influences the leader's image, most of the sub-factors had a significant effect.

Training and directive behavior, democratic behavior, and despotic behavior and positive reward behavior had a significant effect on the leader's image, and social support behavior did not influence the leader's image. It shows a similar context to the research results of Bongjin Jeong[13]. Suggesting that the leaders who perform positive rewards such as praise are preferred.

### 4.2. Effect of taekwondo demonstration team leader's leadership style on the leader's trust

It turned out that the leadership type of the Taekwondo Demonstration Team leader did not influence the trust of the leader. Yongsoo Yim, Yeonpoong Oh, Seongeun Jin, and Jongpil Kim claimed that leadership such as charisma, consideration, and intellectual stimulation of a leader demonstrated a positive effect on trust, and Seunghyeon Yim, Gyeongwan Nam, and Ildoo Jung that individual care and interest in the members may lead to winning a high level of trust. Accordingly, Hyeonsoon Yoo and Myunggook Park(2021) claimed that the transformational leadership demonstrates a positive effect, yet claimed that the transactional leadership causes no significant effect[14][15]. This may be different for each event, and given the nature of the Taekwondo demonstration, the technical failure of the members may lead to injuries[16]. Suggested that Taekwondo leaders provide athletes with a strategic vision, try to change the current state, and take personal risks and losses, but claimed that not adhering to the support of the athletes may form trust with the athletes. However, it can be determined that it may not be possible to pursue changes given the nature of the demonstration.

### 4.3. Influence of taekwondo demonstration team leader's image on the leader's trust

The image of leader turned out to have no influence on the trust of the leader. Gwanyong Choi claimed that the leader's image is a set of beliefs and impressions of a specific target and operates as a factor in shaping the attitudes of others, and claimed that the image could operate as a variable that could influence the performance[17]. Hence, it is determined that trust may vary depending on the actions of the leaders according to the success or failure of the demonstration team's techniques.

## 5. Conclusion & Recommendations

The purpose of this study is to explore the appropriate qualities of the Taekwondo Demonstration Team leader, identify the influence of the leader's leadership style on the leader's image and trust, and provide the basic data for the research that promotes the development of the Taekwondo Demonstration Team. The following conclusions were reached.

First, multiple regression analysis was conducted on the effect of the leadership style of the Taekwondo Demonstration Team leader on the leader's image. As a result, it turned out that training and instruction had a positive(+) effect on the leader's image, and as a result of the multiple regression analysis performed on the image of democratic behaviors of leaders, it turned out that democratic actions had a positive effect on the leader's image. Furthermore, as a result of the multiple regression analysis performed for the effect of dictatorial behavior on the leader's image, it turned out that positive effect was made, and as a result of the multiple regression analysis performed on the effect of positive reward behavior on leader image, it turned out to have a positive effect, and as a result of the multiple regression analysis performed on the effect of social support behavior on leader image, it turned out to have no effect.

Second, it turned out that the leadership style of the Taekwondo Demonstration Team leader did not influence the leader's trust.

Third, it turned out that the image of the Taekwondo Demonstration Team leader did not influence the leader's trust.

Gathering such results, it is apparent that athletes prefer the leaders who show rewards and positive aspects, and prefer democratic and caring leaders. Furthermore, it is apparent that the trust in the leader varies according to the level of devotion of the leader.

Hence, based on the conclusions presented in this study, it is sought to make recommendations for the follow-up studies.

First, since the subject of this study was limited to the Taekwondo Demonstration Team enrolled in the university, it cannot be concluded that the research results are the entire Taekwondo Demonstration Team's. In Korea, it is known that the Taekwondo Demonstration Teams of various age groups are operated, and in future research, it will be possible to provide more accurate and wider data by expanding the scope of the research subjects.

Second, since this study was intended for the newly recruited coaches, it is considered that the sympathy with the demonstration team members may have been insufficient. Hence, in the future research, it is determined that more accurate research data can be provided if it is conducted for the leaders with more than 5 years of experience as the demonstration team leader.

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## 7. Appendix

### 7.1. Author's contribution

	Initial name	Contribution
Author	HS	-Set of concepts <input checked="" type="checkbox"/> -Design <input checked="" type="checkbox"/> -Getting results <input checked="" type="checkbox"/> -Analysis <input checked="" type="checkbox"/> -Make a significant contribution to collection <input checked="" type="checkbox"/> -Final approval of the paper <input checked="" type="checkbox"/> -Corresponding <input checked="" type="checkbox"/> -Play a decisive role in modification <input checked="" type="checkbox"/> -Significant contributions to concepts, designs, practices, analysis and interpretation of data <input checked="" type="checkbox"/> -Participants in Drafting and Revising Papers <input checked="" type="checkbox"/> -Someone who can explain all aspects of the paper <input checked="" type="checkbox"/>



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Corresponding author\*  
E-mail: tbfpr69@hanmail.net

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## A Study on the Cultural Interpretation of Taekwondo Origin and Okinawa Origin

Wonhee Lee<sup>1</sup>

Yongin University, Yongin, Republic of Korea

Ilhoon Song<sup>2\*</sup>

Yongin University, Yongin, Republic of Korea

### Abstract

**Purpose:** The purpose of this study is to examine and analyze the cultural base of the Three Taegeuk in depth in Subak, karate(dangsu), Goryeo, Joseon, and Ryukyuguk, and to present the identity of the historical and cultural aspects of Taekwondo.

**Method:** The method of this study was to examine and analyze the cultural base of Taekwondo of Subak and karate in depth, to present the identity of Taekwondo in the historical and cultural aspects, and to present the traditionality and legitimacy of Taekwondo in the national flag.

**Results:** The re-establishment of Taekwondo is essential due to the theory of origin of Okinawa, but most Taekwondo people lack the recognition of historicity. Okinawa had close interaction with us in the Joseon Dynasty. This means that there are some reliably authentic documents and relics that are related to Subaks and party Subaks, that is, there should be an in-depth analysis on the historical recognition of the origin theory of Taekwondo in Okinawa. This can be a medium to open historical horizons to Taekwondo people.

**Conclusion:** The re-establishment of Taekwondo is essential due to the origin of Taekwondo in Okinawa, but most Taekwondo people are very lacking in historical awareness. Okinawa had close exchanges with us during the Joseon Dynasty, and when we saw it, there were credible ancient documents and artifacts that were related to Subaks and party trees. If Taekwondo academics do not present this, and go to this state, it may bring about a crisis of identity for the national Taekwondo physical education culture. Therefore, there should be a clear argument and a clear argument about Taekwondo history of Taekwondo history. Furthermore, we can present the right historical values and instill the right Taekwondo history education to our descendants.

**Keywords:** Taekwondo, Okinawa, Circular, Body Culture, Karate

## 1. Introduction

Today, Taekwondo does not present the essence of its original form and the identity of its historical origin, but Taekwondo is loved by the world as a physical culture. This contains infinite cultural heritage. In other words, Taekwondo archetypes have Taegeuk. This Taegeuk is fully contained in the class. The movement of the theft line, the form of breathing and movement form the Taegeuk, and we can get a glimpse of the soul and weather of our nation.

In the meantime, the historical view of Taekwondo has been emerging as a traditionalist and revisionist history, and many years have passed since it was not established due to the controversy. However, Taekwondo history can obtain the essence and cultural value of the original form.

In particular, the theory of the origin of Ryukyuguk is the fundamental theory of Taekwondo

history, because it has its essence in the traditionality of Korean Taekwondo and Japanese karate(aircraft capital). Japan is going to Taekwondo and rivalry as it adopted the airlift as a formal event through the 2020 Olympics. Japan also claims its legitimacy from the historicity of karate(aircraft capital) to the traditionalist cadre.

As a result, the national flag Taekwondo is getting caught up in the identity of its essence. To solve this problem, it is necessary to provide the archetype and cultural value of Taekwondo. Also, the cultural value of legitimacy according to the traditionalist view of Taekwondo and the connection between Ryukyuguk's party leader and Subak should be revealed to form a historical foundation for Koreanization and globalization. This is also the task that Taekwondo is facing. Because Taekwondo has been deeply recognized in the Japanese karate theory, it is necessary to explore its essence because it has made errors without finding any specific clues in the traditionalist history.

In addition, it is not able to review and analyze the relationship between the principle and formation of Samtaegeuk, the root of the circular body culture of Taekwondo, with the party leader of Ryukyuguk(Okinawa). In other words, it is necessary to find out what historical traces there are with Ryukyuguk's party leader, Goryeo, Chosun's Subak, and Samtaegeuk. Through this, it is possible to understand the original and essential quality of the national flag Taekwondo, and to present the origin of the bare martial arts according to Ryukyuguk's party leader, Goryeo and Joseon Subak.

However, in the history of Taekwondo academia, it is going to the debate by dividing the traditionalist and the revisionist officers. On the other hand, it is time to reconsider and review the historical and cultural aspects such as Subak, party leader(Garate) and the law of the right, and what purpose exchanges and periods of events were in the era according to the cultural interpretation of Goryeo and Joseon.

The history of the country has a close relationship with culture and it is also developed and contributed through mutual exchange with neighboring countries. It is a different country now, but since it has developed with the same culture in the past history, it is necessary to study from a macroscopic perspective and a microscopic perspective to look at history and culture, so that the traces of the era in history can be identified and the identity can be presented.

In the meantime, it is important to analyze the results of the second and third researchers with the traditionalist and revisionist officers announced in Taekwondo academia, but the results based on cultural interpretation and historical base should be continued with the primary feed aspect. However, previous studies have been conducted Kim Bong-gyung(2021)[1], Effects of Taekwondo Globalness on National Image and Loyalty : Moderating Effects of Taekwondo Typicality, Kim Hak-Duk(2017)[2], Sports Modernization Influential Reach on Traditional Taekwondo, Cha Myeonghwan(2020)[3], Taekwondo History from the Perspective of " Tradition", Choi Bok-Kyu(2018)[4], Issues in Description of Taekwondo History in Traditionalism, Cha Myeonghwan(2021)[5], The inherent meaning of "origin" in Taekwondo history, Kim Youngsun(2019)[6], A Study on the Establishment of Songmoo-gwan as the foundation of Modern Taekwondo, Kim Youngsun, Yeo InSung(2019)[7], A Study on the Establishment of Chungdo-kwan as the Foundation of Modern Taekwondo, Kim Youngsun, Yeo InSung(2020)[8], A Study on the Opening Date and Activities of the 'YMCA Kwonbup-bu' as the Foundation of Modern Taekwondo, Kim Young-Man, Kim Yong-Bom(2011)[9] Rediscussion for a View about Chinese Origin of Dangsu etc.

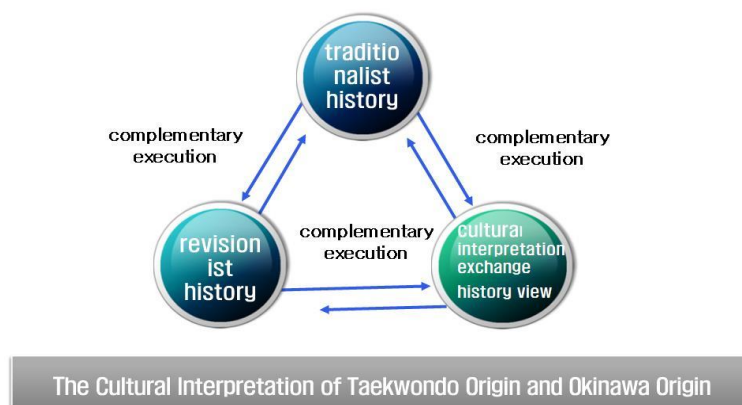
However, most of the previous studies were conducted with traditionalist and revisionist cadets based on the historical basis of Taekwondo. However, there is a need for research on cultural interpretation, exchange and connection such as Goryeo, Joseon, and Ryukyuguk based on historical primary feeds of Subak, Taekwondo and karate(dangsu). In other words, there should

be an identity presentation on the influence of the cultural foundation of the Three Taegeuk on Subak, karate(dangsu) and Goryeo, Joseon, and Ryukyuguk.

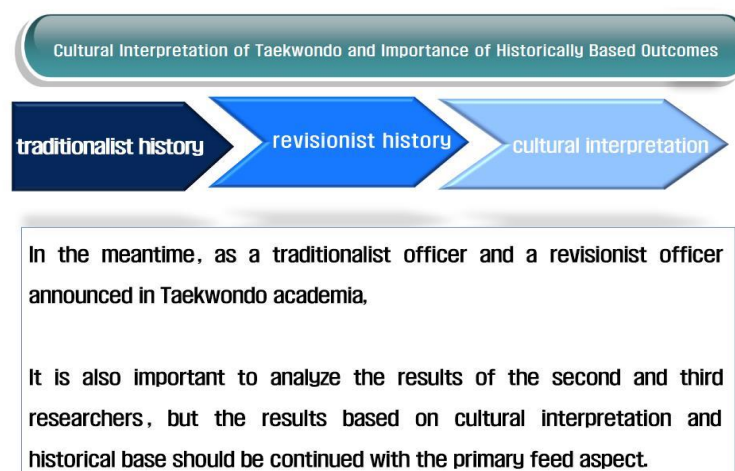
Therefore, the purpose of this study is to examine and analyze the cultural base of the Three Taegeuk in depth, including Subak and karate(dangsu), and Goryeo, Joseon and Ryukyuguk, and to present the identity of the historical and cultural aspects of Taekwondo. books, historical papers, and internet sites related to the cultural interpretation of Taekwondo's archetypal sam-taegeuk and Ryukyu(Okinawa) and the specific contents of the survey are as follows.

First, books and papers related to Taekwondo were investigated and analyzed to explore the cultural value of physical studies and essence of Taekwondo. Second, books and papers related to the cultural value of the essence of traditional Taekwondo were investigated and analyzed. Third, the archetypal value of Ryukyu(Hyun, Okinawa) and Subak and Taekwondo were investigated and analyzed. Fourth, the study investigated, analyzed, and discussed the original form and essence of Taekwondo, Subak, and Subak of the national and Ryukyu Samtaegeuk.

**Figure 1.** The cultural interpretation of taekwondo origin and okinawa origin.



**Figure 2.** Cultural interpretation of taekwondo and importance of historically based outcomes.



Based on the concrete approach, the cultural foundation of Subak and karate(dangsu) was examined and analyzed in depth to present the identity of Taekwondo in the historical and cultural aspects, and through this, the traditionality and legitimacy of Taekwondo in the national flag were presented.

## 2. The Cultural Value of Physical Studies and Essence of Taekwondo

Taekwondo has cultural value as a study to explore the fundamental and essential nature of body thought. Taekwondo contains the traditionality of the nation. In other words, the perception of historical aspects has both structural formation and speculation about human life.

The same is true of the Korean national flag Taekwondo, and it should be recognized that integrating various forms is very important for forming the knowledge system of national philosophical thought. In other words, it reflects the inherent physical culture and thought, so it teaches the essence of physical science inherent in the real inside.

Especially, the traditionally recognized ideological discipline of Taekwondo is The Ideology and Norms of Taekwondo Spirit in Rediscovery of Taekwondo Value by Lee Kyung-myung(2010)[10][11][12].

The spirit of Taekwondo has an important value of making the right person. It is not a function of Taekwondo but an egoistic humanistics of Taekwondo. As a Taekwondo person who realizes the Tao of Taekwon, it is in a traditional study that emphasizes human education that is 'human' or 'human'. This is the moral cultivation that can be called the medium of traditional studies, so the national flag Taekwondo should also be sought.

I realize the original spirit of the national flag Taekwondo ideological discipline. In order to realize more complex moral and mental goals that are the center of national flag Taekwondo, one needs his own commitment and constant ideological physical studies. The history of Taekwondo has been changed in many evolutionary processes so far, and the present age is directly related to the change of various human desires among many factors of change. If we want to preserve the unique vitality of national flag Taekwondo, we need to understand not only the current interests but also the essential value and meaning of taekwondo ideological studies. This is one of the most common ideological systems and practice norms of taekwondo ideological spirit. Taekwondo is the process of the relationship between human body and gesture. The theory of reception (the theory) is that the purpose of training is based on human instinctive personality.

In order to become a traditionally recognized self-reflection anthropology, there must be an identity presentation of the actuality of Taekwondo and the identity of body thought. The universal characteristics of Taekwondo spirit are not related to our traditional ideas. Taekwondo has evolved in the gestures of Korean people. The spirit and ideology of Taekwondo should be applied to the universal spirit beyond the boundaries of the gestures of the Korean people.

This is a way of education to develop the character of unique consciousness that improves morality and morality through the cultural value of Taekwondo physical science and essence. The virtue of human formation as a cultural element of physical science and essence of Taekwondo is a medium that can instill a sense of community that helps people live with many people[13].

Therefore, the issue of formation as a cultural element of physical studies and essence of Taekwondo is emerging. It should not be forgotten that the cultural value of the essence of physical studies pursued by Taekwondo meets very diverse purposes in itself.

### 3. Cultural Value of the Essence of Traditionalist Taekwondo

Traditionalist Taekwondo is the main subject of traditional theory of origin, that is, it is historical view by 'nationalist officer'. This is the description of Taekwondo history of nationalist history in the 1970s and is a traditional Korean martial art and Taekwondo history. Taekwondo has been handed down from the ancient Three Kingdoms period to today, emphasizing that it is a pure traditional martial art in Korea. Most Taekwondo textbooks are showing the traditionality of Taekwondo[14].

Especially, since 1960s, traditional Taekwondo history was established and distributed in the 1970s in connection with patriotism in the globalization process of Taekwondo. Since 1980s, it has been raised the issue of traditional Taekwondo history triggered by the emergence of Taekwondo department in the course of scholasticization of Taekwondo. As a result, it has been the development process of Korean Taekwondo since liberation and its historical significance. See the thesis for a master's degree at Seoul National University.

It created the moment that came to this appearance. However, Kukkiwon records and establishes Taekwondo history of traditionalism on the basis of it, but it is very insufficient for the cultural base of Samtaegeuk in Subak, karate(dangsu), Goryeo, Joseon, and Ryukyuguk[15].

In the case of Kukkiwon(2002)'s Taekwondogyobon, it is established as a Taekwondo company that existed in Korea since the Three Kingdoms period. The problem is that Kukkiwon uses the quadrant of Korean history for the division of Taekwondo history, not the cultural base of Samtaegeuk, in Subak, karate(dangsu) and Goryeo, Joseon, and Ryukyuguk. For example, it is developed by the ancient times(the Three Kingdoms period), the Middle Ages(the Goryeo period), the modern times(the Joseon Dynasty, the Korean Empire period, the Japanese colonial period), and the modern times(after the establishment of the government).

In the Three Kingdoms period of ancient Korean peninsula, the necessity of martial arts aimed at improving defense capability and combat function was raised, which is the 'senior' of Goguryeo, which is the Jouseon and Baekuseonin. In other words, the basis of martial arts is Taekkyon, and the traces of the dance gun, which is a mural of Goguryeo, can be seen in the contest.

In addition, Hwarangdo in Silla is a group that imitates the "senior" of Goguryeo. They worked hard on their studies and played various games such as Subak, sword, horse, duck dog, sesame and wrestling. As a relic that can be seen, the attack and defense posture in the history of Seokguram is much similar to the form of Taekwondo. The right fist(regime) is above and below is the same movement as today's one fist: in the history of Dongjo Geumgang, it is very similar to the traces of using the foot and Taekwondo's class movements[16].

Second, Taekkyon of the Three Kingdoms period was inherited to the Goryeo period. In the Three Kingdoms period, because of the need for defense capabilities and combat functions, a group alliance that can be applied in practice has developed, like Oh Byung-soo Park. The fact that there were rules to cover the competition of Taekkyon has started the foundation of Taekwondo's game and sports shoes since the Goryeo Dynasty.

Subak is an essential martial arts of unarmed people, and it has a sports personality so that the king can watch it. As the proportion of martial arts decreased due to the emergence of gunpowder at the end of Goryeo, Sue Park Hee established the foundation as a folk game.

Third, in Joseon, where martial arts such as Sue-bak-hee were declining, Jeongjo compiled to train the irrelevant. The fourth volume of the martial arts general notice(law) reveals the same movement as the poomsae of Taekwondo. It is said that there was a Taekkyon by national support such as the martial arts general notice. This is also confirmed in the appearance of Ssireum and Taekkyon in 'Dae Pyeong-do'.



Fourth, however, Taekkyon evolved into a form of folk games and play according to the changes of the times; in the end, Taekkyon was banned by Japanese oppression, but it was secretly handed down by the masters. Taekkyon has the most foot technology among 14 technologies except for the arms and the chamber[17].

Fifth, with the liberation, the national culture and tradition were formed as an independent consciousness, and the folk games were revived. In the past, people who practiced Taekkyon appeared, and on President Rhee's birthday, Taekwondo(Taekkyon) demonstrated the difference between Taekkyon and Karate in Korea. In other words, Taekwondo was opened and distributed to the general public. In 1954, the name was unified into Taekwondo, and in 1961, the Korean Taekwondo Association was changed to the Korean Taekwondo Association. In 1965, it was renamed the Taekwondo Association. The development of Taekwondo through competition is approved as a sports organization of the Korea Sports Council on June 20, 1962. On September 3, 1964, it became a formal sports event at the 45th National Athletic Meet. In 1972, Kukkiwon, the center of Taekwondo, was opened. On May 28, 1973, the World Taekwondo Federation was established and the first World Championships were held.,With this in mind, Taekwondo has been spread to all walks of life around the world[18][19][20].

As such, the current member countries of the World Taekwondo Federation are 192 countries, which are the most widely distributed martial arts and sports in the world, contributing to civilian diplomacy and national prestige[21][22][23].

#### **4. The Aspects of Ryukyu(Okinawa)'s Tangsu, Subak and Taekwondo**

Today, Ryukyu(Okinawa) is originally Korean territory and appears in the Sejong Annals, that is, in the early Joseon Dynasty, a character named Iye was dispatched dozens of times to Ryukyu(Okinawa). He was a great person, as the birth date and the year of death related to him can be heard in the ancient literature. This example is the year 1373(22 years of King Kongmin) of the Goryeo Dynasty, and 1445(27 years of King Sejong) of the death date. His main building is the school. In 1396(the 5th year of King Taejo), Jiulsan, who was taken by a Japanese enemy, was exempted from the station of the temple and received a court order. He was defeated by the left army as a ball that brought 50 prisoners to Ikido for the first time in 1401(the first year of King Taejong)[24][25][26].

Then, until 1410, he became a carrier every year, and came to Samdo, visited 500 prisoners, and promoted several times to become a soldier. In 1416, he visited 44 prisoners while visiting Ryukyu as an envoy. In 1419 (Sejong 1 year), he became a lieutenant soldier and conquered Tsushima Island, the home of the Japanese army. In 1438, he was promoted to the Chumji Central Chubu Temple and became a Tsushima Provincial Deputy. In 1443, he was promoted to the Dongji Central Governor by the ball that he had been a guardian of the hemp to come to the prisoners who were taken by the enemy. In the early Joseon Dynasty, there were about 40 trips to Japan under missions. Shiho is a full-time student[27][28].

**Figure 3.** Ryukyu manguk jinryangjong(based on okinawa prefectural museum.



Ryukyu Manguk Jinryangjong (based on Okinawa Prefectural Museum

The article related to the "Chosun Dynasty Annals" seems to be as follows., "Taejong Annals" 19 volumes, May 13, 10, Taejong 10 The third article of the year 1410, the 8th year of the year: I sent the former Hogun Lee to the Jongjungmu of Tsushima. : I sent a bow to the front and went to Tsushima. The government sent a letter to Jong Jung-moo, "How dare you not know that you are grateful for the sale, the protection of the guardian, and the always forbidden bandits!, I send a total of 150 seats and 150 seats of soybeans to the ship, and I express my God. " At this time, Jong Jung-moo told Pyeongdojeon, "The sincerity for us in Joseon is not as good as it was now. I used to send 5,600 rice, but now I do not send it. You also ask for a vacation. "The king heard the king and went down to the Uijeongbu to discuss, and finally sent a message [29][30].

"Taejong Annals" 31 volumes, January 27, 16th, 1416 Myeong Yeongrak 14 years: In order to reclaim the person who was caught and sold to Ryukyu country, I sent the former Hogun Yiye to Ryukyu. As a person of his home country, he was told that there were many people who were taken prisoner and sold to the Yugu country, and ordered him to send a letter to request the repatriation. Hwang Hee-hee, a good writer, said, "The waterway is rough and far away, and now it is cumbersome and expensive to send people, so it is better not to dispatch them." The king said, "If you miss your homeland, you are not alone in your home, for example, if you are tired of this kind of tired person in your home, how will you be cumbersome and expensive?, However, Lee brought about 70 men and women who were captured in Japan: the Japanese saloon returned after overtaking 70 men and women who were tired of the ritual.

**Figure 4.** The ryukyu movie book, which was released in 1930.



In this way, Yugu and Joseon were the same people, territory, and numerous exchanges, especially Lee Ye, who played a role in bridge. As there are records of the martial arts Subak in the royal ceremony, the airways(roads) or karate are bare martial arts of the party leader who strikes the opponent using hands and feet originating from Ryukyuguk(now Okinawa, Japan), and the original stream can be analogized as martial arts formed in Korean Subaks[31][32].

The same kind of prestigious name means the identity of the nation, and their identity seems to have been close to the Korean people. "Ryukyu Islands are in the west in Japan and in the east in China. They're on the south side of the peninsula, but they're not. The fact that the South Sea is defined as the country means that the identity is Korea. "He has revealed that the flag of the Ryukyu Kingdom is Taegeuk.

According to Dr. Kim Young-man's ancient history of Taekkyeonsa, the posture and arrangement in "Kwon Kyung" and "Jang Kwon 32" of "Ki Hyo Shinseo" records the Subak of Sambyeolcho. The names of the "41, 42, 43, 44, 47, 48" in Yugumbiji are all the same, and this is important evidence that one has influenced the other.

The Yugumubiji is divided into 1~48 times and explained with the movement. The technique is 96 times in pairs. It is much more than the age of 32 in China, and consists of a form of competition between the two. Most techniques are attack by hand or foot after the opponent takes the attack hand and overpowers it. It is said that it is like the form of self-defense today.

**Figure 5.** Ryukyu flag(1854-1879) & dosan seowon samtaegeuk pattern.



Compared to the paintings of this Chinese movie magazine or Kihyosinseo, the way of painting is completely different. The appearance of the intentional dances rolled out so that they did not flow down is the same as the Korean costume.

The Chinese-style painting is first wearing a hood on its head and so-called steamed bun hair. In the 4th General Pomyosusu and Haeappo Training Path, Pomyosu means to catch the rabbit's ear. It compared 'Sangtoo' as the rabbit's ear. The only way to catch the other person's battle in a fight is in Korea, and as you can see in the picture, there is no room to catch the so-called chubby head wearing a Chinese hood.

Of course, some of the front part of Yugumubiji was inserted into later generations, which made it difficult to recognize it for the first time because of the different style. The Taekwondo movement passed down in the Onikinawa party is the principle of the Three Taegeuk. The Taekwondo movement is based on the three acts of each heaven and earth, and the figure principle of Taekwondo movement is based on the act according to the square. In this way, various Taekwondo movements such as turning, standing, and shouting are based on Samtaegeuk. It is a combination of the ideas of the square. The

sky, the earth, and the people are gathered to form the universe as a whole. As such, Taekwondo is also developing into a martial arts that aims at the universe by gathering movements based on Sam-taegeuk.

## 5. Conclusion

The re-establishment of Taekwondo is essential due to the origin of Taekwondo in Okinawa, but most Taekwondo people are very lacking in historical awareness. Okinawa had close exchanges with us during the Joseon Dynasty, and when we saw it, there were credible ancient documents and artifacts that were related to Subaks and party trees.

In other words, there should be an in-depth analysis on the perception of the historicity of Okinawa's theory of origin of Taekwondo, which can be a medium to open up historical horizons for Taekwondo people.

First, the main concern about the essential discussion of the national flag Taekwondo history is the issue of the establishment argument about what the inquiry task is about the traditional Taekwondo history. This is a problem about the identity of the historical view of physical studies in the national flag Taekwondo.

Second, the history of national flag Taekwondo is treated as a sub-domain of general. In other words, Taekwondo is facing the crisis of identity because it is trying to restore the historical nature of indiscriminate martial arts and to study the history of body thought.

To escape this, it is urgent to systematically study the establishment along with accurate arguments about the history of traditional Taekwondo to lay the foundations for the academicization of national Taekwondo.

Third, it will be possible to present a new direction of identity regarding traditional Taekwondo history in physical studies of Taekwondo.

If Taekwondo academics do not present this, and go to this state, it may bring about a crisis of identity for the national Taekwondo physical education culture.

Therefore, there should be a clear argument and a clear argument about Taekwondo history of Taekwondo history. Furthermore, we can present the right historical values and instill the right Taekwondo history education to our descendants.

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## 7. Appendix

### 7.1. Authors contribution

	Initial name	Contribution
Lead Author	WL	-Set of concepts <input checked="" type="checkbox"/> -Design <input checked="" type="checkbox"/> -Getting results <input checked="" type="checkbox"/> -Analysis <input checked="" type="checkbox"/> -Make a significant contribution to collection <input checked="" type="checkbox"/> -Final approval of the paper <input checked="" type="checkbox"/> -Corresponding <input checked="" type="checkbox"/> -Play a decisive role in modification <input checked="" type="checkbox"/>
Corresponding Author*	IS	-Significant contributions to concepts, designs, practices, analysis and interpretation of data <input checked="" type="checkbox"/> -Participants in Drafting and Revising Papers <input checked="" type="checkbox"/> -Someone who can explain all aspects of the paper <input checked="" type="checkbox"/>

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E-mail: taeheung2758@naver.com

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## The Relationship Among Social Support, Career Adaptability, Psychological Capital and Career Preparation Behavior of Judo Kata Major

Wonhee Lee<sup>1</sup>

Yongin University, Yongin, Republic of Korea

Wookyung Sun<sup>2\*</sup>

Yongin University, Yongin, Republic of Korea

### Abstract

**Purpose:** The purpose of this study is to investigate the relationship between social support, career adaptability, psychological capital, and career preparation behavior of the majored in Judo kata in 2021. To achieve the purpose of this study, the following detailed goals were set.

**Method:** This study collected data from students who completed Judo kata class among students majoring in Judo kata in 2021 to investigate the relationship between Judo kata major's social support, career adaptability, psychological capital and career preparation behavior. The data were collected by the researcher in the class of judo kata major after the guidance professor of the university Judo kata explained the purpose and purpose of the study in advance and received permission to collect the data. The data used in the actual analysis was 480 copies in a row, or the contents of the questionnaire were partially omitted. 78 questionnaires were excluded.

**Results:** Therefore, universities need to introduce and implement various career preparation programs to increase students' psychological capital and actively implement information collection for their careers to achieve their goals. If they can invest time in consultation rather than interest or support for students, or provide financial support, they will be able to prepare for proper career.

**Conclusion:** In relation to social support and career, environmental factors and educational considerations should be followed up on other departments, and social support, career adaptability, psychological capital, and career preparation behavior according to martial arts or physical education departments should be conducted more reliable research.

**Keywords:** Judo Kata, Social Support, Career Adaptation, Psychological Capital, Career Preparation Behavior

## 1. Introduction

The problem of the university in the present age is a great deal of importance to the employment and career of college students, and this problem is emerging as a social problem and its influence is an indicator in the university evaluation. As such, career problems due to job preparation are overloaded in social conflict factors, that is, career is a very important choice in self-life and a task to live in the future.

The problem related to career decision is a very important process of choice that is not an exaggeration to say that it is the most important problem in an individual's life. Career is more than simply collecting information about the job and selecting the right job accordingly[1].

Then, it is necessary to closely examine how to choose career decision making according to self-aptitude, what is self-reflection ability, and to make an index of intellectual evaluation ability along with in-depth counseling with experts, that is, career goal, career value, career search, etc.

However, Korean university students experience career education such as career goals, career values, and career search that they should experience in middle and high schools due to entrance examina-

tion-oriented cramming education, and feel unstable emotions due to rapid changes in the surrounding environment, resulting in loss of desires, ability, and active behavior decline in career[2].

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As a result, college students are inexperienced in their practical behavior of planning and preparing their careers, and can cause various maladjustment problems in their own areas of life. Therefore, when accurate exploration of their career world is made, they can reduce trial and error in career decision making, which is the general view that college students' career preparation behavior is necessary. And career preparation behavior was influenced not only by individual internal factors but also by external factors[3].

This study aims to investigate the relationship between external factors and career preparation behavior by setting internal factors as social support and career adaptability and psychological capital[4]. Social support is an emotion that makes people feel interested and respected and worthy, and can be seen as all forms of positive resources that can be exchanged with each other in personal relationships. Positive resources include emotional interest, meaningful aid, information and evaluation of environment or situation[5].

Also, when one's own opinions can be shared with others, social support is very high when they are persuasive or form a consensus. In other words, interaction behavior, speech, and attitude of life that can gain reliability to others are a factor of social concept that makes relationship.

Each scholar has various definitions of social support, Betz(1989) defines it as helping individuals to actively take career behaviors in relation to career, and Cohen and Hoberman(1983) define social support as various resources provided by others as a broad concept. Bandura(1997) defined social support as all positive resources that an individual gets from others through interaction with others, and Ko Tae-yong(2008) defined it as being obtained by interacting with others to meet social needs, so social support can be defined as all forms of positive resources that can be obtained through social relationships.

However, as seen in the previous studies, most of the studies conducted on job-seekers or college students are mostly conducted, and there is a lack of previous studies that proved the individual relationship between social support, career adaptability, psychological capital, and career preparation behavior for college students majoring in sports. In other words, academic in-depth research is raised and the necessity is required.

Especially, the study on career preparation behavior of sports major college students means concrete behavior about how much effort is made to achieve reasonable individual career decision and goal. It is very meaningful to understand this. In other words, it is very important to check career preparation behavior because the level of actual behavior is not necessarily high because the cognitive and attitude aspects are mature in the research related to the career of college students.

In order to promote career preparation behavior, it is necessary to increase social support externally and to increase career adaptability and psychological capital internally.

Therefore, this study determined that it would be helpful to the field academically and practically to understand how social support affects career adaptability, psychological capital, and career preparation behavior for the right career decision of the major major in college, and how it affects career adaptability and psychological capital in career preparation behavior. This study was conducted by considering that it would provide an opportunity to do so[6][7].

The purpose of this study is to investigate the relationship between social support, career adaptability, psychological capital, and career preparation behavior of the majored in Judo kata in 2021. To achieve the purpose of this study, the following detailed goals were set.

## 2. Research Method

### 2.1. Research subjects

This study collected data from students who completed Judo kata class among students majoring in Judo kata in 2021 to investigate the relationship between Judo kata major's social support, career adaptability, psychological capital and career preparation behavior. The data were collected by the researcher in the class of judo kata major after the guidance professor of the university Judo kata explained the purpose and purpose of the study in advance and received permission to collect the data. The data used in the actual analysis was 480 copies in a row, or the contents of the questionnaire were partially omitted. 78 questionnaires were excluded.

The personal characteristics of the subjects are as follows: By gender, 242 male and 160 female groups(60.2%) were found. By age, 134(33.3%) were found in the group under 20 years old, 104(25.9%) were found in the group 21 years old, 98(24.4%) were found in the group 22 to 23 years old, and 66(16.4%) were found in the group 24 years old or older. By grade, 156 students(38.8%) in the first grade group, 116 students(28.9%) in the second grade group, 76 students(18.9%) in the third grade group, 54 students(13.4%) in the fourth grade group. By exercise period, 89 students(22.1%) in the third year group, 117 students(29.1%) in the fourth year~5 year group, 112 students(27.9%) in the sixth~7 year group, and 112 students(27.9%) in the sixth year group and over 8 years group. This was 84(20.9%). According to the level of father education, 78 people(18.4%) were under high school graduates, 61 people(15.2%) were college graduates, 223 people(55.5%) were college graduates, and 40 people(10.0%) were over graduate graduates. By mother education level, 97 people(24.1%) were under high school graduates, 52(12.9%) were college graduates, 211 people(52.5%) were college graduates, and 42.5% were graduate graduates and more. It was named(10.4%).

### 2.2. Research tools

As of 2021, the questionnaire was constructed as follows to investigate the relationship between social support, career adaptability, psychological capital, and career preparation behavior of the majors who have completed the class. The composition of questionnaires: The questionnaires to be used for hypothesis testing in this study were composed as follows. It consisted of 64 questions including 13 social support questions, 21 career adaptability questions, 12 psychological capital questions, 12 career preparation behaviors and 6 personal characteristics.

## 3. Research Result

### 3.1. Confirmatory factor analysis

(CFA) used the method to derive the optimal state by measurement items to determine the suitability of each research unit before verifying the research hypothesis and verified the validity. In the case of measurement model, the GFI(.90), NFI(.90), IFI(.90), CFI(.90), RMR(.05~.08), RMSEA(.08) values suggested by Kim Gye-su(2008), Hair, Anderson, Tatham and Black(2006) were set as the appropriateness criteria. 29. The results of this study were as follows: IFI was .945, CFI was .945, RMR=.025, RMSEA=.087, and it was judged that the evaluation criteria were satisfied as a whole.

**Table 1 .** Measurement variable confirmatory factor analysis result(1).

Variable	Clause		Path coefficient (estimate)	Standardi- zation path coefficient	Standard error (S.E.)	t value (C.R.)	Conception reliability	AVE
Social support	Emotional support	1	1.000	.871	.213	-	.919	.748
		2	1.017	.931	.107	21.551		

Career path adaptability	Informative support	3	.791	.739	.349	17.404	.884	.657
		8	1.000	.795	.250	-		
		9	1.026	.784	.284	15.200		
		10	.961	.744	.322	14.491		
		11	.916	.714	.349	13.896		
	Material support	13	1.000	.775	.311	-	.847	.650
		14	1.054	.818	.258	13.134		
		15	.906	.707	.385	12.678		
	Evaluative support	16	1.000	.769	.284	-	.871	.692
		17	1.123	.845	.209	14.195		
		18	.989	.740	.331	13.750		
	Interest	1	1.000	.708	.403	-	.907	.620
		2	.926	.726	.312	13.339		
		3	1.033	.765	.306	14.008		
		4	1.061	.788	.277	14.390		
		5	1.008	.738	.343	13.556		
	Control	6	1.002	.719	.380	13.221	.892	.580
		7	1.000	.674	.417	-		
		8	1.060	.712	.379	12.366		
		9	1.081	.749	.317	12.894		
		10	1.083	.713	.393	12.382		
	Curiosity	11	1.247	.792	.321	13.467	.859	.605
		12	1.031	.679	.430	11.880		
		13	1.000	.714	.334	-		
		14	1.203	.775	.333	13.089		
	Confidence	15	1.175	.761	.348	12.944	.870	.573
		16	1.006	.686	.394	11.942		
		19	1.000	.642	.404	-		
		20	1.247	.774	.296	12.138		
		21	1.310	.775	.323	12.155		
		22	1.183	.699	.414	11.324		
		23	1.063	.651	.435	10.723		

Factor loading of items on measurement variables was significant as shown in <Table 1> ( $t > 6.00$ ). In the case of the concept reliability (CR) value, the sum of the consensus square of the standardization loading value and the measurement error variance of the standardization loading value by item were added to the consensus square of each standardization loading value, and the value was calculated from .847 to .919. The value of the variance extraction index (AVE) was calculated from .573 to .748 by using the method of Fornell and Larcker (1981), which are divided into the sum of the square of the standardization loading value and the sum of the measurement error variance by item. This study was conducted by considering that the internal consistency was secured in this state because the concept reliability was more than 0.7 and the variance extraction index (AVE) was more than 0.5 as the standard.

### 3.2. Correlation analysis

<Table 2> was conducted to verify whether the discriminant validity was secured between social support, career adaptability, psychological capital, and career preparation behavior, which were measured variables presented through the purification process of the scale. The discriminant validity test shows that if the variance extraction index(AVE) obtained between the two factors is greater than the determinant coefficient( $r^2$ ), which is the square value of each factor, the discriminant validity is secured between the two factors. In this study, the correlation coefficient of all variables was less than 0.8, and when the square of the correlation coefficient( $r^2$ ) was calculated, it was found that all variables were smaller than the variance extraction index(AVE), indicating that there is discriminant validity among the variables.

And according to <Table 2>, the correlation of sub-factors of measurement variables was analyzed, and all of them showed positive correlation, so it can be said that they satisfy the standard validity for verifying the research hypothesis. And the correlation analysis result through Pearson's correlation coefficient showed that the value was .438~.713.

**Table 2.** Results of confirmatory factor analysis of measurement variables(2).

Variable	Clause		Path coefficient (estimate)	Standardization path coefficient	Standard error (S.E.)	t value (C.R.)	Conception reliability	AVE
Psychological capital	Magnetoefficacy	1	1.000	.778	.348	-	.849	.654
		2	1.086	.885	.175	13.809		
		3	.810	.665	.443	12.802		
	Hope	6	1.000	.736	.368	-	.866	.617
		7	1.049	.764	.341	13.632		
		8	1.036	.759	.344	13.561		
		9	.999	.745	.347	13.370		
		14	1.000	.725	.387	-		
		15	1.137	.800	.310	14.864		
	Resilience resiliency	16	1.051	.802	.263	14.883	.889	.616
		17	1.073	.766	.348	14.271		
		18	1.001	.687	.480	12.852		
Career path preparation behavior	Career search behavior	1	1.000	.860	.294	-	.881	.652
		2	.854	.862	.210	19.647		
		3	.708	.736	.356	16.332		
		4	.687	.678	.465	14.653		
	Information gathering behavior	6	1.000	.716	.357	-	.864	.614
		7	1.161	.799	.288	13.620		
		8	1.082	.752	.339	13.097		
		9	1.052	.708	.415	12.465		
		10	1.000	.770	.410	-		
	Work experience behavior	11	1.012	.834	.267	16.253	.872	.631
		12	.942	.790	.320	15.513		
		13	.918	.733	.433	14.371		

**Table 3.** Results of correlation analysis by sub-factor(1).

	Emotional	Informative	Material	Evaluative	Interest	Control	Curiosity
Emotional	1.000						
Informative	.645**	1.000					
Material	.580**	.655**	1.000				
Evaluative	.581**	.619**	.658**	1.000			
Interest	.488**	.526**	.501**	.488**	1.000		
Control	.530**	.580**	.578**	.525**	.705**	1.000	
Curiosity	.487**	.535**	.519**	.516**	.636**	.703**	1.000
Confidence	.460**	.525**	.626**	.559**	.596**	.653**	.639**
Self-efficacy	.553**	.454**	.549**	.471**	.612**	.559**	.569**
Hope	.458**	.470**	.491**	.473**	.588**	.641**	.610**
Recovery elasticity	.519**	.549**	.579**	.540**	.620**	.713**	.610**
Career search	.482**	.461**	.516**	.438**	.573**	.605**	.531**
Information collection	.521**	.512**	.501**	.450**	.603**	.632**	.608**
Work experience	.485**	.497**	.541**	.525**	.544**	.599**	.599**
M	3.72	3.71	3.75	3.76	3.69	3.72	3.72
SD	.81	.69	.75	.77	.68	.68	.71

Note: \*\*p&lt;.01.

**Table 4.** Results of correlation analysis by sub-factor(2).

	Confidence	Self-efficacy	Hope	Resilience	Career search	Information collection	Work experience
Confidence	1.000						
Self-efficacy	.527**	1.000					
Hope	.665**	.598**	1.000				
Resilience	.681**	.604**	.674**	1.000			
Career search	.538**	.558**	.531**	.617**	1.000		
Information collection	.617**	.565**	.624**	.674**	.634**	1.000	
Work experience	.627**	.542**	.630**	.645**	.565**	.635**	1.000
M	3.69	3.62	3.71	3.74	3.59	3.72	3.63
SD	.67	.77	.73	.73	.79	.72	.80

Note: \*\*p&lt;.01.

### 3.3. Verification of hypotheses

#### 3.3.1. Verification of the fit of the research model

In this study, the path verification of the research model on the relationship between social support, career adaptability, psychological capital, and career preparation behavior of the major majors was conducted by setting up the research hypothesis with a total of 5 paths in which the social support of the majors affected career adaptability, psychological capital, and career preparation behavior, and career adaptability affected career preparation behavior and psychological capital affected career preparation behavior.

First, the fit index was analyzed to verify the fit of the research model presented in this study. In this study, the suitability of the model was verified by using  $\chi^2$ , df, p, Normed  $\chi^2$ , GFI, NFI, IFI, CFI, RMR, and RMSEA index proposed by Kim Gye-su(2008) to secure objectivity of the model suitability criteria. The results are as shown in <Table 5>.

The study model fit index of <Table 5> shows that  $\chi^2$  is 283.942(df=72,  $p<.000$ ), Normed  $\chi^2$  is 4.056, GFI is .901, NFI is .929, IFI is .945, CFI is .945, RMR is .025, RMSEA is .087. The overall value of 2(3), GFI(.90), NFI(.90), IFI(.90), CFI(.90), RMR(.05~.08), RESEA(.08) was found to be appropriate.

However, the relationship between the error terms with the value of the Caiza victory exceeding 4 was revealed, and the fit index was modified by suggesting a correction model using the modification index(MI).

Joreskog and Sorom(1981) proposed a correction index in which the Caiza value( $\chi^2$ ) decreases when one free feature number (path coefficient) is increased, and the reduction of the Caiza value can be more than expected. Therefore, the researcher shows the effect of fixing parameter by reducing the degree of freedom when the number of free features is increased by using the correction index. If the value of the correction index does not exceed  $\leq .05$  and the value of the Caiza victory based on one degree of freedom does not exceed 4, it should be understood that it does not bring the result as much as liberalizing the parameter.

In the study model, the modified index was used in e5e6, e6e7 with the value of the chi-square exceeding 4; the bidirectional arrow between the error terms indicates the degree of covariance. Based on this, the modified model is suggested that  $\chi^2$  is 270.540(df=70,  $p<.000$ ), Normed  $\chi^2$  is 3.979, GFI is .907, NFI is .932, IFI is .948, CFI is .948, RMR is .024, RMSEA is .086. Therefore, the modified model set in this study was judged to explain this study relatively well, and path analysis was conducted for hypothesis testing based on the modified model.

**Table 5.** The fitness index of the research model and the modified model.

Fitness index	$\chi^2$	df	Normed $\chi^2$	GFI	NFI	IFI	CFI	RMR	RMSEA
Research model	283.942	72	4.056	.901	.929	.945	.945	.025	.087
Modification model	270.540	70	3.979	.907	.932	.948	.948	.024	.086

#### 3.3.2. Verification of hypothesis

The revised model presented in <Table 4> is considered to be suitable for the hypothesis verification of this study, and the research hypothesis was verified based on the modified model and the results such as <Table 5> were obtained.

The results of this study are as follows: First, the results of empirical analysis on the effect of social support on career adaptability of major majors in Hypothesis I showed that the path coefficient value of social support and career adaptability had a significant effect on .833( $t=14.224$ ). The hypothesis that the social support of the major will have a significant effect on career adaptability was adopted.

Second, as a result of empirical analysis on the effect of social support on psychological capital of major majors, the path coefficient value of social support and psychological capital was .893( $t=13.494$ ), which



was significant. The hypothesis that social support of the major will have a significant impact on psychological capital was adopted.

Third, the result of empirical analysis on the effect of social support of major majors on career preparation behavior showed that the path coefficient value of social support and career preparation behavior had a significant effect on .623( $t=2.055$ ). The hypothesis that the social support of the major will have a significant effect on career preparation behavior was adopted.

Fourth, as a result of empirical analysis on the effect of career adaptability of major majors on career preparation behavior, the path coefficient value of career adaptability and career preparation behavior was .785( $t=3.282$ ). The hypothesis that the career adaptability of the major will have a significant effect on career preparation behavior was adopted.

Fifth, as a result of empirical analysis on the effect of psychological capital of major major in the induction of hypothesis V on career preparation behavior, the path coefficient value of psychological capital and career preparation behavior was .968( $t=4.743$ ), which was significant. The hypothesis that the psychological capital of the major will have a significant effect on career preparation behavior was adopted.

### 3.4. Causal relationship verification of measurement variables

Structural equation model verification can show causal effect which is the influence of the whole variable, and causal effect between variables is direct effect.

**Table 6.** Results of verification of research hypotheses.

Hy-pothe-sis	Light road	Path coefficient (estimate)	Standardi-zation path coefficient	Standard error (S.E.)	t value (C.R.)	Signifi-cance	Adoption or not
1	Social support → career adaptability	.833	.942	.059	14.224	.000	Aoption
2	Social support → psychological capital	.893	.922	.066	13.494	.000	Adoption
3	Social support → career preparation behavior	.623	.619	.303	2.055	.040	Adoption
4	Career adaptability → career preparation behavior	.785	.689	.239	3.282	.001	Adoption
5	Psychological capital → career preparation behavior	.968	.931	.204	4.743	.000	Adoption

**Table 7.** Causal effect.

Light road	Direct effect	Indirect effect	Causal effect
Social support → career adaptability	.833	-	.833
Social support → psychological capital	.893	-	.893
Social support → career preparation behavior	.623		.623
Social support → career adaptability → career preparation behavior	.623	.833×.785=.654	1.277
Social support → psychological capital → career preparation behavior	.623	.893×.968=.864	1.487

Career adaptability → career preparation behavior	.785	-	.785
Psychological capital → career preparation behavior	.968	-	.968

### 3.5. Verification of causality of measurement variables

Structural equation model verification can show causal effect which is the influence of the whole variable, and causal effect between variables is direct effect,

It is classified into the indirect effect two kinds.,Direct effect means direct path coefficient between two variables, and indirect effect means path coefficient including parameter between two variables.

The direct effect of social support on career adaptability was .833, the direct effect of social support on psychological capital was .893, and the direct effect of social support on career preparation behavior was .623. And the indirect effect of social support on career preparation behavior through career adaptability was .654, the total effect was 1.277, and the indirect effect of social support on career preparation behavior through psychological capital was .864, and the total effect was 1.487.,And the direct effect of career adaptability on career preparation behavior was .785, and the direct effect of psychological capital on career preparation behavior was .968. These results showed that career adaptability and psychological capital are very important variables that play a mediating role in the relationship between social support and career preparation behavior.

## 4. Non-Universal

This study focused on the research hypothesis set up in this study to identify the relationship between social support, career adaptability, psychological capital, and career preparation behavior targeting the majors who were induced in 2021. First, the relationship between social support and career adaptability, the relationship between social support and psychological capital, the relationship between social support and career preparation behavior, the relationship between social support and career preparation behavior, the relationship between career adaptability and career preparation behavior, the relationship between psychological capital and career preparation behavior were discussed[8][9][10][11].

### 4.1. Relationship between social support and career adaptability

The empirical analysis of the effect of social support on career adaptability of major majors showed that the path coefficient value was .833( $t=14.224$ ), which showed that social support had a significant effect on career adaptability[12][13][14][15].

Social support plays an important role in career counseling. In a study of married women with career breaks, Shin Kap-sook(2012) reported that career adaptability was higher as the level of recognition of social support was higher. In a study of college students, Yook Jung-won and Kim Bong-hwan(2017) reported that social support positively influenced career adaptability, and that career adaptability increased as the ability to perceive social support and form relationships with activities to explore oneself and jobs increased. In a study of college students, Cho(2015) reported that social support positively affects career adaptability, and that college students with high social support improve their career adaptability through positive thinking.,Hirschi(2009) reported that social support from parents, friends, relatives, or affiliated organizations showed a positive correlation with career adaptability. In a study of college students of Yousefi, Abedi, Baghban, Eatemadi, and Abedi(2009), it was found that social support from family, friends, and other major figures reported a positive effect on career adaptability[16][17][18].

This means that social support such as emotional, informational, material, and evaluative support

of the people around them provides the students with the opportunity of career adaptability to naturally explore themselves and their jobs to be selected in the future, and to prepare for career by increasing confidence that they can cope with career problems efficiently. In conclusion, it can be seen that college students who perceive that they receive high social support from the surroundings can actively act and have high ability to adapt to the rapidly changing occupational world. Therefore, it is thought that universities should try to improve the social support that students perceive and develop and educate various technologies that can adapt and utilize positively to rapidly changing society in relation to career, so that they can have high career adaptability[19][20][21].

#### **4.2. Relationship between social support and psychological capital**

Induction As a result of empirical analysis on the effect of social support on psychological capital of major major, the path coefficient value was .893( $t=13.494$ ), which confirmed that social support had a significant effect on psychological capital.

Social support has positive effects on both work situation and psychological aspect. Lee Yeon-hee and Jung Jae-eun(2012) reported that social support received from parents, teachers, and friends had positive effects on resilience, and social support was found to be an important variable that has significant effects on self-efficacy and hope. In a study of hotel workers, Yeo In-ju(2015) reported that social support had a significant effect on all variables such as self-efficacy, optimism, hope, resilience, etc., which are sub-factors of psychological capital. In a study of college students, Lee Mi-ok and Yoo Sung-yong(2018), social support had a positive effect on psychological capital, and informational support among social support that affects important psychological capital for future career and career was reported to have the greatest effect. In a study of service workers, Yang Sung-yoon(2017) reported that social support had a significant effect on all of the sub-factors of psychological capital, such as self-efficacy, optimism, hope, and resilience, and reported that social support, such as interest, consideration, and intimacy received from bosses and colleagues in the organization, plays a positive role in raising psychological capital.

Social support, which is a positive resource that can be exchanged with each other within interpersonal relationships, has a positive psychological effect on individuals and has a positive psychological stability(sex advance, 2010), and it can be confirmed through the results of this study and previous studies that anyone can develop positively by raising psychological capital through friendly social relationships.,In the case of actual psychological capital, it is most influenced by people around you living together, and if psychological capital is high, you can demonstrate creativity through more flexible thinking[22][23][24][25].

Therefore, it is necessary to hold seminars on various topics that can give hope to students for career preparation, to develop and introduce programs that can enhance self-efficacy and resilience. In the department level, it is necessary to introduce various creative and fun methods to increase social support by seeking various ways to positively change the relationship between professors and students, seniors and colleagues.

#### **4.3. Relationship between social support and career preparation behavior**

The empirical analysis of the effect of social support on career preparation behavior of the major majors showed that the path coefficient value was .623( $t=2.055$ ), which showed that social support had a significant effect on career preparation behavior[26][27][28][29].

Career preparation behavior, which is an act to implement rational and correct career decision, is positively influenced by social support. In a study of college students, Kim Jong-hak and Choi Bo-young(2015) reported that the higher social support had a positive effect on career preparation behavior, and that social support should be promoted in order to increase the employment possibility of college students. In a study of college students, Bae Eul-gyu, Lee Ho-yeon and Kim Dae-young(2017), social support had a positive effect on career preparation behavior. and reported that they were doing it. Yoo Su-bok and Yoon Hye-mi(2014) reported that social support directly affects career preparation behavior and indirectly affects career self-efficacy. In order to prepare career for college students, various programs are needed to strengthen their support, including parents, and Lee Seung-ik and Lee

Mu-hyung(2018) reported that social support has a positive effect on career preparation behavior. It was shown that they supported the study.

If college students protect from stress situations or negative problems and increase social support to improve their adaptability through praise, encouragement, and respect, they can cultivate the ability to solve problems facing themselves even in difficult economic situations and employment situations, and they will further promote career preparation-related behaviors such as purchasing textbooks or registering a private institute in order to collect information on employment and cultivate necessary abilities. This means that if the level of social support is perceived high, the career preparation activity is autonomously performed and the level of career preparation behavior is increased. Therefore, it is necessary to introduce various programs such as face-to-face with students with positive feelings to raise the level of career preparation behavior by increasing social support of students in universities and departments, to understand their problems and to think together, to present various directions, not methods to cope wisely when solving problems, and to give advice to have a sense of reality about employment[30][31][32][33].

#### **4.4. Relationship between career adaptability and career preparation behavior**

As a result of empirical analysis on the effect of career adaptability of major majors on career preparation behavior, the path coefficient value was .785( $t=3.282$ ), which confirmed that career adaptability had a significant effect on career preparation behavior.

In the study on career preparation behavior, the verification of the relationship with career-related variables is mainly conducted. Kim Jong-sang(2018) reported that there is a close relationship between career preparation behavior and career adaptability in a study of travel agency workers, and that the development of practical education programs is necessary. Yang Eun-hee(2018) reported that career adaptability positively affects career preparation behavior in a study of college students. The report that career adaptability is very closely related to career preparation behavior, and Lee Soo-bun(2016) emphasized that career adaptability is very important because it is possible to adapt effectively only if career preparation behavior is premised.,In addition, in a study of college students, Kim Wan-joo(2018) reported that self-directed learning ability had a significant effect on career preparation behavior through the medium of career adaptability, and career adaptability played a very important role as a partial mediation[34].

Students who have a lot of career preparation behavior should continue to make efforts to strengthen their learning capacity because of their high career adaptability. Especially, it is judged that physical education major students need more concrete and practical career preparation behavior than general students. In case of Judo kata major students, there is not much direction of career, so it is more necessary to grasp the current job characteristics rather than simply collecting information about occupation.,Therefore, universities and departments should understand students' career problems more deeply and increase various supportive environments that can improve career preparation behavior to find students' advancement into similar fields as well as advance into major fields.

#### **4.5. Relationship between psychological capital and career preparation behavior**

As a result of empirical analysis on the effect of psychological capital of major majors on career preparation behavior, the path coefficient value was .968( $t=4.743$ ), which confirmed that psychological capital had a significant effect on career preparation behavior.

Psychological capital is being studied from the perspective of improving the competitiveness of individuals or organizations(Abbas & Raja, 2015), and studies on learning strategies and preparation behaviors are being conducted in terms of individuals. Lee Mi-ok and Yoo Sung-yong(2018) reported that psychological capital had a positive effect on career preparation behavior in a study of college students, but except for this study, there was little research on the relationship between psychological capital and career preparation behavior.,However, in the previous studies studied by sub-factors of psychological capital, Kim Ji-yeon and Lee Ki-hak(2015) reported that resilience had a positive effect on career preparation behavior, Kim Jin-sook(2013) reported that self-efficacy had an effect on career prepara-

tion behavior, and Cha-am and Lee Hee-kyung(2014) reported that hope factors played a role in continuing career preparation behavior when career barriers interfered with career preparation behavior.

This result shows that students with high psychological capital have positive effects in preparing for their career path, try to solve them confidently even if they face difficult difficulties, and have confidence that they are essential people in the field where they want to convey their thoughts around them. Therefore, universities need to introduce and implement various career preparation programs to increase students' psychological capital and actively implement information collection for their careers to achieve their goals. If they can invest time in consultation rather than interest or support for students, or provide financial support, they will be able to prepare for proper career.

## 5. Conclusion

The purpose of this study is to investigate the relationship between social support, career adaptability, psychological capital and career preparation behavior of the major. For this purpose, a survey was conducted on students who majored in judo kata in 2021 at the university and 402 questionnaires were used as final research data. The data were analyzed by frequency analysis, exploratory factor analysis, reliability analysis, and correlation analysis using SPSS 21.0 program. After confirmatory factor analysis using AMOS 21.0 program, the fit of the model was verified and hypothesis test was conducted by covariance structure analysis.

First, as a result of empirical analysis on the effect of social support on career adaptability of the major majors, the path coefficient value was .833( $t=14.224$ ), which confirmed that social support had a significant effect on career adaptability. Second, as a result of empirical analysis on the effect of social support on psychological capital of the major, the path coefficient value was .893( $t=13.494$ ), which confirmed that social support had a significant effect on psychological capital. Third, as a result of empirical analysis on the effect of social support on career preparation behavior of the major in induction, the path coefficient value was .623( $t=2.055$ ), which confirmed that social support had a significant effect on career preparation behavior. Fourth, as a result of empirical analysis on the effect of career adaptability of major majors on career preparation behavior, the path coefficient value was .785( $t=3.282$ ), which confirmed that career adaptability had a significant effect on career preparation behavior.

Fifth, as a result of empirical analysis on the effect of psychological capital of the major on career preparation behavior, the path coefficient value was .968( $t=4.743$ ), which confirmed that psychological capital had a significant effect on career preparation behavior. In conclusion, the following studies should be conducted in consideration of environmental factors and educational factors related to social support and career, and therefore, the more reliable studies should be conducted on social support, career adaptability, psychological capital, and career preparation behavior according to martial arts or physical education.

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## 7. Appendix

### 7.1. Authors contribution

	Initial name	Contribution
Lead Author	WL	-Set of concepts <input checked="" type="checkbox"/>
		-Design <input checked="" type="checkbox"/>
		-Getting results <input checked="" type="checkbox"/>
		-Analysis <input checked="" type="checkbox"/>
		-Make a significant contribution to collection <input checked="" type="checkbox"/>
		-Final approval of the paper <input checked="" type="checkbox"/>
Corresponding Author*	WS	-Corresponding <input checked="" type="checkbox"/>
		-Play a decisive role in modification <input checked="" type="checkbox"/>
		-Significant contributions to concepts, designs, practices, analysis and interpretation of data <input checked="" type="checkbox"/>
		-Participants in Drafting and Revising Papers <input checked="" type="checkbox"/>
		-Someone who can explain all aspects of the paper <input checked="" type="checkbox"/>



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Corresponding author\*  
E-mail: judohee5095@kmcu.ac.kr

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## The Effects of Short-Term Weight Loss on Body Composition, Blood Electrolytes, and Immunoglobulin Concentrations among Ordinary Judo Athletes and Excellent Judo Athletes

Yanghee Jung

Keimyung College University, Daegu, Republic of Korea

### Abstract

**Purpose:** While electrolytes and immunity are highlighted as important in terms of the relationship between health and physical activity, immunoglobulin plays such a decisive role in the immune function that defends the human body, and it occurs in multiple tissues, such as the skin, lungs, blood, muscle, etc., affecting an increased risk of infection, including sleep deprivation, mental stress, malnutrition, and weight loss. Hence, this study was conducted to examine the effect of short-term weight loss on body composition and blood electrolyte and immunoglobulin concentrations among non-excellent and excellent Judo athletes.

**Method:** The subjects of this study were 14 male athletes who were currently active as Judo athletes at university and had over 5 years of athlete experience and weight loss experience. For the statistical processing of this study, the mean and standard deviation for each item were calculated using the SPSS 12.0 statistical program, and the Two-way repeated ANOVA was performed according to group(non-excellent athlete and excellent athlete) and time (before the weight loss, 6 days after the weight loss, immediately after the competition, 30 minutes recovery period), and in the case of an interaction effect, the post-test was conducted by contrast test for each period and paired t-test for each period.

**Results:** The changes in body weight(A), total weight without fat(B), and body fat percentage(C) are demonstrated before and after the weight loss(6 days), immediately after the competition, and 30 minutes in the recovery period(A). In terms of the change of body weight over time by group(A), both groups significantly decreased( $p<.001$ ) at the weight loss(6 days after) compared to before the weight loss. The changes in Ca(A), Na(B), K(C) and Mg(D) before and after the weight loss(6 days after), immediately after the competition, and 30 minutes of recovery are demonstrated. Comparing the change(A) of Ca between groups by group, both groups significantly decreased during the reduction period compared to before the weight loss( $p<.001$ ). The changes in IgA (A), changes in IgG(B), changes in IgM(C) and changes in IgD(D) are demonstrated before and after the weight loss(6 days), immediately after the competition, and after 30 minutes of recovery. Comparing the change in IgA between the periods by group, there was a significant increase in the excessive weight loss(after 6 days) in the excellent athlete group compared to before the weight loss( $p<.001$ ).

**Conclusion:** Weight loss is considered to have a negative impact on performance improvement and affect the pre-match condition and performance. Based on the results of this study, the scientific weight loss methods and appropriate short- and long-term weight loss will serve as the important basic data for further research to improve the athletic performance among the athletes of weight class.

**Keywords:** Judo Athlete, Weight Loss, Body Composition, Blood Electrolyte, Immunoglobulin

## 1. Introduction

Victory conditions in Judo must be supported by physical factors for prompt and smooth movement and judgement[1]. In Judo, the athletes with good physique and physical strength

have advantageous match performance, yet it is a natural result that victory or defeat is determined by technical factors between the athletes[2]. However, in the competitions that are divided by weight class, such as Judo, the participation after losing weight before the competition may have a decisive effect on victory or defeat. As such, Judo, a weight class competition, includes nutritional management according to time, method, and period in the training process to provide a systematic and reasonable method to maintain the athlete's condition, prevent fatigue, and replenish energy, thereby making efforts toward improving athletic performance and game operation ability[3][4]. However, the currently and widely used weight loss method not only harms the athlete's health, yet also leads to a decrease in physical strength and a decrease in skills[5]. However, it is difficult to limit weight loss because athletes participating in Judo have a strong belief that they can achieve more favorable performance through the weight loss[6][7].

Since the difference in terms of physique and weight between the players rather than physical factors appears to be an important factor in terms of having relevance to performance, and with a view to minimize the impact on competition results due to many differences in physique and weight, many researchers and leaders have developed a systematic training method. Various methods of weight loss are implemented to ensure the safety and better performance of the athletes[8]. In Judo, which is a speculative event that is divided by weight class, most of them compete after losing weight. In such a situation where strength and muscular endurance are important, short-term weight loss has a negative impact on the health and life of athletes due to a decrease in muscle mass and lack of nutrients and body water in the body[9]. Steep changes in the body composition that occur mainly in short-term weight loss cause malnutrition and dehydration symptoms, reduce the health and athletic performance of athletes, and negatively affect the immune function that forms the body's defense system[10].

It has been demonstrated that dehydration and the lack of nutritional intake due to weight loss increase the concentration of calcium, a part of electrolytes related to muscle contraction, that can affect the electrolyte concentration[11]. In a study of 10 high school male wrestlers, electrolytes increased immediately after the weight loss compared to before the weight loss[12]. In another previous study, in a study conducted on 24 male university Taekwondo athletes, sodium(Na) increased and potassium(K) decreased during short-term weight loss[8]. In the human body, electrolytes act as a buffer system to adapt to changes in acidity, change body fluids and maintain cell membrane permeability. The role of these electrolytes in generating alkaline digestive juices, such as bile and bile, is closely related to exercise that consumes a large amount of water and energy, so the interest in them has increased[13]. The weight loss of athletes of weight class is mostly executed by controlling water and restricting diet, so the secretion of sweat due to dehydration causes water loss and electrolyte imbalance in the body, which negatively affects the performance[14].

Electrolyte and immunity have emerged as important in the relationship between health and physical activity, and immunoglobulin plays a decisive role in the immune function to defend the human body, and they also affect the increased risk of infection, such as stress, malnutrition, and weight loss[15]. Yaegaki et al.(2007) reported that there was no significant difference in immunoglobulin levels depending on the degree of weight loss in a study conducted on athletes participating in weight class, while Umeda et al.(2004) reported that the steep weight loss among the Judo athletes decreased immunoglobulin[16][17][18][19]. Notwithstanding the fact that weight loss has a negative impact on immunoglobulins in the body, the athletes are repeatedly losing weight for competitive performance. Hence, this study was conducted to examine the effect of short-term weight loss on body composition and blood electrolyte and immunoglobulin concentrations among the ordinary players(OP) and excellent players(EP) Judo athletes.

## 2. Research Method

### 2.1. Research subjects

The subjects of this study were 14 male athletes who were currently active as Judo athletes at university and had over 5 years of athlete experience and weight loss experience. Seven out of 14 college students were selected from among the OP who had experience only in the municipal and provincial competitions. Considering the fact that they are professional athletes, the weight loss method that is usually used for physical and psychological condition was adjusted according to their weight class. The characteristics of the study subjects are demonstrated in <Table 1>.

**Table 1.** Subject's physical characteristics.

Group \ Item	Age (years old)	Height (cm)	Weight (kg)	Lean mass (kg)	Body fat (kg)
OP	22.00 ±2.64	176.57 ±5.99	83.90 ±14.37	62.92 ±8.40	16.78 ±5.84
EP	22.42 ±1.27	175.42 ±5.85	83.38 ±16.57	64.38 ±8.97	13.88 ±8.90

Note: Mean ± standard deviation.

### 2.2. Experimental method

#### 2.2.1. Weight loss and training method

The athletes participating in the experiment were fully informed about the purposes and were restricted on the intake of certain drugs, alcohol and beverages containing caffeine during the weight loss period. As for the weight loss method, excluding the cool-down exercise and warm-up exercise, 120 minutes of induction technique training was the basic basis, and weight loss was achieved through the main exercise and diet control. Furthermore, the 6-day weight loss of the two groups resulted in a weight loss of 6-7% during the weight loss period according to a set plan. The weight loss method was reduced by using a combination of diet restriction and exercise through a reduction of 500 kcal per day based on previous studies on weight control by Katsilambros(2000)[20]. The simulated game after the weight loss(6th day) was held at K University's Judo arena for 5 minutes according to the international competition format under the same conditions as the actual game.

#### 2.2.2. Body composition measurement

The body composition was measured using the InBody 720(Biospace, Korea), which applies the Bioelectrical Impedance Analysis, to measure the subject's body weight, lean mass, and total weight without fat percentage(% fat).

#### 2.2.3. Electrolyte, immunoglobulin analysis method

A professional with a license to practice medicine directly collected blood from the brachial fluid 4 times before the weight loss, 6 days after the weight loss, right after 5 minutes of competition, and 30 minutes after recovery. After the blood collection, the blood was placed in an anticoagulant-treated tube and was centrifuged for 15 minutes at 3000 rpm in a centrifuge for

measurement and analysis, and the test method for IgA, IgG, and IgM among the immune substances was based on the principle of immunoturbidity using immunoturbidimetric assay, and IgA(IgG, IgM) formed a precipitate with specific antibodies in the reagent and was measured at 340 nm wavelength. The reagent used was Cobas Integra IgA(Roche, Switzerland), and the measuring device was Cobas Integra(Roche, Switzerland).

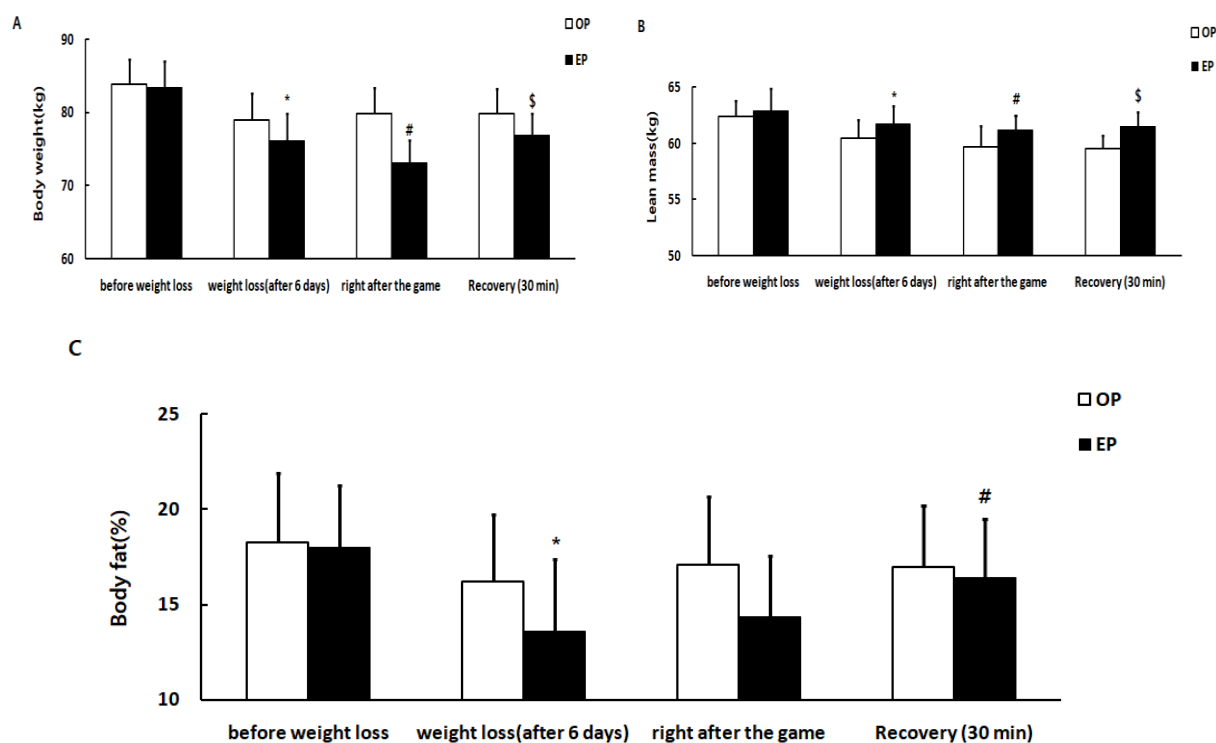
### 2.3. Data processing method

For the statistical processing of this study, the mean and standard deviation for each item were calculated using the SPSS 12.0 statistical program, and the two-way repeated ANOVA was performed according to group(non-excellent athlete and excellent athlete) and time(before the weight loss, 6 days after the weight loss, immediately after the competition, recovery period 30 minutes), and in the case of an interaction effect, the post-test was conducted by contrast test for each period and paired t-test for each period. The statistical significance level was set to 0.05.

## 3. Result

### 3.1. Change in the body composition

**Figure 1.** Change in body weight(A), lean mass(B), and body fat(C) during the short-term weight loss period.



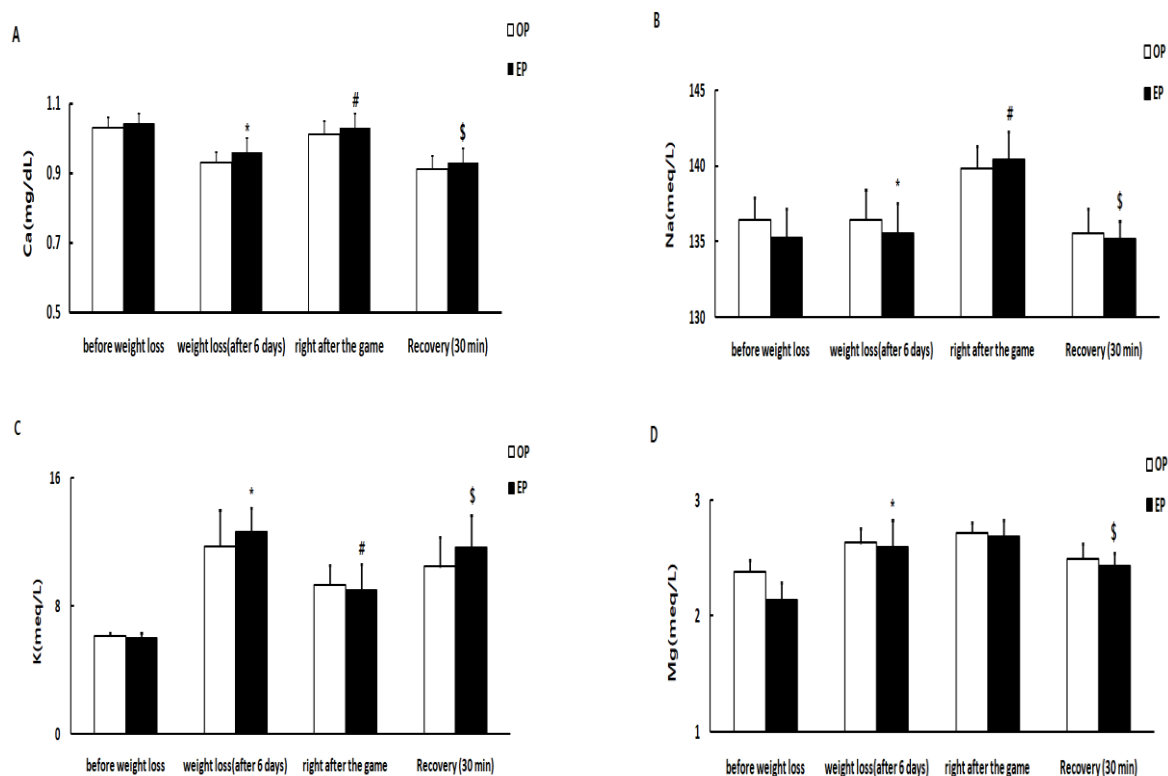
Note: \* $p < .001$ , # $p < .01$ , \$ $p < .05$  significant difference as compared to OP group.

<Figure 1> demonstrates the change in body weight(A), lean mass(B), and change in the body fat percentage(C) before and after the weight loss(6 days after), immediately after the competition, and during the 30-minute recovery period. In the change of body weight over time by group(A), both groups significantly decreased( $p < .001$ ) in the weight loss group(6 days after)

compared to before the weight loss( $p<.001$ ). .01), yet it increased significantly at 30 minutes of recovery( $p<.05$ ). In the change of total weight without fat(B), both groups significantly decreased in the weight loss(after 6 days), yet increased significantly in the excellent players group than in the OP group( $p<.001$ ), and was superior to the non-excellent athlete group immediately after the competition. It increased significantly in the athlete group( $p<.01$ ), and also significantly increased in the excellent athlete group than in the non-excellent athlete group at 30 minutes of recovery( $p<.05$ ). In terms of the change of total weight without fat, both groups significantly decreased( $p<.001$ ) compared to before the weight loss(after 6 days), yet immediately after the competition, both groups increased, yet there was no significant difference. In the 30-minute recovery period, there was a significant increase in the excellent athlete group( $p<.01$ ).

### 3.2. Changes in the blood electrolytes

**Figure 2.** Change in Ca(A), Na(B), K(C), and Mg(D) during the changes in blood electrolytes period.



Note: \* $p<.001$ , # $p<.01$ , \$ $p<.05$  significant difference as compared to OP group.

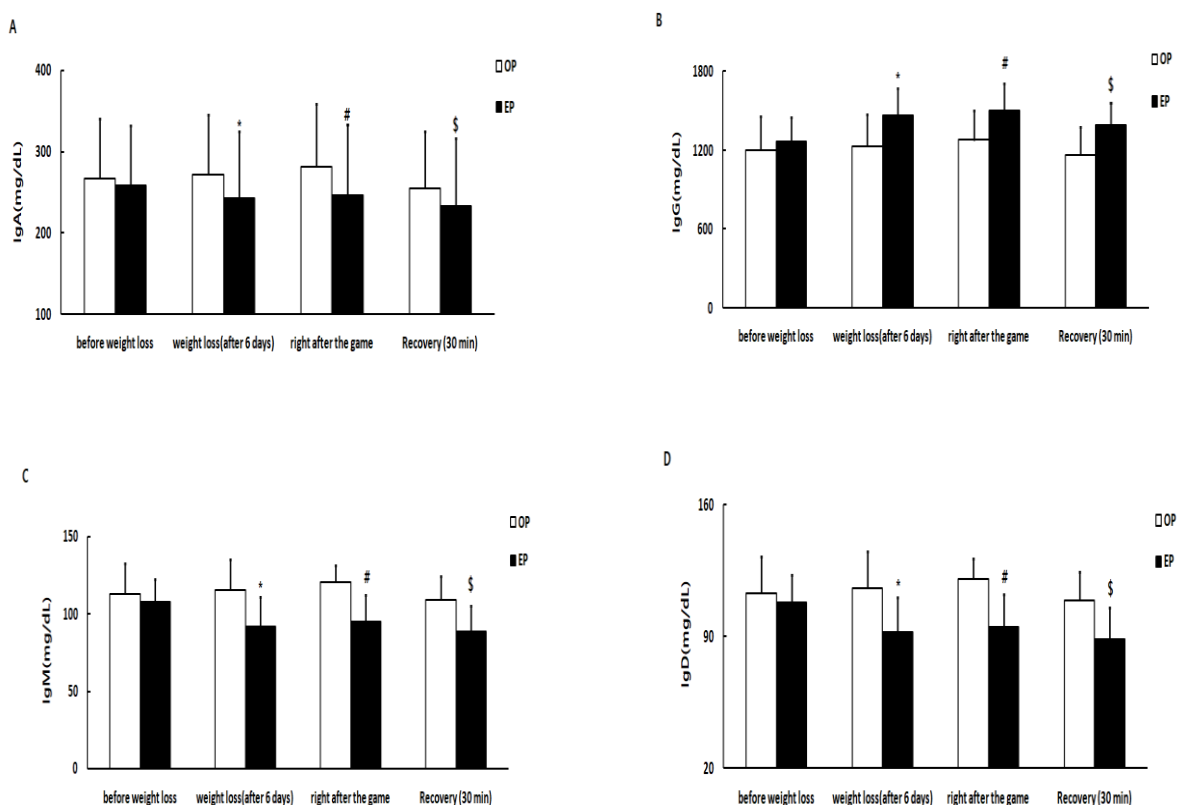
<Figure 2> demonstrates the changes in calcium(Ca)(A), Na(B), K(C), and magnesium(Mg)(D) before and after the weight loss(6 days), immediately after the competition, and 30 minutes of recovery. Comparing the change(A) of Ca between the groups for each period, both groups significantly decreased during the reduction period compared to before the weight loss( $p<.001$ ). Regarding the weight loss(after 6 days), the Judo athlete group significantly increased immediately after the competition( $p<.05$ ) and decreased significantly at 30 minutes of recovery( $p<.05$ ). Comparing the change in Na for each group(B), both groups significantly increased immediately after the competition( $p<.01$ ) for the weight loss(6 days after) compared to before the weight loss in both groups( $p<.01$ ). decreased significantly. The OP group significantly increased imme-



diately after the competition, and decreased significantly( $p<.05$ ) after excessive weight loss(after 6 days) and 30 minutes of recovery. There was no significant difference between the groups by period. Comparing the change(C) of K by group between the periods, as for the weight loss(after 6 days), the EP group significantly decreased immediately after the competition, and the non-excellent athlete group significantly decreased immediately after the competition and at 30 minutes of recovery. Similarly, when comparing the change in Mg between the periods for each group, both groups significantly increased in the excessive weight loss(after 6 days) compared to that before the weight loss. Regarding the weight loss(after 6 days), there was no significant change in the Judo athlete group, and the non-excellent athlete group significantly decreased at 30 minutes of recovery. Across the entire period, the weight loss group of the EP significantly increased(after 6 days), yet decreased significantly( $p<.05$ ) at 30 minutes of the recovery period.

### 3.3. Changes in the blood immunoglobulin

**Figure 3.** Change in IgA(A), IgG(B), IgM(C), and IgD(D) during the changes in blood electrolytes period.



Note: \* $p<.001$ , # $p<.01$ , \$ $p<.05$  significant difference as compared to OP group.

<Figure 3> demonstrates the change in IgA(A), change in IgG(B), change in IgM(C), and the change in IgD(D) before and after the weight loss(6 days), immediately after the competition, and 30 minutes of recovery. Comparing the change in IgA between the periods by group, there was a significant increase in the excessive weight loss(6 days after) in the EP group compared to before the weight loss( $p<.001$ ), and there was no significant change in the OP group. The OP group increased immediately after the game, yet decreased by 30 minutes during the recovery period, yet there was no significant difference. Comparing the change(B) of IgG between the

periods by group, the weight loss(6 days after) was significantly increased in the excellent athlete group compared to before the weight loss( $p<.001$ ), and there was no significant change in the OP group. For excessive weight loss(after 6 days), both groups significantly increased immediately after the competition( $p<.01$ ), and significantly decreased at 30 minutes of recovery( $p<.05$ ). In comparison of the change in IgM(C), there was a significant increase in the excessive weight loss(6 days after) in the EP group compared to before the weight loss( $p<.01$ ), and there was no significant change in the non-excellent athlete group. In the comparison of the change in IgD(D), there was a significant increase in the excessive weight loss(after 6 days) in the EP group compared to before the weight loss( $p<.001$ ). Between the groups by period, the EP group demonstrated significantly higher weight loss than the OP group(after 6 days), immediately after the competition, and 30 minutes of recovery( $p<.05$ ).

## 4. Discussion

Weight loss is a strategy of weight class athletes, which also impacts the victory and defeat. Many studies have been conducted on the physiological changes, biological and biochemical reactions of the human body during weight loss. Choma, Sporzo, & Keller(1998) reported a negative study result that inhibited function, and Freischlag, Koskinen, Laak, Rankinen, & Roukonen(1993), demonstrated conflicting views as a result of the study that there was no impact[21][22]. However, the goal of weight loss of athletes participating in physical sports is to compete in a lightweight class that is lower than their current body weight to obtain favorable performance. To achieve such a successful result, it is a situation in which weight loss is attempted repeatedly during the season with abnormal methods such as diet, high-intensity training, and dehydration to reduce the body fat to the extent possible and maintain the total weight without fat[23].

The effective weight loss of the weight class athletes is inextricably related to performance, which was presented as an important topic of interest in a study by Kijin Kim, Seonjang Lee, and Inhyeon Jang(2000). The athletes participating in weight class competitions mainly apply a method of restricting diet for 3 to 5 days and a method of dehydration by controlling water in order to qualify[24]. In a study conducted on Judo athletes by Umeda, & Sugawara(2002) applying this method, weight loss through exercise and diet demonstrated a significant weight loss 1 day before the competition(2.8kg), and the reduction in the total weight without fat was 1.9 It has been reported that 68% in kg is due to total weight without fat[18][25]. This is considered to be due to the decrease in body water and the increase in the use of total weight without fat and protein as an energy source by restricting calories and voluntary dehydration through dietary restriction and high-intensity exercise. Furthermore, due to the steep weight loss before competition, the athletes in competitions by body weight may lose their balance before competition, which may adversely affect performance. Furthermore, during short-term weight loss due to dehydration, there is a high possibility of negative impact on the water metabolism through the imbalance in terms of the electrolyte concentration and decrease in the body fluid[26].

In particular, the loss of electrolytes in the body occurs concurrently with the loss of water centered on sweating during exercise. In this study, Ca was significantly decreased in both the Judo group and the group of friends in the excessive weight loss(after 6 days) compared to before the weight loss( $p<.001$ ). was significantly increased( $p<.05$ ), and decreased significantly in the recovery period( $p<.05$ ), and there was no significant difference in the group of friends, yet demonstrated a tendency to decrease over time. These results were consistent with the results of DaehueKoh and Seongchan Kim(2004) in the weight control of Taekwondo athletes where Ca decreased after the weight control and increased during the recovery period[27]. Such results demonstrate the fact that as a result of a decrease in Ca as Mg increases due to its

antagonistic action with Mg, it plays an important role in glucose metabolism by facilitating the reaction of synthesizing glucose into glycogen in the liver or muscle, glucose, which supplies energy to cells, and it is considered to be involved in the breakdown of fatty acids and amino acids.

Lactic acid, NH<sub>3</sub>, and LDH, which are fatigue-inducing substances that have an important impact on the exercise fatigue, are used as the indicators of the physiological exercise ability and the fatigue pattern analysis based on the energy metabolism[28][29][30]. Supportive of such results, in this study, immunoglobulins(IgA, IgG, IgM, IgD) significantly increased during the excessive weight loss period and immediately after 5 minutes of competition. However, in the recovery phase, IgA, IgG, and IgM levels were significantly lower. Hence, in this study, the increase in immunoglobulin during short-term excessive weight loss is a change within the normal range, yet it is considered that it may cause an effect on immune function. Hence, in the case of domestic Judo athletes, most of them regularly lose weight, and if accumulated over a long period of time, it may cause an abnormal condition. Hence, it is considered that if the period weight loss is repeated continuously, it may affect the immune function.

## 5. Conclusion

Gathering the results of this study, the Judo athletes in Korea would be able to lose excess weight within 6-7% of their body weight over a short period of time, yet the long-term accumulation may cause abnormal conditions. Hence, it is considered that it may have a negative impact on the enzyme activity and immune function.

While the short-term excessive weight loss of the Judo athletes varies depending on the physical strength or physical characteristics of each individual, the excessive weight loss is considered to have a negative impact on the performance improvement and the pre-competition condition and performance. Based on the results of this study, the scientific weight loss methods and appropriate short- and long-term weight loss will serve as the important basic data for further studies to help improve the athletic performance of the athletes of weight class.

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## 7. Appendix

### 7.1. Author's contributions

	Initial name	Contribution
Author	YJ	<ul style="list-style-type: none"> <li>-Set of concepts <input checked="" type="checkbox"/></li> <li>-Design <input checked="" type="checkbox"/></li> <li>-Getting results <input checked="" type="checkbox"/></li> <li>-Analysis <input checked="" type="checkbox"/></li> <li>-Make a significant contribution to collection <input checked="" type="checkbox"/></li> <li>-Final approval of the paper <input checked="" type="checkbox"/></li> <li>-Corresponding <input checked="" type="checkbox"/></li> <li>-Play a decisive role in modification <input checked="" type="checkbox"/></li> <li>-Significant contributions to concepts, designs, practices, analysis and interpretation of data <input checked="" type="checkbox"/></li> <li>-Participants in Drafting and Revising Papers <input checked="" type="checkbox"/></li> <li>-Someone who can explain all aspects of the paper <input checked="" type="checkbox"/></li> </ul>

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## The Effect of Taekwondo Leaders' Sympathy on Competitiveness Recognized as Exercise Immersive

Boseob Heo<sup>1</sup>

Kosin University, Busan, Republic of Korea

Kyunghwan Choi<sup>2\*</sup>

Kyungsung University, Busan, Republic of Korea

### Abstract

**Purpose:** This study revealed the effect of taekwondo leaders' sympathy on athletic performance perceived as immersive. Corona 19 has increased anxiety due to abandonment of the university(exercise) due to the cancellation of the tournament. Attempts to provide materials.

**Method:** Players(Kyoruki, Poomsae, demo) who participated in the tournament sponsored by the Korea Taekwondo Association(19th Korea Taekwondo Association President's Cup, 2022 National Taekwondo Championship) for about one month from February to March 2022. A recruitment team was selected in, and a questionnaire was distributed, and a total of 278 copies were used for the final analysis. After explaining the purpose and purpose of this study to the players, questionnaires were distributed. As a data processing method, frequency analysis, exploratory factor analysis, reliability analysis, correlation analysis, multiplex, and simple regression analysis were performed using SPSS 21.0, and the following conclusions were drawn based on the results.

**Results:** First, it was found that the sympathy of taekwondo leaders had a significant effect on exercise immersion. Second, the sympathy of taekwondo leaders has been shown to have a significant effect on perceived competitiveness. Third, it was shown that exercise immersion has a significant effect on perceived competitiveness.

**Conclusion:** First, since this study was conducted with players participating in the tournament from February to March 2022, it is somewhat difficult to generalize. Second, since this study was conducted with athletes participating in the official competition hosted by the Korea Taekwondo Association, it is somewhat difficult to generalize to the public confidence of all leaders. Therefore, in follow-up studies, it is judged that more diverse results will be obtained if a long period of time is selected and the study is conducted.

**Keywords:** Mutual Credibility, Exercise Immersion, Recognized Competitiveness, Taekwondo, Leaders

## 1. Introduction

The dictionary meaning of a leader is defined as a person who teaches others and guides them physically and mentally[1]. More specifically, a leader means a person who exerts influence on the belief system and behavioral method based on the guidance of others[2]. Therefore, the person who teaches taekwondo to the practitioners is called the taekwondo leader, and has a great influence directly on the practitioners[3].

Therefore Taekwondo leaders argued that the trainees must continue to be motivated and have both theory and practice for taekwondo[4]. So, In order for Taekwondo to become more active, the program and facilities are important, but the most important factor is the Taekwondo leader factor[5]. In other words, it is not an exaggeration to say that in order for Taekwondo to grow and become more active, it depends on securing a leader who has both theoretical and practical skills while possessing educational qualities.



The reason why the importance of taekwondo instructors is emphasized is because they form a close relationship with the athletes and have a huge impact on improving their skills and performance as much as the athletes trust them[6].

Coach claimed that he was a person who gave sports confidence to the players[7], the importance of the Taekwondo instructor was emphasized by examining the effect of the Taekwondo instructor's leadership on the psychological factors of the athletes[8]. As such, it is well known what kind of existence a Taekwondo instructor is to athletes or trainees.

However, despite the fact that taekwondo instructors make a significant contribution to enhancing player competency and revitalizing the dojo, most studies on taekwondo instructors have focused on leadership, and the need for various studies on leaders is being raised[9][10][11][12][13][14][15][16][17][18].

In this context, public confidence is the image of the communicator perceived by the receiver by the communicator, professionalism, and attitude[19]. In other words, the communicator provides and delivers a sense of trust to the audience with professionalism and attractiveness at the forefront.

Therefore, defined public trust as the most important concept in communication research[20]. As such, studies related to public trust are ongoing, emphasizing the importance of public trust[21][22][23].

As such, the importance of public confidence is recognized and research on public confidence is in progress. Nevertheless, most of the studies are not related to sports, such as broadcast commentators and national leaders. It is in an obscure state.

For the past two years, the Republic of Korea has been experiencing difficulties in various fields as well as the economy due to COVID-19. The Taekwondo field is also experiencing many difficulties due to the strengthening of social distancing. For about two years from 2020, the Taekwondo tournament has been canceled or temporarily postponed to prevent the spread of COVID-19, and the anxiety about going to college and going on a career path remains the responsibility of the Taekwondo players[24].

But, as social distancing is over, the Taekwondo competition is reviving, but it is still in the recovery stage. At this point, in order to return to the pre-COVID-19 state, it is judged that the quality and public confidence of the leader will act as a very important factor above all else, and it is judged that the public confidence of the leader will approach the players and trainees with various advantages.

Therefore, this study is meaningful in that it investigates the effect of public confidence in Taekwondo instructors on exercise commitment and perceived performance, and provides empirical data for activating Taekwondo and expanding the base of athletes. The research questions to achieve these research objectives are as follows. Therefore, this study is meaningful in that it investigates the effect of public confidence in Taekwondo instructors on exercise commitment and perceived performance, and provides empirical data for activating Taekwondo and expanding the base of athletes. The research questions to achieve these research objectives are as follows.

First, the influence of Taekwondo leader's public confidence on exercise commitment is investigated.

Second, the public confidence of the Taekwondo instructor is investigated to determine the effect on the perceived performance.

Third, the effect of exercise commitment on perceived performance is investigated.

## 2. Research Method

This study, From February to March 2022 for about a month Competition hosted by the Korea Taekwondo Association(19th Korea Taekwondo Association President, 2022 National Taekwondo Championships) in population was selected from the participating players, and the convenience sampling method was used among non-probability sampling methods. After explaining the purpose and purpose of this study to the players, questionnaires were distributed. Total of 310 questionnaires were distributed and 299 copies were recovered, and 278 copies were used for the final analysis, excluding

21 questionnaires that were answered insincerely. The general characteristics of the study subjects are shown in <Table 1>.

Looking at gender, 177 people(63.7%) were male and 101 people(36.3%) were female, and the male ratio was high, with 58 people attending middle school(20.9%), 97 people attending high school(34.9%), and university With 123 enrolled students(44.2%), the university rate was the highest. As for the specific Taekwondo events, Poomsae had the most with 77 people(27.7%), Poomsae with 169 people(60.8%), and 32 people with demonstration(11.5%). (35.3%), Chungcheong-do 28(10.1%), Jeolla-do 32(11.5%), Gyeongsang-do 30(10.8%), Gangwon-do 22(7.9%), and Jeju-do 10(3.6%).

**Table 1.** Demographic characteristics.

Division	Contents	Personnel	Frequency
Gender	Male	177	63.7
	Female	101	36.3
Education	Middle School	58	20.9
	High school	97	34.9
	University	123	44.2
Residence	Seoul	58	20.9
	Gyeonggi-do	98	35.3
	Chungcheong-do	28	10.1
	Jeolla-do	32	11.5
Event	Taekwondo gyeorugi	77	27.7
	Taekwondo poomsae	169	60.8
	Taekwondo demonstration	32	11.5
Sum		278	100

### 3. Research Tool

The variables of this study consisted of three variables: public confidence(attraction, reliability, professionalism), exercise commitment, and perceived performance, and all items were measured on a 7point Likert scale. Public confidence as a questionnaire was based on the study of[19]. The items used in the study of[22]. were used. In the study of exercise immersion in [24], and in the study of perceived performance, the questions used in the study of Kim JH(2014) were modified and secured according to this study[25].

Thus, as for the final items used, a total of 22 items were used in this study: 4 items on demographics, 10 items on public confidence, 4 items on exercise commitment, and 4 items on perceived performance.

### 4. Verification of Validity and Reliability of Measurement Tools

Exploratory factor analysis was performed to verify the validity of the measurement tool used in this study. Only items with factor loading values of .5 or higher were selected through factor analysis, and reliability analysis was performed to verify reliability.

<Table 2> shows the results of the exploratory factor analysis on the public confidence factors of Taekwondo instructors. The items measuring the public confidence factor were three sub-factors. First, the attractive factor had an eigenvalue of 3.503 and variance of 35.027%, and second, the reliability factor had an eigenvalue of 2.735 and variance of 27.355%. Third, as for the professionalism factor, the eigenvalue was 2.605 and the variance was 26.045%, and the cumulative variance ratio was 88.427%.

**Table 2.** Exploratory factor analysis result for public confidence factor.

Questionnaire	Attractive	Reliability	Professionalism
Positive	.941	.081	.211
Interesting	.932	.068	.232
Attractive	.880	.122	.207
Awesome	.865	.095	.259
True	.113	.959	.083
Faith goes	.105	.939	.157
Trust goes	.063	.923	.111
Experienced	.214	.121	.890
Have expertise	.243	.129	.886
Rich in quality	.305	.125	.880
Eigenvalue	3.503	2.735	2.605
Dispersion(%)	35.027	27.355	26.045
Accumulate(%)	35.027	62.382	88.427
Cronbach's $\alpha$	.953	.948	.922
KMO=.829, Bartlett's sphericity test: $\chi^2=2633.877$ , df=45, p=.000			

The results of the exploratory factor analysis on exercise commitment are shown in <Table 3>. As for the items measuring exercise commitment, the eigenvalue was 2.960 and the variance was 73.997% as a single factor, indicating that the items measuring exercise commitment were measured relatively properly.

**Table 3.** Exploratory factor analysis result for exercise immersion.

Questionnaire	Exercise immersion
Immersed in exercise	.913
Exercise is like my life	.907
Feel happy	.861
Focus when exercising	.750
Eigenvalue	2.960
Dispersion(%)	73.997
Accumulate(%)	73.997
Cronbach's $\alpha$	.881
KMO=.816, Bartlett's sphericity test: $\chi^2=533.540$ , df=6, p=.000	

The results of the exploratory factor analysis on perceived performance are shown in <Table 4>. As for the items measuring the perceived performance, the eigenvalue was 2.859 and the variance was

71.480% as a single factor, indicating that the items measuring the perceived performance were measured relatively properly.

**Table 4.** Exploratory factor analysis result for perceived performance.

Questionnaire	Perceived performance
Improved stamina	.879
Improvement of competition technique	.853
Match strategy improvement	.845
Psychologically stable	.803
Eigenvalue	2.859
Dispersion(%)	71.480
Accumulate(%)	71.480
Cronbach's $\alpha$	.863
KMO=.714, Bartlett's sphericity test: $\chi^2=426.475$ , df=6, p=.000	

## 5. Data Processing Method

The data processing method of this study was performed using the SPSS 21.0 program. First, a frequency analysis was performed to confirm the demographic characteristics of the survey subjects. Second, reliability analysis was performed to verify reliability. Third, an exploratory factor analysis was performed to verify the validity of the items used in this study. Fourth, correlation analysis and multiple regression analysis were performed to examine the correlation between variables.

## 6. Research Results

### 6.1. Correlation analysis

<Table 5> shows the results of correlation analysis to examine the relationship between variables. Correlation values for all variables ranged from a minimum of .241 to a maximum of .507, indicating that there is a statistically significant correlation.

**Table 5.** Correlation analysis.

Variable	Attractive	Professionalism	Reliability	Exercise immersion	Perceived performance
Attractive	1				
Professionalism	.507**	1			
Reliability	.221**	.277**	1		
Exercise immersion	.329**	.311**	.244**	1	
Perceived performance	.306**	.329**	.241**	.256**	1

Note: \*\*p<.01.

## 6.2. The effect of taekwondo instructor's public confidence on exercise commitment

Multiple regression analysis was performed to analyze the effect of Taekwondo instructor's public confidence on exercise commitment, and the results are shown in <Table 6>. As a result of the analysis, it was found that among the factors of public confidence, attractiveness( $\beta=.213$ ), reliability( $\beta=.147$ ), and professionalism( $\beta=.157$ ) had a significant effect on exercise commitment in the order.

**Table 6.** The effect of public confidence on exercise commitment.

Variable	B	SE	$\beta$	t	p
Attractive	.192	.063	.213	3.032	.003
Professionalism	.139	.064	.157	2.190	.029
Reliability	.140	.060	.147	2.330	.021
R=.394. R <sup>2</sup> = .144, F= 14.356***					

Note: \*\*\*p<.001, \*\*p<.01, \*p<.05.

## 6.3. Effect of taekwondo instructor's public trust on perceived performance

Multiple regression analysis was conducted to analyze the effect of Taekwondo instructor's public confidence on perceived performance, and the results are shown in <Table 7>. As a result of the analysis, it was found that among the factors of public confidence, professionalism( $\beta=.200$ ), attractiveness( $\beta=.173$ ), and reliability( $\beta=.142$ ) had a significant effect on perceived performance in the order.

**Table 7.** Effect of public confidence on perceived performance.

Variable	B	SE	$\beta$	t	p
Attractive	.129	.053	.173	2.449	.015
Professionalism	.151	.054	.200	2.782	.006
Reliability	.109	.049	.143	2.218	.028
R=.391. R <sup>2</sup> = .142, F= 13.769***					

Note: \*\*\*p<.001, \*\*p<.01, \*p<.05.

## 6.4. Effect of exercise commitment on perceived performance

A simple regression analysis was performed to analyze the effect of exercise commitment on perceived performance, and the results are shown in <Table 8>. As a result of the analysis, it was found that exercise commitment( $\beta=.256$ ) had a significant effect on perceived performance.

**Table 8.** Effect of public confidence on perceived performance.

Variable	B	SE	$\beta$	t	p
Exercise immersion	.211	.053	.256	3.952	.000
R=.256. R <sup>2</sup> = .062, F= 15.615***					

Note: \*\*\*p<.001.

## 7. Argument

This study investigated the relationship between public confidence (attraction, professionalism, and credibility) of Taekwondo instructors on exercise commitment and perceived performance.

First, it was found that among the factors of public confidence of Taekwondo leaders, attractiveness, reliability, and professionalism had an effect on exercise commitment in the order of attractiveness, reliability, and professionalism. Accordingly, also supports the results of this study by arguing that perceived public confidence leads to immersion [26][27].

It was confirmed that the public confidence of the Taekwondo instructor is a very important factor that enables the athletes to immerse themselves in the sport. Based on the results of this study, it is judged that it is necessary to devise a plan to increase the public confidence of the leader in order to increase the exercise commitment.

Looking at the results in detail, it was found that attractiveness was the most closely related to exercise commitment among the sub-factors of public confidence. Based on this, in order to appear positive and attractive to the players, taekwondo leaders pay more attention to their words and behaviors and behavior to form an image as a leader. do.

Second, the public confidence of the Taekwondo instructor was found to affect the perceived performance. Examining the results in detail, it was found that among the sub-factors of public confidence, professionalism had the greatest effect on perceived performance. It can be seen that this resulted in somewhat different results from exercise immersion.

It was found that the professionalism of the instructor is the greatest in order to improve the performance enough to be recognized by Taekwondo players. Argued that Taekwondo instructors and athletes form a very close relationship compared to other sports [28]. Also argued that the professionalism of a leader during the rapidly changing Taekwondo competition is closely related to the performance of the athletes [29]. Therefore, it is judged that the professionalism of the instructor should be strengthened in order to improve the performance of Taekwondo players.

First, in order to appeal to the players the professionalism of the leader, it is judged that the perceived performance will be greatly increased if the players communicate with the know-how and experiences of the tournament experience, build trust with the players first, and then train with a program tailored to individual characteristics.

In addition, the trustworthiness and attractiveness of the coach are also important factors for the players. If you strengthen your trust by devising a way to trust and interact with the players, and appeal to the charm through Taekwondo, the perceived performance will be maximized. is judged

Third, exercise commitment was found to have a very positive effect on perceived performance. Argued that golf players' exercise immersion had a very positive effect on performance improvement [30], and also argued that college taekwondo athletes' exercise immersion greatly contributes to perceived performance [31]. It supports the results of this study.

It was found that the exercise immersion due to the public confidence of the Taekwondo instructor leads to the perceived performance, and it was found that the exercise immersion factor also acts as a very important factor in improving the performance.

Based on these results, it is judged that it is necessary to maximize the perceived performance by strengthening the exercise immersion of the players. In order to strengthen exercise immersion, it is necessary to provide conditions by creating a place and training atmosphere, and it is judged that attachment should be heightened enough to perceive Taekwondo as a part of life.

Leaders with high public confidence provide an environment where they can immerse themselves

in the exercise by providing a program that can be accomplished by providing tasks that are appropriate for their level due to team coaching and individual coaching. is judged.

The continuously improved performance will result in an increase in competition performance or competition management ability, and this positive effect will lead to the continuous intention of Taekwondo and is expected to bring about various advantages.

## 8. Results and Suggestions

This study investigated the effect of public confidence of Taekwondo instructors on exercise commitment and perceived performance. At this point in time when the anxiety of giving up on college(exercise) due to the cancellation of the tournament due to the Corona 19 is growing, we would like to provide practical basic data for expanding the Taekwondo base through the public confidence of the leader and improving the sports immersion environment and performance of the players.

Therefore, from February to March 2022, the competition hosted by the Korea Taekwondo Association(19th Korea Taekwondo Association President, 2022 National Taekwondo Championships) in The population was selected from the participating players(Gyeonggi, Poomsae, Demonstration), and a questionnaire was distributed and a total of 278 copies were used for the final analysis. For data processing methods, frequency analysis, exploratory factor analysis, reliability analysis, correlation analysis, multiple, and simple regression analysis were performed using SPSS 21.0, and the following conclusions were drawn based on the results.

First, the public confidence of the Taekwondo instructor was found to have a significant effect on exercise commitment.

Second, it was found that the public confidence of the Taekwondo instructor had a significant effect on the perceived performance.

Third, it was found that exercise immersion had a significant effect on perceived performance.

Based on the limitations of this study, I would like to suggest the following directions for future research.

First, since this study was conducted with players participating in the tournament from February to March 2022, it is somewhat difficult to generalize. Therefore, in follow-up studies, it is judged that more diverse results will be obtained if a long period of time is selected and the study is conducted.

Second, since this study was conducted with athletes participating in the official competition hosted by the Korea Taekwondo Association, it is somewhat difficult to generalize to the public confidence of all leaders. Therefore, in the follow-up study, it is judged that more colorful results will be obtained if the research is conducted separately from the leader of the Taekwondo studio and the school(team) leader.

Third, this study investigated the public confidence of the leader without dividing the Taekwondo disciplines. Therefore, it is judged that more diverse results will be obtained if the public confidence according to the specific sports is identified in the follow-up study.

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## 10. Appendix

### 10.1. Authors contribution

	Initial name	Contribution
Lead Author	BH	-Set of concepts <input checked="" type="checkbox"/>
		-Design <input checked="" type="checkbox"/>
		-Getting results <input checked="" type="checkbox"/>
		-Analysis <input checked="" type="checkbox"/>
		-Make a significant contribution to collection <input checked="" type="checkbox"/>
		-Final approval of the paper <input checked="" type="checkbox"/>
Corresponding Author*	KC	-Corresponding <input checked="" type="checkbox"/>
		-Play a decisive role in modification <input checked="" type="checkbox"/>
		-Significant contributions to concepts, designs, practices, analysis and interpretation of data <input checked="" type="checkbox"/>
		-Participants in Drafting and Revising Papers <input checked="" type="checkbox"/>
		-Someone who can explain all aspects of the paper <input checked="" type="checkbox"/>

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