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The Effects of Performance Routine on Competitive State Anxiety, Psychological Skills, and Perceived Performance of Taekwondo Poomsae Players

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Abstract

The purpose of this study was to examine the effects of performance routine on competitive state anxiety, psychological skills and perceived performance of Taekwondo form players. The participants were composed of three women Taekwondo form players in university. The instruments of this study were composed of TOPS (Test of Performance Strategy Inventory), Revised Competitive State Anxiety-2 (Revised CSAI-2), Competition reflection Questionnaires, and perceived performance inventory. The performance routine program for Taekwondo form players was the broad routine (behavioral routine, cognitive routine), mistake coping routine, unexppected condition coping routine. 8 session performance routine program was applied to participants about 50-minute session (1 times session a week) every week. The results were as follows. Firstly, performance routine program decreased cognitive anxiety and somatic anxiety intensity but increased self-confidence intensity of Taekwondo form players. Also, performance routine program positively changed direction of cognitive anxiety, somatic anxiety and self-confidence of Taekwondo form players. Secondly, performance routine program increased self-talk, relaxation, emotion control level of Taekwondo form players. Thirdly, performance routine program enhanced perceived performance of Taekwondo form players. Lastly, qualitative data such as interview examined that performance routine program positively impacted positive thinking, competitive state anxiety, psychological skills and perceived performance of Taekwondo form players.

Key words: Performance routine, Competitive state anxiety, Psychological skills, Perceived performance

Introduction

Taekwondo is divided into basic motion, poomsae, sparring, self-defense, breaks and such, and technique, stamina, and psychological skills are important in sparring and poomsae. From early 1960s to 1990s, it was developed centering on sparring, so poomsae has been recognized as a preparation for promotion screening, but starting with Taekwondo Hanmadang Competition hosted by Korea Taekwondo Association, where the poomsae event was officially organized, the performance in poomsae event has drawn much attention and has been valued very highly (Ju, 2007; Lim & Oh, 2008), and it has also been included as a main event of the Asian Games.

A poomsae player is influenced by environmental factors (matchup, spectators, judge calls, waiting room), personal characteristic factors, body factors and such

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various factors, and excessive psychological burden interferes with the attention or concentration of the players and causes physical tension, making them not only perform inefficiently, but also be easily tired and fatigued (Lee, 2005). Also, since it is an event centering on mastery rather than accuracy, so there are players who get extremely tense when they meet opponents who are better than them or have beat them in the past, thus making unexpected mistakes, and there are often cases where players who used to perform great during training fail to perform at their best capacity during events in case the uncertainty of event results increases. Such characteristics of poomsae items suggest the need for psychological skill training of a poomsae player.

On the other hand, Vealey (1988) supported psychological training to help the player perform at their highest capacity for the target event by assisting the player with individual growth through acquiring cognitive, behavioral, and sentimental skills and interviews (Hill, 2001; Kim, 2003; Shin et al., 2006). Shin et al (2009) confirmed that the decisive psychological skills for the player to exercise the highest performance included effective goal-setting, positive sentiment/thought/behavior, appropriate anxiety and awareness level adjustment, coach confidence, consistent execution routine and such. Much psychological skill training was performed for events such as archery, shooting, diving, fencing and such because they require more psychological response capacities than other sports (Yun, 2009), and it has been confirmed that it is difficult to exercise the top performance without psychological skill training (Kang & Choi, 2003; Kim, 2010).

The events on which domestic precedent studies have been conducted to show that psychological skill training influences the psychological skills and performances of players include golf (Kim, 2003; Shin et al., 2003; Kim, 2008; Park, 2009; Kim, 2010; Kim, 2011), pistol (Ma, 2011), dance sports (Kim, 2011), bowling (Kim, 2007; Kim, 2009; Cho, 2012), badminton (Jeong, 2013), shooting and archery (Jang, 2012), ice hockey (Shin et al., 2006), aerobic gymnastics (Park, 2011), taekwondo (Kim et al., 2007; Eom, 2013), tennis (Park et al., 2005), fencing (Shin et al., 2009; Park, 2010; Shin, 2010) and such. Such precedent studies commonly utilized the routine training as the psychological skill training program.

The precedent studies comprised exclusively of routine training include golf (Lee, 2004; Yu et al., 2011; Ji, 2012), basketball free throw (Baek, 2012), diving (Song et al., 2012), archery (Kim, 2005; Kim, 2007), volleyball serve (Jeong et al., 2009), shooting (Kim et al., 2000) and such. Jang et al (2004) confirmed that routine training was effective in concentration adjustment capability and performance record of shooting players. Also, Yu et al (2011) confirmed that the records were improved in actual golf competitions against the past year through routine training program comprised of behavioral routine and cognitive routine. As the result of a study on routine in biathlon shooting players, it has been reported that players who used effective cues suited to themselves were good at attention concentration (Son, 2012).

Precedent studies confirmed the result that routine training had positive influences on the psychological skills and performance improvement in players, and due to the characteristics of taekwondo poomsae, which is a self-control skill and a closed event, routine training is a program very essential to performance improvement. That is, for a poomsae event, the player stands by while watching other competitors perform up front for about 1 minute right before the game, and experience great tension from the gaze of the judges and the spectators while expressing high-difficulty kicks as soon as the game starts, so a certain behavioral routine is necessary, and an efficient routine that can control anxiety and awareness is necessary. Also, it has been confirmed that superior players have already developed and used unique routines of their own consciously or unconsciously in the game situation in order to exercise their highest capacity during the game (Korea Society of Sport Psychology, 2005; Lee, 2009; Kim, 2010), and have developed and used positive private speeches, and picture successful images frequently (Nideffer et al., 2001; Yu et al., 2011). From such aspects, it is thought to be necessary to identify what the psychological issues experienced by players in the poomsae event are, and

develop/apply the performance routine suited to the individual characteristics while also being effective in exercising psychological skills and performances (Lee & Park, 2003; Lee, 2004).

On the other hand, the functions promoting performance improvement can be interpreted in various aspects, among which it allows the players to concentrate on their own minds rather than losing attention to cues unrelated to the skill performance during games, thus removing unnecessary distractions (Boutcher, 1992; Moran, 1996; Kim, 2005; Park, 2009). Also, a performance routine with a complex combination of behavioral factors and cognitive factors is utilized by the player to control the pace of the game and prepare the skills to be exercised in the game (Kim et al., 2000). Cognitive factors consist of psychological relaxation, imagery, technical evidences, cognitive reconstruction, confidence maintenance, positive thinking, self-statement, decision-making process, attention concentration and such factors necessary for the best performance (Cohn et al., 1990; Yu et al., 2011), and behavioral factors consist of physical relaxation, motions necessary for skill performance, and factors requiring the same actions. While cognitive factors and behavioral factors are included in the routine, it should be constituted according to the characteristics of the event and the skill levels, and since each player has different psychological skills by default and different capacities to exercise such, so the routine program should be developed individually with the help of an expert (Prapavessis & Grove, 1991; Murphy & Jowdy, 1992; Tenenbaum, 2001; Jang et al., 2004). Also, Daw and Burton (1994) claimed that an active cooperation of the coach constituting the practice method in order to perform the psychological skills successfully.

In this study, the details suggested by such precedent studies have all been reflected to develop and train the individual routines with high site applicability that are helpful for improving psychological skills and performance in taekwondo poomsae players. In order to achieve this study objective, the following study questions have been established. First, will performance routine influence the intensity and direction of the competitive state anxiety in the college taekwondo poomsae players? Second, will performance routine influence the psychological skills of the college taekwondo poomsae players? Third, will performance routine influence the perceived performance of the college taekwondo poomsae players?

Method

Participants

The participants of this study consisted of 3 female taekwondo poomsae players at D university who are registered as players at Korea Taekwondo Association and B Metropolitan City Taekwondo Association, with careers spanning from 5 to 7 years. As for performance level, all study participants had experiences of ranking in the top 3 in regional and national college poomsae competitions. The participants were on the school team, participating in the training according to the poomsae team schedule with morning training and individual training after school, had had no experience in psychological skills training at all, and voluntarily agreed to participate in the program after being debriefed on the objective and method of the routine training. Also, considering that all 3 poomsae players wanted to participate in the program and the ethical/educational aspect that the benefit of the program should be applied to all players, only the routine training group was established without a control group.

Measurement Tool

All measurement tools used in this study were verified by two doctors in sports psychology, two graduate students who are taekwondo poomsae players and also majoring in sports psychology, and two taekwondo poomsae instructors regarding the test sheet before use.

Modified Competitive State Anxiety Test Sheet (CSAI-2)

In order to measure the competitive state anxiety of the study subjects, CSAI-2 (Competitive State Anxiety Inventory – 2) test sheet developed by Martens, Vealey and Burton

(1990) was used. This criterion consists of cognitive anxiety, physical anxiety, and state confidence, and the sub-factors for each were constituted of 9 questions and 4-point Likert scale. For the question measuring the competitive state anxiety symptom direction, the method suggested by Jones and Swain (1992) was used. That is, the study subject indicated the level of how facilitative or debilitative the competitive state anxiety symptom was perceived to be towards the performance. The response was a 7-point scale where "very debilitative to performance" at -3, "not important" at 0, and "very facilitative to performance" at +3.

Korean-Version Performance Strategy Test Sheet (TOPS)

In order to find out the changes in psychological skills through performance routine training, this study used the Korean-version performance strategy test sheet developed by Kim and Oh (2002) based on the test of performance strategies (TOPS) developed by Thomas et al (1999). TOPS consists of 5 strategy factors and psychological skills used by the player in training circumstances and at competitions (monologue, imagery and objective setting, tension relief, condition control, emotion control).

Cognitive Performance Test Sheet

This study used the cognitive performance test sheet developed for performance measurement by Mamassis and Doganis (2004). This test sheet consists of a 5-point scale with 8 sub-factors for measuring the sports performance of the players, and the 8 sub-factors are as follows. First, their physical perception, second, timing and rhythm, third, quality of technique, fourth, concentration, fifth, psychological attitude and thinking, sixth, quantity of efforts, seventh, in-game confidence level, and eighth, the comparison of the expected performance and the actual performance in the game against their opponents. The higher the score, the higher the performance, and the performance score was analyzed as the sum of the 8 items, not just as each item.

Routine Training Program

The contents of performance routine training program for taekwondo poomsae players were constituted to suit each individual player by integrating player interviews, precedent study considerations, and expert opinions (1 professor of sports psychology, 1 doctor of sports psychology, 1 professor of taekwondo poomsae practice, 1 master of sports psychology who is also a poomsae player, 2 taekwondo instructors registered as players at Korea Taekwondo Association with winning records at a national level, 4 players with winning records at metropolitan city taekwondo associations). The performance routine training program produced in this study was prepared as a manual and provided individually. This study consisted of 8 steps (1 step: once a week), and each step took about 50 minutes. At each step, the performance routine training program explanation and practice, and inspection of application level in practice situations were conducted.

The contents of performance routine training program applied in this study are as in <Table 1>. The performance routine training program is to produce detailed behavior, perception, and thoughts sequentially for attention concentration against what may happen before/during the game for the player himself/herself (Kim, 2007).

This study consisted of 10 minutes before the game, right before the game, and after the game (after demonstrating 1 of 2 poomsaes) for the taekwondo poomsae player, and was divided into behavioral routines and cognitive routines. Additionally, the routine used for a side kick by circumstances and mistake-overcoming cognitive routine, and cognitive routine per each poomsae were used. The side kick routine was developed by the researcher as it was commonly pointed out in the interviews with the study subjects that they felt insecure during side kicks. Also, poomsae games designate 2 poomsaes randomly, and the poomsae to be demonstrated is displayed on the electronic display when the player enters the stadium. Therefore, since each poomsae has different points to focus on, the cognitive routine per each poomsae was developed. Also, a response routine against an unexpected situation before the game was developed to prepare for unexpected situations before the game.

Table 1. Performance Routine Training Program Contents

Phase	Step	Content
Pre-phase	Preparations	* Instructor interview * Routine program documentation considerations
	Step 1	* Test sheet distribution * Group interview
	Step 2	* Test sheet distribution
	Step 3	* Test sheet distribution * Player routine inspection (training video shooting, actual practice training accompaniment)
Actual training phase	Orientation	* Theoretical explanation for routine program composition * Player routine analysis result discussion
	Step 1	* Test sheet distribution * Performance routine overall briefing * Performance routine demonstration
	Step 2	* Performance routine applied to practice circumstances
	Step 3	* Performance routine inspection
		Simulation game (execution evaluation) * Test sheet distribution
	Step 4	* Inspection of routine application to simulation game (video analysis and individual evaluation) * Routine modification and supplementation
	Step 5	* Performance routine applied to practice circumstances
	Step 6	* Performance routine applied to practice circumstances
	Step 7	* Performance routine final inspection
		Simulation game (execution evaluation) * Test sheet distribution
	Step 8	* Performance routine final decision (video analysis and individual evaluation) * Training program effect analysis (individual interview)

For the performance routine training of study subjects, behavioral routine and cognitive routine were conducted in parallel, where cognitive routine training focused on the training to reproduce the perception at the best game and the perception of performance at the best condition, and the game-recollection questionnaire developed by Orlick (1986) was used. Through this, the best and worst games of the player were recollected to identify the perception, thoughts, behaviors, concentration of the player in the game situations, and the two games were compared for psychological/physical differences.

The game recollection questionnaire consisted of 12 questions, where the content was to answer each question while recollecting the best and worst games, and consisted of simple-answer questions from 0 to 10 on a 11-point scale and open questions inducing free answers with no special scoring scheme, which was used to compare and check the best and worst games of the player. For behavioral routine training, the practice during training was shot with a video camera and analyzed when developing the routine sequence, so as to identify certain habits or behaviors during the training of the player. Through video analysis, it was possible to provide the information on bad habits, specific habits and such of the player of which the player herself was not aware, providing more objective information to the players. Also, it was utilized as a good indicator to check if the behavioral routine was being well executed, and to modify/supplement in cooperation with the player (Yu et al., 2011).

The overall routine of the study subjects was as follows.

Table 2. *Player P Performance Routine*

	Behavioral Routine		Cognitive Routine
10 minutes before the game	Stretching (lower body flexibility, shoulder) Stretch legs against the wall	10 minutes before the game	Remind the performance goals
	Kicking while facing the wall (4 times of pelvic rotation, 2 times of leg shaking off, 1 time of forward bend stretching and then left kick – right kick in order) 1~2 times sequentially from side kicks		
	1~2 times of light shouting while relaxing the shoulder		Imagery (best-performed side kick, important points in poomsae)
Right before the game	Make popping sounds with the toe bones (twice per each foot)	Right before the game	(When nervous) I even did demonstrations; this nervousness is nothing.
	Fix the attire and take deep breath (pull up the pants, pull the clothes at the back, at the front, and fix the belt)		Positive keyword (I'm the best!)
	Relax the shoulders		
After the game	Turn around and fix the attire	After the game	Think of demonstration poomsae cognitive routine
Side kick	Gaze toward the kicking point	Side kick	Push in the hip (hip!)

Table 3. *Player W Performance Routine*

	Behavioral Routine		Cognitive Routine
10 minutes before the game	Stretching (lower body stretching) (Face the wall and raise the side kick) Kick once and kick facing the wall once (left foot, right foot)	10 minutes before the game	Imagery (think of the stadium and poomsae points)
	1 time of low front kick, 1 time of high kick (in the order of right foot, left foot)		Remind the performance goals
	Full power for right hand twice, left hand twice (repeat until satisfied)		
Right before the game	Check the feel for the floor (Fore sole chop once for right foot and then shaking off the feet)	Right before the game	I am strong powerful!
	Stretching (pelvis push)		Let's take the opponent into my pace!
	Check the attire and take a deep breath		
After the game	Turn around and fix the attire, fix the hair, check the attire	After the game	Think of demonstration poomsae cognitive routine
Side kick	Pelvis push	Side kick	Pull the knees to the chest (knee!)

Table 4. Player K Performance Routine

behavioral routine		cognitive routine	
10 minutes before the game	Stretching (side kick stretching with the foot on the wall, front kick stretching) Sit and stand 10 times Hold the wall and kick 2 times each (Front kicks after 5 front sole kicks)	10 minutes before the game	Imagery (recollect the poomsae that was good today during practice)
	Full power until the sound feels satisfactory (shout twice)		Remind the performance goals
	Light standing jump 5 times Fix the attire and take a deep breath		
Right before the game	Check the feel for the floor	Right before the game	
	Check the attire and take a deep breath (order of attire – touch the front hair twice, pull the front side to the back, pull the rear side to the front, fold over, and lower the belt down to the pelvis)		Positive keyword I can do it! I believe in myself
	Relax the shoulder Rotate the knees		
After the game	Turn around and fix the attire	After the game	Think of demonstration poomsae cognitive routine
Side kick	Gaze towards the kicking point	Side kick	Hands on hip! (hands!)
			Gaze until kicking!

Table 5. Mistake-overcoming cognitive routine, cognitive routine per each poomsae

Mistake-overcoming cognitive routine			
Fine		Let's finish it	
Poker face			
Cognitive routine per each poomsae			
Taeguk 8	Lower the posture, diamond	Pyeongwon	Front kick, turn around and eyes!
Goryo	Repeated snap-snap (kicking speed)	Shipjin	Lower the posture and heavily
Geumgang	Center! One two~eight and snap!	Jitae	Kick and center! Kick~ and punch!
Taebaek	Center when turning!		

Mistake-overcoming routine and cognitive routine per each poomsae

The poomsae event is difficult to use behavioral strategy as mistake-overcoming routine in performance routine, so the mistakes during games were made to overcome with cognitive strategies, and the important points to remember for each poomsae were constituted as the cognitive routine per each poomsae.

Response routine against unexpected situations

① In case the game time is delayed
Stretch more comfortably and conduct imagery training.

② In case the game is delayed due to the inadequate game direction by the judge during standby right before the game, take a deep breath and turn around and fix the attire one more time. And remind the routine for right before the game once again.

③ In case the opponent player has not shown up
Execute the routine for right before the game just the same, take a bow politely, get the game results,

and leave. After that, when preparing for the game with the next opponent, there may be the burden for not having played a game in the stadium since you played one fewer game than the opponent, but the opponent would have consumed more stamina due to the pressure from the game. So, remind the cognitive routine for confidence.

④ In case the next game is right after the previous game without a break, turn around and fix the attire, take a deep breath, remind the cognitive routine for right before the game, and enter the game.

Data Analysis

In this study, the quantitative data analysis used the SPSS 20.0 Version program, and the performance routine program was divided into before intervention and after intervention, and the average score per factor of sports performance strategy test sheet, modified competitive state anxiety test sheet, and perceived performance test sheet were compared to the baseline 3-time averages and 3-time averages per training step.

Results

Influence of performance routine on the competitive state anxiety

The influence of the performance routine on cognitive anxiety intensity in college taekwondo poomsae player was analyzed, and the results were as follows. As shown in <Table 6>, the cognitive anxiety intensity and physical anxiety intensity of player P were reduced, and the state confidence intensity was increased. The cognitive anxiety direction and the physical anxiety direction were positive from the training stage, and were decreased slightly, but the confidence direction changed from negative to positive. The cognitive anxiety intensity and physical anxiety intensity of player W were reduced, and the state confidence intensity was increased. The cognitive anxiety direction and the physical anxiety direction showed patterns of negative direction, but the confidence direction changed from negative to positive. The cognitive anxiety intensity and physical anxiety intensity of player K were increased, and the state confidence intensity was increased. The cognitive anxiety direction, the physical anxiety direction and the confidence direction changed to positive directions helpful for the performance. Overall, the performance routine caused positive changes in the intensity and direction of competitive state anxiety of the 3 players, and partial negative changes are thought to require in-depth studies.

Influence of performance routine on sports performance strategy and perceived performance

The influence of performance routine on performance strategy and perceived performance in college taekwondo poomsae players was analyzed, and the results are as follows. As shown in <Table 7>, the form of positive changes to monologue, condition control, imagery and goal setting, tension relief, and emotion control was commonly observed in all three players.

Table 6. *Changes in modified competitive state anxiety according to routine training per player*

Variable	Cognitive anxiety intensity		Cognitive anxiety direction		Physical anxiety intensity		Physical anxiety direction		Confidence intensity		Confidence direction	
	pre-time	post-time	pre-time	post-time	pre-time	post-time	pre-time	post-time	pre-time	post-time	pre-time	post-time
Player P	3.77	2.55	2.55	0.77	3.44	2.70	1.96	1.07	1.89	2.78	-1.44	1.00
Player W	3.14	2.51	1.11	0.73	2.21	1.62	0.11	-1.37	1.74	2.33	-0.48	0.29
Player K	2.40	3.22	0.03	1.62	2.25	2.58	-0.51	0.40	1.44	2.36	-1.77	-0.51

Table 7. Changes in performance strategy and perceived performance according to routine training per player

	Monologue		Condition control		Imagery and goal setting		Tension relief		Emotion control		Perceived performance	
	pre-time	post-time	pre-time	post-time	pre-time	post-time	pre-time	post-time	pre-time	post-time	pre-time	post-time
P	3.66	4.00	3.61	4.23	3.73	4.00	1.91	3.25	1.91	3.08	3.24	3.99
W	3.58	4.00	3.37	3.90	2.93	3.33	1.91	3.16	1.75	2.16	3.04	3.20
K	3.41	4.41	3.61	4.23	3.66	3.93	2.75	3.08	2.41	3.66	2.75	4.29

As the result of analyzing the influence of performance routine on perceived performance, the form of positive changes to perceived performance was commonly observed in all three players.

Analysis of qualitative effect through interviews

For a more in-depth examination of the effect of performance routine training program conducted against female taekwondo poomsae players, interviews have been conducted with the players during the program intervention period. As the result of analyzing the interview contents, the female taekwondo poomsae players overall were categorized into competitive anxiety, psychological skills, and perceived performance with respect to the effect of the performance routine training program, and this indicates that the performance routine had positive influences on the competitive state anxiety, psychological skills, and perceived performance of taekwondo poomsae players. The interview contents of the female taekwondo poomsae players can be summed up as follows.

"During the 2nd simulation game, after the 1st poomsae demonstration, I tried to think only of the next poomsae cognitive routine while fixing the attire, and not think of anything nervous. Then I think I grew more confident and comfortable as the game went on one by one." (Player P)

"I became much more confident than before. And I can feel better concentration and less anxiety. I used to feel like I will keep making mistakes over the part I once errored, but saying positive words like 'I can do well' a lot reduced the negative thoughts, naturally improving the kick performances, and it feels good." (Player P)

"The behavioral part was very helpful from the performance routine. Especially, I used to see other people stretching and 'huh, they do that kind of stretching? I should try myself' and do excessive stretching, which consumed a lot of stamina and led to bad fatigue, but now that the routine has been established, there are no unnecessary motions anymore, so I feel more energetic and recharged, which feels good." (Player P)

"Side kicks used to not go well and I used to feel bad, but I pictured back when I was good, and think positively a lot. And I tend to get very nervous at the stadium, so that when fixing the attire, I reminded myself look to a single spot only! don't get nervous! while rubbing the chest with hands, which I found helpful." (Player W)

"I always used to perform poomsae without thinking, but now I think once more before performing an action. Especially the concentration for side kicks (cognitive routine) was very helpful and I liked that. I still do performance routines habitually, and will continue to do so." (Player W)

"My poomsae wasn't so clean as I kept thinking of the next action during poomsae performance, but now that I do not think too much during poomsae performance and only focus on the main points (respective poomsae cognitive routine), side kicks work better and it felt comfortable." (Player K)

"I don't do much poomsae or stretch a lot on the game day, and having a behavioral routine suited to such

allowed me to practice the stretching and only the part absolutely necessary for the game, which was good." (Player K)

"When performing poomsae in group under practice circumstances, the standby time was very short so I didn't get to the routine for right before the game, and performed just the cognitive routine for unexpected circumstances and went into the game. If something like that happened in an actual situation, I would have been very anxious, so it was good to practice beforehand. Poomsae game is a closed event, but it makes me very anxious when the circumstances change outside the poomsae. I think the cognitive routine for the unexpected circumstances that you made at this time is very helping." (Player K)

Discussion

The objective of this study was to analyze the influence of performance routine on competitive anxiety, psychological skills and perceived performance in college taekwondo poomsae players. Through study subjects, expert group meeting and participative observations, the individual psychological characteristics with taekwondo poomsae were identified. Also, based on the domestic precedent studies (Kim et al., 2000; Kim, 2003; Lee, 2004; Jang et al., 2004; Kim, 2005; Kim, 2007; Jeong et al., 2009; Yu et al., 2011; Ji, 2012; Baek, 2012; Song et al., 2012) and foreign precedent studies (Mahoney et al., 1977; Kirschenbaum et al., 1982; Moore, 1986; Orlick, 1986; Lobmeyer & Wasserman, 1986; Boutcher et al., 1987; Cohn et al., 1990) that routine positively influences the competitive anxiety and psychological skills of the players, the expert opinions, player interviews and such data were integrated to develop a performance routine training program. Based on the study results, the following discussions follow.

First, performance routine training had positive influences on the sub-factors of the competitive state anxiety in taekwondo poomsae players, namely, cognitive anxiety intensity, physical anxiety intensity, and confidence intensity. The precedent studies that psychological skills training including routine training had positive influences on competitive anxiety (Suinn, 1989; Orick, 1995; Bum et al., 1996; Seol, 2000; Ju, 2000; Kim, 2002; Ju, 2003; Gil et al., 2004; Shin et al., 2006; Park, 2009; Song et al., 2012; Eom, 2013) support this study. As all sports include an anxiety element, it is thought to be very important also for poomsae, which is a representative close event. The reason why this study showed positive influences on competitive anxiety was thought to be because repeated positive cue words and deep breaths during anxious and tense practice situations could reduce anxiety. Such results partially support the study that psychological skills training reduced the competitive state anxiety of the players and improved the state confidence (Shin et al., 2009). The study by Park (2009) that when routine training was conducted against golf players, who had similar event characteristics as this study, there were positive influences on competitive characteristic anxiety, competitive state anxiety, psychological skills, and records.

Among the study participants, player K showed slightly high anxiety, and the study by Jeong et al (2007) which indicated that it was not easy to change the negative thinking of the player herself within a short period, and while it was important to lower the state anxiety intensity before the game, it was more effective for performance to perceive the anxiety positively.

As it is thought that there may be somewhat logical leap to describe the routine training effect with competitive state anxiety changes only, this study added the competitive state anxiety direction variable based on the study by Byeon and Han (2012) on the direction analysis and performance relation against track players and precedent studies (Jones et al., 1992; Jones & Hanton, 1996) which suggested that anxiety direction had a closer relation than the intensity does.

In this study, player K showed increases in all of cognitive anxiety direction, physical anxiety direction, and confidence direction. Player P and player W showed decreases in cognitive anxiety direction and physical

anxiety direction, but an increase in confidence direction. The decrease in anxiety direction in the two players is thought to be due to the failure to control external environmental factors.

Second, performance routine training had positive influences on the sub-factors of the psychological skills in taekwondo poomsae players, namely, monologue, condition control, tension relief, and emotion control, and imagery and goal setting showed almost no changes. This study is supported by the precedent studies (Kim et al., 2000; Kim, 2002; Kang et al., 2003; Jang et al., 2004; Lee, 2005; Kim, 2007; Yu, 2010; Yu et al., 2011; Son, 2012; Song et al., 2012; Eom, 2013) that psychological skills training including routines had positive influences on psychological skills.

This study showed overall improvement results with the sports execution strategy of players, among which 'tension relief' area showed improvement by the largest at .93 on average. The fact that tension relief showed the largest improvement among sub-factors was thought to be because the players lacked basic knowledge on psychological skills training before the study intervention, and as they participated in this study, they studied the theoretical parts beforehand and conducted cognitive routines when under tension, thus greatly improving the tension relief compared to before the study intervention. This is supported by the study results by Kim (2003) which claimed that performance routine training had positive influences on psychological skills factor, and the factors emphasized as weaknesses at the previous stage showed positive influences after the training intervention.

Player W, a participant of this study, mentioned that when she had performed poomsae, she had been dragged by the poomsae speed of the opponent, and stated that she felt she led the opponent after receiving the performance routine training. This partially matched the precedent study (Lee et al., 2011) where the player felt he or she was 'leading the game on his/her own' through psychological skills training. Kirschenbaum et al (1982) suggested evidence that the training for developing and familiarizing with detailed concentration routines against games was effective on the emotion control and positive monologues of the player, and this could be seen as similar to the results of this study.

In this study, the imagery and goal setting almost did not change, and such result is thought to be because the study subjects had conducted imagery training individually, and there were modifications and educations on the lacking parts only, and the goal setting was relatively high from the pre-study phase.

Third, performance routine training had positive influences on perceived performance in taekwondo poomsae players. Poomsae is subjectively evaluated by each of the 5 judges, and the performance can greatly vary by the matchup, so this study measured the performance perceived by the player herself regardless of the game results, that is, win or loss. Such result partially matches the study (Yu et al., 2010) that psychological skills of taekwondo players had significant influences on their perceived performances. Also, player W reported that while she did not make it to the finals in the game, she had her goals set on the performance process, not the game results, and thus was satisfied with the performance of that day as she perceived it. This study results are partially supported by the precedent studies (Kang et al., 2009; Ma, 2011; Jang, 2012) which confirmed that perceived performance showed positive influences from psychological skills training. It is thought that subsequent studies would yield more significant results by analyzing the routine training effects through measurement of perceived performance along with actual games.

Finally, from the analysis of the details from the qualitative studies, the interview results that all three taekwondo female poomsae players who participated in the study came to have more positive thinking than negative thinking, and perform well at the game for not wasting unnecessarily with systematic behaviors confirmed that performance routine had positive influences on competitive anxiety, psychological factors and perceived performance.

Player K stated that she used to think about the next move during poomsae, so that her poomsae was not very clean, but cognitive routine per each poomsae had positive influences on performance. For a poomsae game, it is

impossible to know which poomsae would be prompted from Taegeuk 8 to Jitae, and the poomsaes to be performed is displayed on the electronic display when the players enter. At the time, there are about 10 seconds to think of that poomsae, but since they have already practiced like an actual game with the cognitive routine per each poomsae, so they get to think of the main points only when the poomsae appears on the electronic display, which is thought to have had positive influences on the performance. Such results suggest that the cognitive routine per poomsae with validity and on-site presence created in this study helped the player. Since poomsae is characteristic in that one cannot perform an action again after a behavioral mistake, so this study developed a mistake-overcoming cognitive routine. This study result was supported by the study by Kim (2003) which showed the importance of the application with interest in developing the routine after mistake and the pre-shot routine including detailed cognitive-behavioral inspection procedures.

While the mistake-overcoming cognitive routine, cognitive routine per each poomsae, and response routine against unexpected circumstances developed by this researcher had positive influences on the study subjects, the statistical significances have not been verified, so it is thought that it cannot be generalized. From such aspects, it is thought that the subsequent studies require a study verifying the quantitative and qualitative effects of the routine program. Also, in order to measure the effects of the routine training program more accurately, it is thought to be necessary to develop psychological test sheets suited to the poomsae event.

References

Baek, S. (2012). Influence of free throw routines on free throw performances in elementary school female basketball players. Master thesis at Korea National University of Education.

Boutcher, S. H. (1992). Attention and athletic performance: An integrated approach. In T. S. Horn (Ed.), Advances in sport psychology. Champaign, IL: Human Kinetics. 251-265.

Boutcher. S. H., & Crews, D. J. (1987). The effect of a pre-shot attentional routine on a well-learned skill. International Journal of Sport Psychology, **18**, 30-39.

Boutcher, S. H., & Crews, D. J. (1992). Imagery and Mental Practice. In T. s. Horn (Ed). Advences in sport psychology. Human Kinetics Publishers. Inc, 221-250.

Bum, D. J., Morris, T., & Andersen, M. B. (1996). Stress, life and visual attention. Proceeding of the international Congress on Stress and Health. Sydney.

Byeon, M., Han, G. (2012). Relation of performance and direction interpretation of competitive anxiety in track players. Sports science collected papers, **24**, 125-148.

Cho, S. (2012). Influence of psychological skills training on sports psychological skills and performance in bowling players on female business teams. Doctoral thesis at University of Ulsan.

Cohn, P. J., Rotella, R. J., & Lioyd, J. W. (1990). Effects of a cognitive-behavioral intervention on the pre-shot routine and performance in golf, The sport Psychologist, **4**, 33-47.

Daw, J., & Burton, D. (1994). Evaluation of a comprehensive psychological skills training program for collegiate tennis players. The Sport Psychologist, **8**(1), 37 - 57.

Eom, G. (2013). Effect of psychological skills training program for performance improvement of taekwondo players. Master thesis at Gachon University.

Gil, J., Kim, H., & Kim, S. (2004). Influence of psychological skills training on competitive anxiety reduction in sports injury players. Korea Sports Research, **15**(6), 1093-1102.

Hill, K. L. (2001). Frameworks for sport psychologists: Enhancing sport performance. Champaign, IL: Human Kinetics.

Hong, S. (2005). Application and effect of psychological skills training program for softball pitchers. Doctoral

thesis at Kyonggi University.

Jang, D., Kim, B., Gu, H., & Shin, D. (2004). Effect of routine training in a single-case shooting player. Journal of Korean Society of Sports Psychology, **15**(1), 79-96.

Jang, J. (2012). Influence of psychological skills training on psychological variables and performance in shooting and archery players. Doctoral thesis at Chonnam University.

Jeon, M., & Kwak, E. (2001). Sports psychology for game directors. Bogyeong Munhwasa.

Jeong, C. (2003). Understanding of sports psychology. Seoul: Publisher Geumgwang.

Jeong, E. (2013). Effect of psychological skills training in college female badminton players. Doctoral thesis at Busan University of Foreign Studies.

Jeong, G., Jang, D., & Hwang, G. (2009). Improvement of serve performance through development and application of serve concentration routine in male middle school volleyball players. Journal of Korean Society of Sports Psychology, **20**(1), 35-48.

Jeong, J., Yook, D., & Kim, B. (2007). Influence of psychological skills training on competitive state anxiety and perceived performance in figure skating players on a national team. Journal of Korean Society of Sports Psychology, **18**(1), 33-55.

Ji, Y. (2012). Relationship of pre-shot routine, psychological skills and performance in golfers. Journal of Korean Society of Sport and Leisure Studies, **48**, 407-418.

Jones, G., & Hanton, S. (1996). Interpretation of competitive anxiety symptoms and goal attainment expectancies. Journal of Sport and Exercise Psychology, **18**, 144-157.

Jones, G., & Swain, A. (1992). Intensity and direction as dimensions of competitive state anxiety and relationships with competitiveness. Perceptual and Motor Skills, **74**, 467-472.

Ju, D. (2000). Influence of psychological skills training method on competitive anxiety, physiological factors, and golf putting performances. Doctoral thesis at Chonnam National University.

Ju, H. (2007). Influence of taekwondo poomsae competition operation factors on the participation satisfaction level. Master thesis at Keimyung University.

Ju, J. M. (2003). Influence of psychological skills training on taekwondo sports performance capabilities. Doctoral thesis at Kyung Hee University.

Kang, G., Kim, S., Kwon, S., & Lee, H. (2009). Influence of self-management strategies of taekwondo players on their perceived performances. Journal of Korean Alliance of Martial Arts, **11**(2), 205-219.

Kang, S., & Choi, J. (2003). Development of psychological skills training program of pro golfers. Journal of Korean Society of Sports Psychology, **14**(2), 265-285.

Kim, B., Kim, J., & Hwang, J. (2000). Effect of routine before shooting game performance. Journal of Korean Alliance for Health, Physical Education, Recreation, and Dance, **39**(1), 265-274.

Kim, B. (2002). Actually easy mental training (tennis). Publisher Mujigae

Kim, B. (2003). A single case study regarding golf psychological skills training effects. Journal of Korean Society of Sports Psychology, **14**(2), 213-233.

Kim, B. (2007). Development of pre-shooting routine program before/during games for archery players. Journal of Korean Society of Sports Psychology, **18**(3), 119-143.

Kim, B., & Oh, S. (2002). Validation of Korean-version Test of Performance Strategy (TOPS): question development and factor search. Journal of Korean Society of Measurement and Evaluation, **4**(1), 13-29.

Kim, G. (2008). Case study on psychological skills training application of pro golfers. Doctoral thesis at University of Ulsan.

Kim, J. (2002). Verification of efficiency and development of psychological skills program in swim games. Journal of Korean Alliance for Health, Physical Education, Recreation, and Dance, **41**(5), 177-188.

Kim, J. (2005). A study on effects and development of routine training program for archery players. Journal of Korean Physical Education Association for Girls

and Women, **19**(6), 41-52.

Kim, J. (2007). Case study of person-centered interview and psychological skills training application for bowling players. Doctoral thesis at Sungkyunkwan University.

Kim, J. M. (2011). A single case study regarding the effect of psychological skills training in amateur female golfers. Doctoral thesis at University of Ulsan.

Kim, J., Kim, S., & Hwang, J. (2007). Relationship of imagery types and competitive states in taekwondo players. Journal of Korean Society of Sports Psychology, **18**(1), 119-131.

Kim, S. (2010). Influence of psychological skills and routine of players participating in KLPGA Section 1 on performances. Doctoral thesis at Kyung Hee University.

Kim, S. (2011). Analysis of effect of psychological skills training in middle-school dance sports players. Master thesis at Sunchon National University.

Kim, Y. (2009). Analysis of effect and development of psychological skills training program for classes for bowling players. Doctoral thesis at Yonsei University.

Kirschenbaum, D. S. & Ordman, A. M, Tomarken, A. J., & Holtzbauer, R. (1982). Effects of differential self-monitoring and level of mastery on sports performance : Brain power bowling. Cognitive Therapy and Research, **6**, 335-342.

Korean Society of Sports Psychology (1999). Theory and reality of psychological training for sports competition. Korean Society of Sports Psychology, 1999 winter workshop collected papers.

Korean Society of Sports Psychology (2005). Sports psychology handbook. Seoul: publisher Mujigae.

Kwon, S. (2009). Golf psychological skills training effect from a single case. Sports Science Research, **20** (1), 129-145.

Lee, G. (2004). A single-subject case study on effect of pre-shot routine training in KPGA tour golfers. Journal of Korean Alliance for Health, Physical Education, Recreation, and Dance, **44**(2), 141-154.

Lee, G. (2005). A case study on effect of pre-shot routine training in KPGA, KLPGA tour golfers. Doctoral thesis at Sungkyunkwan University.

Lee, G., & Park, Y. (2003). Comparison of psychological state during game between Korean pro golfers and Australian amateur golfers. Journal of Korean Society of Sports Psychology, **14**(4), 175-188.

Lee, H. (2009). Effect of golf performance routine utilizing self-monitoring. Master thesis at Hanyang University.

Lee, J. (2005). Influence of psychological state on attention concentration in golfers. Korea Sports Research, **16**(5), 193-202.

Lee, M., & Park, S. (2011). Effect of psychological skills training application in track throw players. Journal of Korean Society of Sports Psychology, **22**(2), 77-92.

Lee, S. (2007). Application and effect of psychological skills training program (PSTP) for fencing players. Doctoral thesis at Korea National Sport University.

Lim, S., & Oh, C. (2008). Influence of the awareness of judge evaluation of taekwondo poomsae competition on psychological state and performance in taekwondo players. Journal of Korean Society of Sports Science, **17**(4), 403-413.

Lobmeyer, D. L. & Wasserman, E. A. (1986). Preliminaries to free throw shooting: Superstitious behavior? Journal of Sport Behavior, **9**, 70-78.

Ma, Y. (2011). Influence of psychological skills training on competitive anxiety, psychological skills effects and performance of female pistol player on the national team. Master thesis at Kangwon National University.

Mahoney, M. J., & Avener, M. (1977). Psychology of the elite athlete : An exploratory study. Cognitive Therapy and Research, **1**, 135-141.

Mamassis, G., & Doganis, G. (2004). The effect of mental training program on juniors pre-competitive anxiety, self-onfidence, and tennis performance. Journal of Applied Sport Psychology, **16**, 118～137.

Martens, R., Vealey, R., & Burton, D. (1990). Competitive Anxiety in sport . Champaign, IL: Human Kinetics.

Moore, W. E. (1986). Covert-overt service routines: The effect of a service routine training program on elite tennis players.

Moran, A. P. (1996). The psychology of concentration in sport performers: A cognitive analysis. Hove, England: Psychology Press.

Murphy, S. M. & Jowdy, D. P. (1992). Imagery and Mental Practice. In T. S. Horn (Ed.) Advances in sport psychology. Human Kinetics Publishers, Inc. 221-250.

Nideffer, R. M., Sagal, M. S., Lowry, M., & Bond, J. (2001). Identifying and developing world class performers. In G. Tenenbaum (ED.), The practice of sport psychology. Fitness Information Technology, Inc. 129-144.

Orlick, T. (1986). Psyching for sport: Mental training for athletes Leisure press. Leisure Press, NY.

Orlick, T. (1995). In pursuit of peak performance. Champaign, IL: Human Kinetics.

Park, H., Kim, J., & Jeon, S. (2005). Case study of confidence improvement in tennis players through sports psychological interviews. Journal of Korean Society of Sports Psychology, **16**(3), 35-54.

Park, C. H. (2011). Influence of psychological skills training program on competitive anxiety in aerobic gymnastics players. Master thesis at Yongin University.

Park, C. M. (2009). Verification of effects and development of routine training program for performance improvement of college golfers. Doctoral thesis at Yonsei University.

Park, J. (2010). Influence of psychological skills training program on psychological skills factors and performance in fencing player. Master thesis at University of Ulsan.

Prapavessis, H., & Grove, J. R. (1991). Precompetative emotions and shooting performance: The mental health and zone of optimal function models. The Sport Psychologist, **5**, 223-234.

Seol, J. (2000). Influence of psychological skills training program on sports performance capabilities of elite golfers. Doctoral thesis at Hanyang University.

Shin, D. (2010). Influence of psychological skills training on competitive state anxiety and performance in female high-school fencing players. Master thesis at University of Ulsan.

Shin, J., Choi, J., Kwon, S. (2009). A study on application of psychological skills training for fencing players on the national team for Beijing Olympics. Sports Science Research, **20**(2), 360-371.

Shin, J., Yook, D., & Jeong, J. (2003). Effect of previous performance and sports confidence on golf game performance. Journal of Korean Society of Sports Psychology, **14**(3), 29-41.

Shin, J., Yook, D., & Ko, E. (2006). Effect of psychological training program for college ice hockey players. Journal of Korean Society of Sports Psychology, **17**(1), 47-64.

Son, H. (2012). Influence of shooting routine training on performance capabilities in biathlon players. Master thesis at Korea National Sport University.

Song, J., Wu, M., Shin, J., & Kim, W. (2012). Influence of performance routine on psychological skills and performance in elementary school diving players. Journal of Korean Society of Sport and Leisure Studies, **50**, 901-912.

Suinn, R. M. (1989). Seven steps to peak performance. Totonto, ont: Luber.

Tenenbaum, G. (2001). An introduction to the book: From personal reflections to the practice of sport psychology. In G. Tenenbaum (Ed.), The practice of sport psychology. Fitness Information Technology, Inc. 3-16.

Thomas, P. R., Murphy, S. M., & Hardy, L. (1999). Test of performance strategies: Development and preliminary validation of a comprehensive measure of athletes' psychological skills. Journal of Sports Sciences, **17**, 697-711.

Vealey, R. S. (1986). Future directions in psychological skills training. The sport psychologist, **2**, 318-336.

Yu, G. (2010). A study on behavioral routine and cognitive routine for performance improvements for golfers. Doctoral thesis at Sungkyunkkwan University.

Yu, G., Jang, J., & Lee, G. (2011). A case study on effect of behavioral routine and cognitive routine on performance of pro golfers. Journal of Korean Alliance for Health, Physical Education, Recreation, and Dance, **50**(2), 139-150.

Yu, I., Kim, H., & Lee, H. (2010). Influence of psychological skills on perceived performance in middle school taekwondo players. Journal of Korean Alliance of Martial Arts, **12**(3), 251-264.

Yun, D. (2009). A single case study on effect of junior golfer interviews and psychological skills training. Journal of Korean Society of Sports Psychology, **20**(3), 133-154.