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AN EMPIRICAL STUDY FOR ATHLETIC PSYCHOLOGICAL SKILLS OF HANDICAPPED TABLE TENNIS PLAYERS IN TAIWAN

Abstract

The study was purported to examine the "athletic psychological skills" of handicapped table tennis players in Taiwan. The results might offer useful information for coaches, table tennis players, and promoting agents in terms of preparing training programs, consolidating players' confidence, promoting mental ability, improving performance and providing suggestions for competition strategies. A "Mental Skill Scale for Handicapped Table Tennis Players" was used in the research. Those subjects were handicapped table tennis players who randomly selected from various universities in Taiwan. The major findings from analyzing the answered questionnaire can be summarized as the followings:

1. The dimensions of athletic psychological skills under the investigation were "Confidence", "Teachability", "Motivation", "Peak under pressure", and "Concentration". The results showed "Confidence" owned the highest scores, meanwhile, "Teachability", "Motivation" and "Peak under pressure" followed by order and "Concentration "got the lowest scores.

2. There were significant differences in "Peak under pressure" and "Teachability" between the subjects who have diverse accomplishment. Those non-national level players performed better in "Peak under pressure" than national level players, however, the performance on "Teachability" yielded the opposite results.

Key Words: *Athletic Psychological Skills; Table Tennis; Collegiate Table Tennis Players*

Introduction

1.Motivation and the background

In 1991, the Science Committee of ITTF (International Table Tennis Federation) did a survey about psychological training to 75 participants in the 41st Table Tennis World Cup, 75.8% of players considered psychological training substantial; 74.1% of them agreed that the sport level would be raised if there are instructions given by psychologists (Chiu & Chang, 1994). Wu, Lin, and Liu (1998) found on many outstanding athletes that it is possible to be on the top of world table tennis only when an excellent athlete possesses extraordinary willpower, good thinking quality, and psychological outfit plus surpassing skills, tactics, physical strength, and accommodation. In the analysis done by An Ying and Kao Chi-ming (1998) about the world master, Waldner's key in his victory, the distinguishing characteristics of a deep technical & tactical foundations and good psychological quality of competition are the reasons why he has been a significant figure in the field of the world's table tennis for so many years.

Table tennis is a sport that requires excellent psychological control, agility, and delicate techniques. During an ever changing and extremely stressful game, what players need the most are the psychological skills such as managing stresses, lowering the anxiety, and elevating confidence. The training of table tennis also has to combine the practices of psychology, physicality, techniques, and tactics. During the game, when the skills and physical strengths of both parties are close, psychological skills will also become the key point. Besides, we notice that whether the players are of high level or not, during the important or formal games, their usual skill level is often reduced. This phenomenon is the so-called "shrinking," which means the lost of usual standard. To solve those

problems, the means to efficiently utilizing psychological skills in games becomes crucial for athletes to accelerate their technical level.

Sport for the handicapped was the athletic activity for people with handicaps to improve their body functions by physical training. It was categorized into two aspects: activities for fitness and sports of athletics. On the perspective of activities for fitness, the sport for the handicapped integrates the functions of helping the defectives gain fitness and adjust their psychology; besides, it also includes the importance of sport-rights equality. The promotion of sport for the handicapped can be an evaluation of a nation's emphasis on the defectives' welfare. The perspective of athletic sports targets at discovering the defectives' physical potentials, presenting athletic talents, and achieving excellent accomplishments in sports. Getting good grades at international athletic competition for the handicapped shows how much attention a nation pays to the welfare of the defectives. (Chia, 1995)

Actually, the sports for the handicapped has already been promoted and developed for a century. And the wheelchair table tennis has formally become an event since it was introduced and practiced in the International Stoke Mandevill Wheelchair Games held in Stoke Mandevill, London in 1952. (Wu, 2000) The sports for the handicapped originally emphasized the rehabilitation, assistance for the defectives' recreational sports, and also development of their potentials. Until the establishments of medical grading, classification of sport functions, and the promotion of athletic competition according to physicality, the sport for the handicapped was gradually valued. (Lai, 1997) Compared to common athletic competition, the special feature of sport for the handicapped is that the participants must be qualified to the lowest standard of handicaps defined by the International Sports Organization for the Disabled. Meanwhile, for assuring the candor of the competition, the participants have to be graded according to the events they attend. In the inspection of the history and the status quo of sports for the handicapped, the event of the table tennis for disabled adopts the function classification which belongs to a more mature level. (Ting, 1996) In the equitable classification system, the table tennis sport for the handicapped includes obvious characteristics of athletic sports; therefore, table tennis for the handicapped is no more a passive activity for fitness in people's eyes.

So far, under the efforts of the players, coaches, and some related scholars in our nation, the wheelchair table tennis skill has achieved excellent successes many times and shown its glory to the sports world. But with the springing up of China, S. Korea, Japan, and European countries, the competition in table tennis will be keener and keener, and the issues of related researches and skill training will be more and more important. In recent years, our nation has paid much attention to the training of physical fitness and the promotion of the sport skills for the challenged, but the related studies about sports for the disabled are very lacking. Moreover, it is even insufficient in the cultivation of players' psychological quality and practice, so that there is still much space for handicapped table tennis players' psychological training to be actualized. Especially in the field of sports for the handicapped, experts and coaches are eagerly expected to do in-depth discovery and discuss. If our nation seeks to establish a new foothold, the sport for the disabled would be an issue worth developing and strengthening. Because the promotion of sports for the handicapped not only map out an integral plan for our nationals' physical education, but also elevate our nation's image of a welfare-oriented country at the same time. Thus, to efficiently improve the training level of table tennis for the defectives by the systematic scientific training would be a significant and imperative work.

This research only focuses on the psychological skills of players from different levels in order to discuss divergences of psychological skills between defective players and others. Also, we are able to know what psychological skills do the handicapped players need, and further practice the training of psychological skills for the handicapped table tennis players. By engaging in promoting the sports for the handicapped, I thoroughly understand its specialization. In my idea, besides enhancing the popularization of sport for the challenged, we should even probe into the related academic researches, to construct a theoretical basis, so that we can objectively and scientifically evaluate the shortcomings in the practice of the sport for the handicapped, lead the related studies in

our nation to specialization and internationalization, further attract more experts to participate in the research and study of sports for the challenged.

2. Purpose
   a. To study the characteristics in psychological skills of handicapped table tennis players.
   b. To compare the psychological skills of handicapped players for different sexes, training years, game levels, and achievements.

3. Research area
This research adopted the questionnaire approach to collect related data. In order to achieve the study purpose, we designed the "Questionnaire of handicapped table tennis players' psychological skills." After testing the distinguishability, reliability, and feasibility, deleting improper questions and changing question numbers by factors of experience, the questionnaire was completed. This questionnaire is divided into two parts: a. the assessment form of psychological skills for handicapped table tennis players; b. basic data.

Study Approaches and Procedures

1. Subjects
This study focuses on understanding the psychological skills of handicapped table tennis players, and the targets are the handicapped players in Taiwan, 64 in total. Before the test, the tester explained to the students in order to make them understand. There were 70 questionnaires in total given out, and 68 returned. 4 problematic questionnaires were taken off, and the rest were 64 valid questionnaires in total. The rate of valid return is 91%.

2. The design of questionnaire
The assessment form used in the study was mainly adopted from the form modified by Chiu (2001) based on the Athletic Coping Skills Inventory-28 ("ACSI-28" for short) of Smith el al. (1995) and adapted it for our research by applying related internal and external studies as references, and then revised improper questions by the pre-exam procedure. The design lists five elements as psychological skills: "Peak under Pressure", "Motivation", "Teachability", "Concentration", and "Confidence."

a. Item analysis

There were 31 questions in the assessment form. After the samples returned, items were analyzed by the data, the questions with a critical ratio lower than 3 were deleted. By the tests of the two approaches above, the pre-exam assessment form was verified with high distinguishability. In the 31 questions, all were valid except question 7, 8, 12, 13, 15, 16, and 27.

b. Analysis of exploratory factors

There were 5 perspectives in all; the first one, "Peak under Pressure", included 9 questions, the factor loading was 0.496-0.790, the explainable measure of variance was 45.443%; the second was "motivation," 5 questions were included, the factor loading ranged 0.543-0.773, and the explainable measure of variance was 8.131%; the third was "Concentration", 5 questions, factor loading ranged 0.572-0.769, the explainable measure of variance was 5.378%; the forth was "Teachability," 2 questions, the factor loading was 0.584-0.8134, the explainable measure of variance was 4.798%; the fifth was "Confidence," 3 questions, factor loading was 0.525-0.724, explainable measure of variance was 4.516. All the items on the assessment form fall into each factor as expected.

c. Analysis of reliability

Cronbach's α was used to exam the coherence of whole content. The α coefficient above 0.7 represented the reliability, which was acceptable, but it must be rejected if α was under 0.35 (Nunnally, 1978). Thus, this assessment form showed high internal consistency, which mean it was high reliability. The total Cronbach's α of the assessment form for the psychological skills of handicapped table tennis players was

0.9438, and α coefficients of other aspects were 0.9122, 0.8449, 0.7996, 0.7346, and 0.6749.

d. Data management

After the questionnaires returned, we encoded all the data, abandoned incomplete ones and reorganize the valid ones. We used the software for statistics, SPSS for Window 10.0, to manage the information, and used $\alpha=0.05$ as the significant standard.

Results and Discussion

1. Characteristics in the psychological skills of handicapped table tennis players

a. Descriptions of features in the samples

Table 1. Features of The Samples

Variables	Category	The amount of people	Percentage (%)
Sexes	Male	45	70.3
	Female	19	29.7
Training years	1-5 years	38	59.4
	6-10 years	8	12.5
	More than 10 years	18	28.1
Days of practice	1-2 days	38	59.4
	3-4 days	8	12.5
	More than 5 days	18	28.1
Level of game	Wheelchair	41	64.1
	Stand	23	35.9
Best achievement	National champion level	24	37.5
	Non-national champion level	40	62.5
Total		64	100.0

b. Characteristics of the players' psychological skills

The aspects listed in the assessment were shown in table 2. "Confidence" got the highest scores, "Teachability" was the second, "Motivation" and "Peak under Pressure" followed in order. On the other hand, "Concentration" received the least points. The result was different from the research of Chuang (2004). Chuang checked normal table tennis players of different skill levels. The result showed the "Confidence" aspect got the lowest scores. Subjects were the possible cause to lead such unlikeness. The difference might indicate the diverse competition environment between handicapped and normal table tennis game. The handicapped table tennis players were not as many as normal players. Therefore, they had more opportunities to win the medal than those normal players. They owned much more confidence to play table tennis.

Table 2. Reflection of Aspects in Psychological Skills

Factors	Question number	Average	Standard Deviation
Confidence	4 , 6 , 21	4.11	.62
Teachability	17 , 19	3.72	.68
Motivation	2 , 5 , 14 , 18 , 30	3.58	.77
Peak Under Pressure	3 , 10 , 11 , 19 , 20 , 23 , 26 , 28 , 31	3.48	.70
Concentration	1 , 9 , 22 , 24 , 25	3.40	.69

Table3. Related Matrix of Handicapped Table Tennis Players' Psychological Skills

	Peak Under Pressure	Motivation	Concentration	Teachability	Confidence
Peak Under Pressure	1.00	.73**	.63**	.77**	.61**
Motivation	.73**	1.00	.55**	.63**	.61**
Concentration	.63**	.55**	1.00	.46**	.54**
Teachability	.77**	.63**	.46**	1.00	.54**
Confidence	.61**	.61**	.54**	.54**	1.00

2. Psychological skills in different aspects

a. Psychological skills of different sexes

After testing the scores of male/female players on the assessment form by the independent t test, the result showed that the players of different sexes do not diverse significantly on the five aspects of "Confidence", "Teachability", "Motivation", "Peak under pressure", and "Concentration" as shown in table 4. It meant that the handicapped players of table tennis do not vary in psychological skills due to sexes. The result does not cohere with Wei's research. Wei studied many kinds of school teams for national college of physical education & sports. He found the sex would affect the subject's level of Psychological skills. The unlikeness possibly was caused by events. Different events need diverse psychological skills and cause unlike impacts between both sexes. On the other hand, the handicapped people who step out and play tennis must have stronger willpower than others in spite of sexes. Regardless of the sexes, males and females put aside the preconceived ideas and the frame given by other people. So basically they had prepared well enough in psychological states to engage in sports like this, the divergence does not appear on the five aspects of psychological skills in both sexes.

Table 4. The t Test in Psychological Skills of Both Sexes

Aspects	Sexes	Average	Standard deviation	t	p
Peak Under Pressure	Male	32.56	5.29	2.18	.16
	Female	28.89	7.82		
Motivation	male	18.44	3.52	1.86	.45
	Female	16.53	4.31		
Concentration	male	17.38	3.32	1.31	.97
	Female	16.16	3.63		
Teachability	male	7.58	1.27	1.13	.82
	Female	7.16	1.54		
Confidence	male	12.64	1.77	2.05	.77
	Female	11.63	1.89		

b. Players' psychological skills of different game levels

After testing the scores on the assessment form by the independent t test, the result showed that the players of different levels did not diverse significantly on the five

aspects, as shown in table 5. Actually, the handicapped events were divided by injury, all participants had similar situation. Therefore, their recognition about psychological skills won't be affected by injuries. They didn't show variables on the five aspects of "Confidence", "Teachability", "Motivation", "Peak under pressure" and "Concentration" because of the different game levels of wheelchair and standers.

Table 5. The t Test in Psychological Skills of Players in Different Game Levels

Aspects	Game Levels	Average	Standard Deviation	t	p
Peak under Pressure	wheelchair	30.37	6.37	-1.89	.86
	standers	33.44	5.86		
Motivation	wheelchair	17.61	3.66	-.74	.12
	standers	18.35	4.18		
Concentration	wheelchair	16.46	3.36	-1.75	.53
	standers	18.00	3.41		
Teachability	wheelchair	7.27	1.42	-1.47	.49
	standers	7.78	1.20		
Confidence	wheelchair	12.07	1.72	-1.58	.29
	standers	12.83	2.02		

c. Players' psychological skills of different achievements

After testing the scores on the assessment form by the independent t test, the result showed that the tests of different achievements show apparent divergence on "Stress management" and "Teachability," as shown in table 6. We could tell from the table that those non-national performed better than national champions in "Stress management," while the performance on "Teachability" yielded the opposite result. The possible explanation was that national champions bear more pressure in usual days. Too much stress from coaches and related organizations during usual training or games caused the players' lord. Roobbin (1985) indicated stress was dynamic. It often happened when important result was uncertainty or limitedly. The possible reasons for national level players to perform better than non-national level in "Teachability" were as the following: 1.The players of national level were more aggressive to seek breakthrough than non-national level. Thus, adopting others' suggestion was a good way to try. 2. They have more opportunity to represent the nation to attend games overseas, so the acceptance of revision in actions or skills is relatively higher. Non-national champions almost have no chance to join oversea games or expose to the stimulus from other good players of other countries, so they comparatively cannot accept others' advice.

Table 6. The t Test in The Psychological Skills of Different Player Achievements

Aspects	Achievement	Average	Standard Deviation	t	p
Peak under Pressure	National	31.47	4.46	-0.03	.04*
	Non-national	31.48	7.26		
Motivation	National	18.79	3.34	1.49	.75
	Non-national	17.33	4.05		
Concentration	National	17.21	2.86	.35	.31
	Non-national	16.90	3.76		
Teachability	National	7.83	1.01	1.94	.03*
	Non-national	7.23	1.49		
Confidence	National	12.58	1.67	.80	.55
	Non-national	12.20	1.96		

*p<.05

d. Players' psychological skills of different years of training

After examining the scores by one-way ANOVA on the psychological assessment, the result showed that players of different training length of years diverse on the "Motivation" aspect, as shown in table 7. Through the comparison by the Scheffe's Method, we could see that players trained for more than 10 years score higher in "Motivation" than those trained for only 1~5 years. It was probably because players with more than 10 years of training were all national level with better achievements; they have more chances to meet other good players, and have higher self-expectation, so they have more motive than those trained for fewer years. This result cohered with Mahoney's in 1989 that excellent players had higher motive than common players. Besides, players trained only for 1~5 years were mostly novices, they were still wait-and-see with no long-term goal, so they had different self-expectation. Since table tennis had different features from other ball games that it was opposabililty, required more techniques, and needed longer training years. It was not easy to be proficient and outstanding in the games, so players trained only for 1~5 years are still waiting and learning, and those had been trained for more than 10 years were already proficient in skills and tactics. Excellent players would set clear goals, maintain high motive (Orlick, Partington, 1989) and then kept revising when facing challenges during games. They wanted more training on techniques, tactic using, and better grades in games, so they have higher motive.

Table 7. One-way ANOVA in the Psychological Skill Related to Years of Training

Aspects	Variables	Average	Standard Deviation	Source of Variance	Total Sum of Squares	Degrees of Freedom	Mean Square	F	P	Scheffe's
Peak Under Pressure	1-5 years	30.01	6.74	Class interval	218.68	2	109.34	2.91	.06	
	6-10 years	32.38	3.38	In class	2296.26	61	37.64			
	More than 10 years	34.17	5.62	Sum	2514.95	63				
Motivation	1-5 years	16.95	4.11	Class interval	91.61	2	45.80	3.34	.04*	3 > 1
	6-10 years	18.25	2.71	In class	837.40	61	13.73			
	More than 10 years	19.67	3.09	Sum	929.00	63				
Concentration	1-5 years	16.47	3.88	Class interval	37.53	2	18.76	1.63	.21	
	6-10 years	16.88	1.96	In class	703.46	61	11.53			
	More than 10 years	18.22	2.65	Sum	740.98	63				
Teachability	1-5 years	7.18	1.50	Class interval	8.15	2	4.07	2.31	.11	
	6-10 years	7.50	.93	In class	107.71	61	1.77			
	More than 10 years	8.00	1.03	Sum	115.86	63				
Confidence	1-5 years	12.24	2.02	Class interval	1.25	2	.63	.18	.84	
	6-10 years	12.38	2.07	In class	215.19	61	3.53			
	More than 10 years	12.56	1.42	Sum	216.44	63				

*p<.05

e. Players' psychological skills of different days of training

After examining the scores by one-way ANOVA on the psychological assessment, the result showed that players of different training days diverse on the "Motivation" and "Concentration" aspects, as shown in table 8. Through the Scheffe's Method, we could see players with 3-4 training days have higher motive than those with 1-2 training days. The reason could be that the former are more eager to perform well in table tennis and willing to devote more time for advanced practices since motive is the origin of improvement. Liao indicated in 1993 that higher motive means the players are willing to devote more time on their special skills.

Table 8. One-way ANOVA in the Psychological Skill Related to Training Days

Aspect	Variables	Average	Standard Deviation	ANOVA Source of Variance	Total Sum of Squares	Degrees of freedom	Mean Square	F	P	Scheffe's
Peak Under Pressure	1-2 days	30.76	7.19	Class interval	61.41	2	30.71	.76	.47	
	3-4 days	32.59	4.42	In class	2453.53	61	40.22			
	More than 5 days	33.50	3.42	Sum	2514.95	63				
Motivation	1-2 days	16.68	3.68	Class interval	164.85	2	82.42	6.58	.00*	2 > 1
	3-4 days	19.84	3.30	In class	764.15	61	12.53			
	More than 5 days	20.75	2.99	Sum	929.00	63				
Concentration	1-2 days	16.63	3.08	Class interval	82.74	2	41.37	3.83	.03*	
	3-4 days	18.47	3.06	In class	658.25	61	10.79			
	More than 5 days	14.00	6.06	Sum	740.98	63				
Teachability	1-2 days	7.20	1.42	Class interval	8.14	2	4.07	2.31	.11	
	3-4 days	7.84	1.12	In class	107.72	61	1.77			
	More than 5 days	8.25	1.26	Sum	115.86	63				
Confidence	1-2 days	12.07	1.92	Class interval	11.66	2	5.83	1.74	.19	
	3-4 days	13.00	1.70	In class	204.78	61	3.36			
	More than 5 days	12.00	1.41	Sum	216.44	63				

*p<.05

Conclusion

1. Analysis of features in psychological skills of handicapped table tennis players

There were five aspects in the psychological skills of handicapped table tennis players: "Confidence", "Teachability", "Motivation", "Peak under Pressure", and "Concentration". Above all, "Confidence" received the highest score, it showed that most handicapped players are able to take challenges on the basis of confidence and give themselves positive feedbacks.

2. Comparisons among variables in different psychological skills of handicapped table tennis players

Among the variables in different psychological skills of handicapped table tennis players, "achievement" showed divergence in "Peak under pressure" and "Teachability", and players of different training length of year diverse in "Motivation" while players of different training days showed apparent variances in "Motivation".

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