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Effect of Imagery Practice Program on Imagery Ability in Thailand Adolescent Cyclists

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Abstract

The purpose of the study was to examine the imagery program in Thai Sport School Cyclist-Students. The experiment was designed in duration of 10 weeks at Lampang Sport School, Thailand. Samples consisted of 66 cyclist-students through random purposive sampling, of male (46) and female (20). They were separated into two groups of experiment (33) and control (33). The questionnaire MIQ-R (Moment Imagery Questionnaire) consists of 8 items of kinesthetic (KI) and visual (VI) to evaluate the imagery ability. Program imagery was adapted from Hogg (2002), Hall (2008). Before starting the study, researcher administered a test to see the reliability of the questionnaire: Reliability for imagery ability=.57. The finding showed that the experiment group consisted of male, (Mean=15.5622, SD=15.5530), female (Mean=15.1000, SD=1.10050). Control Group male (Mean=15.4783, SD=1.64785), female (15.3000, SD=1.15900). There was an increase in visual imagery (VI) scores across the three different periods where Multivariate results indicated statistically significant F (2, 63) =4.212, p-value=.019 (p<.05), eta square=.118 (11.8% large effect) at pre-test, post-test 1 and post-test 2 (Experiment and Control group). Kinesthetic imagery (KI) scores increased across the three different periods where Multivariate results indicated statistically significant F (2, 63) =.879, p-value=.017 (p<.05), eta square=.121 (12.1% large effect) at pre-test, post-test 1 and post-test 2 (Experiment and Control group). This research suggested that the imagery program does improve mental skills of Thailand adolescent cyclists in visual and kinesthetic imagery ability.

Keywords: Imagery Ability, Visual Imagery, Kinesthetic Imagery, Cyclist Performance

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Introduction

The mental training practice by athlete is important to the development of their psychological preparation in dealing with mental stress and resistance (e.g., nervousness, fear, lack of focus) faced by athlete before and during competition (Weinberg & Gould, 2007). It is a process that is geared towards mental stability which will also help to improve their psychological skills (i.e. self-confidence, relaxation, concentration, motivation) as well as their physical skills (i.e. visualize the correct skill execution, improve ability, physical readiness) of players in training and competition. Morgan and Costill (1972) identified that most successful marathoners in the history of the Boston Marathon possessed an excellent psychological profile, which is normally a characteristic of the excellent athletes.

Thus, this psychological profile includes the readiness of their mental preparation to psychological skills including decreasing anxiety level, increasing positive energy, coping strategy, and ability to perform imagery (Dominikuset al., 2009; Gammage & Hall, 2006; Loehr, 1986). In fact, there are also many mental experimental researches on motivation, self-confidence, self-concentration, self-talk, focus, arousal, stress, anxiety, and imagery (Cleary & Zimmerman, 2001; Cornelius et al., 1997; Darling, 2008; Eslinger, 2002; Gordon, 2004; McQuown, 2001; Weinstein, 2006; Rout, Hall, & Shapior, 2004; Thomson, 2003; Wang, Marchant, & Moriss, 2004). Despite many other mental preparation components (as mentioned above) that can be used to improve mental strength, this research will focus on only one of the component, that is the imagery practices. The imagery practices is interesting to examine because in the study by Cumming (1998), Morris, Spittle and Watt (2005), and Weinberg and Gould (2003) found that imagery practice when combined with physical training do improve sport performance.

Recently, researchers (i.e., Callow, & Roberts, 2010; Vealey, 2005) believed that mental imagery in sports has indicated that it is the mechanism to support athletes' enhancement in performance. What is imagery and how is it related to sport situations? Richardson (1969) stated that imagery is the process that involves multisensory experiences, which produce positive body reflections in feelings, sound, kinesthetic, and visual. He also indicated that imagery could be referred to as quasi-sensory and quasi-perceptual experiences of which we are self consciously aware of and which are still presented even if we are not in those stimulus conditions.

Thus, this is also agreed by Weinberg and Gould (2007) where they define imagery as a form of simulation where the entire experience (e.g., feeling, hearing, and seeing) occurred in the mind is similar to the real sensory experience. In addition, imagery is also defined as using all the senses to create and recreate an experience in the mind, especially when individuals are able to engage in vivid imagery. Their brain interpreted these images as identical to the actual situation (Vealey, 2004). Thus, with this experience imagery allows athletes to practice sports skills and strategies without physically being in the practice environment. From what has been stated

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above, we can interpret that in sports settings, imagery can produce genuine sensory in different situations.

The Implication of Imagery on Sports Performance

From sports psychological point of view, imagery has been promoted among athletes as a training tool for helping them to create an image of executing a skill properly (Omar-Fauzee 2009). The aim was to inspire them to win in competitions or become a successful athlete. Perhaps, the effectiveness of mental practice techniques can best be seen in the study conducted by Garza and Felts (1998) for skaters. In their study, this technique was applied to see if there were any improvements in figure skating performances, self-efficacy, and self-confidence in skate competition. Based on the findings, there were not only significant improvements in terms of skaters' performances, but also their self- confidence and self-efficacy. An explanation for this is in line with Bandura (1996) who claimed that self-efficacy can be a key point to gear a great performance. Similarly, Cumming (1998) and Moritz et al. (1996) emphasized the importance of mental imagery on performances. They pointed out that imagery has helped athlete perform better than those without it. On the other hand, Sherman (1999) also suggested that imagery is a good paramount of mental skills with both a cognitive function and an experience to manipulate the situation for superb task execution. This is especially true when they have the ability to conduct imagery (i.e., visualize, feel) of the task and situation as if it is the real event.

In imagery, process involves all human senses including kinesthetic, visual, tactile, audition and olfactory. Therefore, there is an ample research about imagery in sport settings, which have been conducted by Barr and Hall (1992), Cumming (1998, 2002), Thomson (2003), and Darling (2008). According to these studies if imagery is coupled with training, the results would be more outstanding. Thomson (2003) and Yandell (1999) also agreed that visualization is vital for skill development in athlete. To be more precise, for example, if badminton player lacks the ability to visualize how to swing a racquet, that player might not be able to execute the skill in the playing court properly. This is the reason why Sailes (2001) emphasized the implementation of mental imagery for an athlete for a better performance.

From coach's point of view, mental imagery in sport settings is one of the most crucial key factors in performance success. To date, the mental training has proven itself to have numerous outcomes which lead to the skill developments and great performances (Callow & Roberts, 2010; Shukadaung, 2009). Based on empirical studies, mental imagery can best be employed during training sessions and competition time especially before the actual game commences. However, it is very important for both the athlete and the coach to build a common ground to understand one another. Many people were found using imagery daily to solve problem, recall events, organize their thoughts, if so, athlete also included which he/she might encounter in the actual physical performance of the movements during game.

However, despite the obvious importance of imagery process, there has been surprisingly little research carried out on different sport types and samples. That is probably the reason why

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Boonweeraboot (1998) has thrown up suggestions to carry out further investigation of the sports such as cycling, running, and swimming. Although some studies have focused on common games such as shooting, gymnastic, and golfing, there is still a need to investigate the ways in which imagery process might employ in a given competitive situation in different sports and cultures. Therefore, research should also be taken into consideration of investigating the imagery practices process with other psychological factors such as self-confidence, motivation, and relaxation.

Justine and Shaw (2008) also reported that mental imagery is beneficial to an athlete in four different aspects. Firstly, it helps an athlete to stay healthy because of accomplishment of both mental and physical exercises. Secondly, it specifically helps an athlete to elevate his or her physical fitness ranking from low to high. Thirdly, it gives an athlete very much the orientation of using skill on training and sport competitions. Finally, it boosts athlete's motivation in order to work harder to achieve his goals. If an athlete acquires the entire characteristics of both physical and mental trainings, he or she is expected to move toward winning the competition. In line this kind of thinking, Pie (1996) and Baron (2000) also reported that if visualization is used during training sessions all the time, the quality of athletic movements can be improved enormously. Further, Sosovec (2004) also supported the fact that adopting mental imagery techniques in training sessions will facilitate the process of teaching for the coaches.

The empirical findings of research on the effects of mental imagery are very encouraging. Numerous studies in specific areas such as golf (Gregg & Hall, 2006; Ploszay, Genter, & Skinner, 2006), indoor cycling group (Thomson, 2003), soccer penalty kick (Sosovec, 2004), cycling (Darling, 2008), skating skill (Stewart, 2006), basketball (Klung, 2006), petangue (Keatkankra, 2001), ice hockey (Wallsbeck, 2009), dancing and aesthetic sport (Nordin & Cumming, 2006), netball (Hardy, Jones, & Gould, 2001), weight training (Silbernagel, Short, & Ross-Stewart, 2007), and tennis (Malouff, McGee, & Halford, 2008) have produced promising results favoring mental imagery which helped many athletes gain positive outcomes in their overall performances. However, most of these studies lack insight about the differences between imagery ability about cycling performance.

On the other hand, specific imagery cycling strategies using the video and relaxation techniques (i.e., music) are also used for preparing skill of starting positions, step pedal movements, aerodynamic body position on the bike, tempo legs muscle ride, control the line principal and the skill to increase speeds (i.e., Wei & Luo, 2009). Further to that, the imagery practice program is helpful to improve their capability of performing the imagery, self-confidence, and master their cycling skill. Once they have mastered the skill by imagery it helps them to execute the skill smoothly and increase performance.

The Imagery Ability

Morris et al., (2005) concluded that the imagery ability is the ability of a performer to successfully detect image by perceiving and focusing on important sensory information. Researchers explain that imagery have two sources of sensory information being important in

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motor performance these are visual (perspective clear image) and a kinesthetic information (e.g. feeling of movement). They concluded that imagery in sport have targeted both visual and kinesthetic to increase a performance.

In addition, Collins, Smith and Hale (1998) specify that imagery ability includes two concepts which are visual and kinesthetic senses. The former, refers to the capability of the individual to clearly visualize image directly linked to experience and strong imagination. The latter, is the feeling of movement that is observed by nerves in several ways. These experiences gave the meaning to not only the visual sense but also to multiple sensory inputs (Cumming & Ste-Marie, 2001). Moreover, Mahoney and Advener (1977) noted that imagery has been established with an internal (imagery within one's body) and external (external observer) perspectives for mental function. Hence, imagery is more effective when multiple senses of visual and kinesthetic works concurrently to produce the real picture (Callow & Hardy, 2004). The imagery ability had been separated by two traits as below:

Visual Ability

The visual ability is defined as the capability of the individual to evoke and control vivid images in their mind (Murphy, 1999). More specifically, imagery was effective for athlete who was able to perform imagery skills and have the ability (i.e. visual ability) to create and control vivid images in aiding his or her skill acquisition (Hall, 1998; Hall & Martin, 1997). Furthermore, Murphy and Jowdy (1992) explained that imagery ability is frequently associated with the vividness (clarity) and controllability (power of manipulation) of image during mental imagery. In fact, this individual is able to visualize a clear picture and control the situation in their mind from internal and external perspectives. Those who have this visual ability will probably achieve successful high-level performance as compare to those who are less capable of the imagery ability (Felts & Landers, 1983; Short et al., 2002).

Moreover, Eslinger (2002) also added that an effective imagery is associated with positive performance that reflects real similarities of competition environments. The individual ability to produce a clear picture of competition situation does help them to perform better as planned. Indeed, the ability of one individual to the other was different in their imagery level. Therefore, to construct a better imagery process, one should identify the imagery ability first before starting an imagery program. Paivio (1985) stated that the individual differences in imagery ability were due to the combination of genetic variability and experience had realized this. With this dissimilarity, it might be pertinent that athlete would develop various conditions of imagery as well at their own level of ability.

Kinesthetic Ability

Kinesthetic imagery ability means being able to feel body movement by using a sensory recall of their own experiences. Moreover, Gregg and Hall (2005) suggested that the capability to facilitate a successful imagery practices is due to the fact that the experienced athlete had engaged in a variety of circumstances, which can be recalled in imagery practice. In the

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kinesthetic ability, they can feel the movement of their experiences during executing the image. The feeling of movement that they encountered is identical to the real situation. Thus it helps athlete to carry-out the task during competition without any worries because they already feel the situation. Therefore, the effectiveness of imagery practice is more favorable to skill athlete than novice (Isacc, 1992; Short et al., 2002). Possibly, this is due to their huge experience, skill competency, and their ability to use the kinesthetic imagery ability. Yandell (1999) had also indicated that skill players will have the ability to visualize and feel the mechanics of swing in tennis, thus, they are able to execute the proper swing in the court as compared to novice player. Therefore, it is easier to improve imagery ability, if athletes have the essential visual ability and kinesthetic ability (Cumming, 1998). Thus; it is more effective if a clear picture in the mind occurs especially in a sport situation when both the visual and kinesthetic ability run concurrently (Callow & Hardy, 2001).

Statement of the Problem

The adolescent of Thailand cyclist had been succeeded in high level sport competition such as Sea Games and Asian Games (Only game for Asian). However, the performance of Thailand cyclist was unimpressive as compared to their neighboring countries such as Malaysia. Secondly, being unable to perform excellently was athlete weakness in their mental strategies as well as physical fitness coordination. In fact, athlete is more successful by using a combination of psychological and physical skills to improve performance, used as new methods in sports foundation to extract problems in cycling. In due respect, this study will further investigate whether what is suggested by Morris et al., (2005) is actually true with the Thailand high school cyclist (age between 13 to 18 years old).

Although, there are many sport psychologists researches (i.e., Hall, 2000; Mumford & Hall, 1985; Sosovec, 2004; Stephen, 1989) which have found that with both the physical and imagery training the athlete's performance was improved. But, the generalization about the effectiveness of imagery toward performance improvement should also be applied to others (Hall, 2000). Thus, this suggestion should also include athletes from Asian country such as the Thailand high school cyclist.

Objective of the Research

To assert the psychology training-program, in order to affect the imagery practice and imagery ability of cyclist.

Research Questions

What extend the differences between the experiment and control group in terms of the score difference between pre-test, post-test 1 and post-test 2 score on imagery ability: visual and kinesthetic?

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Hypotheses

Ho1= there is significant difference between pre-test, post-test 1 and post-test 2 scores in the imagery ability in term of visualization (VI) between experiment and control group.

Ho2= there is significant difference between pre-test, post-test 1 and post-test 2 scores in imagery ability in term of kinesthetic (KI) between experiment and control group.

Methodology

This study constructed a true-experiment design (i.e., imagery procedure) with random sampling procedure. The experiment design of imagery practice program was adopted from Hogg (2002) based on knowledge of imagery practice from the previously imagery research (Cummimg, 1998; Gregg & Hall, 2007; Hogg, 2002; Issac, 1992; Klung, 2006; Thomson, 2003; Vealey, 2004). The imagery practice program content has been validated by expert from Thailand to ensure it measures what is supposed to be measured. Furthermore, the experimental design assigned respondents randomly into two different groups; the experimental group and control group. The sample for this study was from the Lampang Sport School, Thailand. A sample of 66 students (23 male: 10 female real experiment and 23 male: 10 female), age between 13-18 years old had been randomly selected for this study. One major questionnaire was used to measure the dependent variables; The MIQ-R was for testing the imagery ability (Visual and Kinesthetic imagery). This questionnaire was adapted from Hall and Martin (1997) with internal validity (Cronbach' alpha) of visual (.89) and kinesthetic (.88) (Table 3.3). The questionnaire consisted of eight items (four for visual; four for kinesthetic). Each item requires the participant to follow the instructions by performing a visual or kinesthetic movement. The visual is rank on a 7 likert-like scale from (1) very hard to see to (7) to very easy to see. Meanwhile, kinesthetic is rank from (1) very hard to feel to (1) very easy to feel. Example for visual action was, "raise your right knee as high as possible so that you are standing on your left leg with your right leg flexed (bent) at the knee. Now lower your right leg so that you are again standing on two feet. Perform these slowly". Then, rate the score (1 to 7) for vividness, they see.

Control the Extraneous Threat of Internal and External Variables

Researcher controlled the threat that might manipulate the imagery process during the experiment. Therefore, many variables were of affect to the experimental procedure due to the internal and external threat. Researcher tried to avoid the treatment from these environmental threats which were of two types; external intervention, and internal (Cohen, 1985). One of the threats in experimental study was the internal threat, which would give implication to the results of the study. To solve this threat, Isaac and Michael (1997) indicated that the researcher needs to control a sample by making smaller gaps of the time. Because, some problems may occur as a big gap can affect diagram design. Based on design in this study there has an internal variable between-session (e.g. extraneous variable of maturation, selection, i.e.).

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The maturation threat was involved in the internal validity because of the sample's different genetic and sport' ability. According to Branta et al., (1984) athlete participation in the motor performance was done within the range of age. In addition, to control them, Thomas, Nelson and Silverman, (2005) suggested that the athlete ability as performance and mental skills are also equaled by age ranking. The random sampling by age was done to control the maturation threat. By doing so, researcher had accounted on the age sample (Birthday, month, year), to lower down the gap of age differences between them. Therefore, this study used sample of individuals with the similar age; 13-18 years categories. Thus, this small range of age (i.e., 14-18) decreased the maturation and physical condition threat. Then, researcher calculated Mean (M), and selected them by random processes. All sample consisted of 59% male (N=19), 40% female (N=13), mean ages for both were 15.07 (Mean), 1.31 (SD) with age ranging from 13 years old to 18 years old.

Pilot Test

The Pilot test were conducted on the three elements of this study, i) The instructions of the imagery practice program, ii) the reliability of the instruments, and iii) the instructions of the equipment test. Firstly, the researcher tested the instructions of the imagery practice program on 32 athletes from other sports school (Khon Kaen Sport School, Thailand), which are not the respondents. The respondents were gone through the entire program in order to understand the instructions given. The time taken to test the program was about five days. This test was total score of the pre-test. For 2 weeks duration continuing every day: 12-30 minutes per time (practice), then post-test.

Table 1: Result of Pilot Study in 2 Week Durations

Compare Terms		Mean	SD
Pair 1	VI (Pre-test)	5.4063	1.91738
	VI (Post-test)	5.3594	1.64481
Pair 2	KI (Pre-test)	4.3125	1.26022
	KI (Post-test)	5.5625	1.44125

However, when compared, results of Pre-test and Post-test found no significant differences. This suggested that imagery practice program did not improve after the pilot study phase (2 weeks) because duration of the program was short. As the pilot study had confirmed that all facilities (questionnaire tested, schedule of training, imagery program, procedure of research) of research design can be done. However, as no differences were found in variables at the time of pilot study. Thus, researcher needed to continue this program in the real experimental phase as to analyze the findings from Cumming (1998), the experimental imagery practice was

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continued for more than 5 weeks with three times for 15 minutes long period per each time. Experiment was done for 10 weeks duration, following hypothesis of the study.

Experimental Implementation

The implementation of real experiment had begun as the researcher sent the permission letter to director of Lampang Sport School, Thailand (North part of Thailand). The contract was of planning, limitation and exception during experiment. The important rule in experiment for sample was not to be forceful, but they all should participate voluntarily. After the requirements are covenant, researcher had requested the samples to take experiments. To do so, first researcher needed to match group by giving them the test in the form of questionnaire and then took it back. Results from this test were aimed to help in sample selection that must be a part of experiment group and control group. This process was used this way so as to make the cause stricter for a matching group before experiment started.

Table 2: Sample Demographic Experiment and Control group

Groups	N	Mean (Ages) Male	SD	Female	SD
Experiment Group	33	15.5622 (n=23)	1.55530	15.1000 (n=10)	1.10050
Control Group	33	15.4783 (n=23)	1.64785	15.3000 (n=10)	1.15900

N=66

Experiment group consisted of male (Mean=15.5622, SD=15.5530), female (Mean=15.1000, SD=1.10050). Control Group male (Mean=15.4783, SD=1.64785), female (15.3000, SD=1.15900).

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Results of the Research

Table 3: Results of Descriptive Statistic on Imagery Ability

VARIABLE	CONDITION	N	Mean	SD
IMAGERY ABILITY PARAMETERS				
Visual (VI)	Experiment			
week 1		33	5.2576	1.38136
week 5		33	5.3561	0.91008
week 10		33	5.7500	0.88167
Visual (VI)	Control			
week 1		33	5.1818	0.99269
week 5		33	5.2197	1.05467
week 10		33	5.5758	1.23978
Kinesthetic (KI)	Experiment			
week 1		33	4.8758	1.23492
week 5		33	4.9803	1.01988
week 10		33	5.4121	0.90744
Kinesthetic (KI)	Control			
week 1		33	4.9636	1.21670
week 5		33	5.0985	0.96812
week 10		33	5.3500	0.87214

Table 4: Results of Repeated Measure ANOVA for Visual Imagery Ability (Visual)

VISUAL EFFECT	N	F	Sig	Eta	Mean Differ
Experiment * Control	66	4.212	.019*	.118*	
Pre-test–Post-test1	66		1.000		.0682
Post-test1-Post-test2	66		.027*		.3750*
Pre-test–Post-test2	66		.049*		.443*

Note: significant .05 levels

In order to assess HO_1 concerning VI scores, repeated measures of ANOVA were used. There was increasing in VI scores across the three different periods where Multivariate results indicated statistically significant F (2, 63) =4.212, p-value=.019 (p<.05), eta square=.118 (large effect) at pre-test, post-test 1 and post-test 2. Using the commonly used guidelines proposed by Cohen (1988) (.01=small effect, .06=moderate effect, .14=large effect) this result suggested a

large effect size. Result shows that 11.8 % of the variability in the total visual score was associated with the treatment after the variability caused by individual differences was removed. The *p* value is less than .05; therefore, it can be concluded that there is a statistically significant main effect for time. This suggests that there was a change in VI scores across the three different periods.

Report from the pairwise comparison between treatment and control groups indicated there is significant difference in VI. To conclude, HO_1 posited statistically significant difference increased in VI score between intervention group of imagery practice and control group on VI scores at week 1, week 5 and week 10, therefore, had to reject HO_1. Table 4.3 depicts the results clearly and Figure 1 provides the experimental data on the effect of the imagery practice on VI scores.

This graph shows that there are two lines, one is experiment with point line and is higher than control group. Therefore, the lines are more inclined than control group, it means experiment group after completing the imagery practice for 10 weeks had more ability of visual imagery than control group. However, the line of both groups is straight up in the same direction but different position.

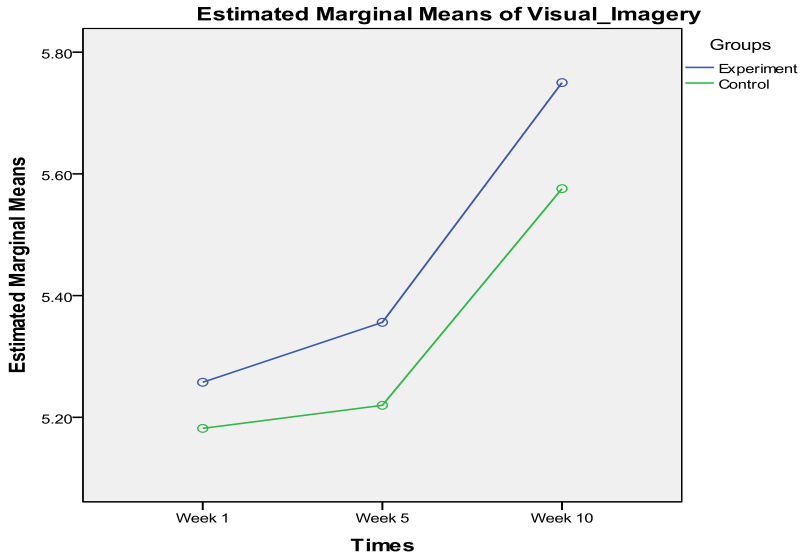

Figure 1 Graph Estimated Marginal Means of Visual Imagery Ability (VI) Score between Experiment and Control Groups at Week 1, Week 5, and Week 10.

Table 5: Results of Repeated Measure ANOVA for Kinesthetic Imagery Ability (Kinesthetic)

KINESTHETIC EFFECT	N	F	Sig.	Eta	Mean Differ
Experiment*Control	66	.879	.017*	.121*	
PAIRWISE COMPARISON					
Pre-test–Post-test1	66		1.000		.120
Post-test1-Post-test2	66		.111		.342
Pre-test–Post-test2	66		.018*		.461*

Note: significant .05 levels

In order to assess HO_2 concerning KI scores, repeated measures of ANOVA were used. There was increase in KI scores across the three different time periods where Multivariate results indicated statistically significant F (2, 63) =.879, p-value=.017 (p<.05), eta square=.121 (large effect) at pre-test, post-test 1 and post-test 2. Using the commonly used guidelines proposed by Cohen (1988) (.01=small effect, .06=moderate effect, .14=large effect), this result suggested a large effect size. Result shows that 12.1 % of the variability in the total kinesthetic score was associated with the treatment after the variability caused by individual differences was removed. The *p* value is less than .05; therefore it can be concluded that there is a statistically significant main effect for time. This suggests that there was a change in KI scores across the three different time periods.

Report from the pairwise comparison between experiment and control groups indicated there was significant difference in KI. To conclude, hypothesis posited statistically significant difference decreased in KI score between intervention group of imagery practice and control group on KI scores at week 1, week 5 and week 10, therefore it rejects Hypothesis. Table 5 depicts the results clearly and Figure 2 provides the experimental data on the effect of the imagery practice on KI scores.

The graph can provide results to help see the devilment of kinesthetic imagery. In the picture, it is shown that there are two lines; one is increasing experimental line which is higher than control group line. Therefore, experiment line is more inclined than line of control group; it means experiment group after completing the imagery practice for 10 weeks had more ability than control group. However, the line of both groups is straight up as they are going together in same direction but different positions. The gap of origin of experiment line was a bit lower than control group, as it was because of the effect of difference in random sample mean (Mean different random = 4.8758, 4.9636 Table 3). It indicates that when respondent will be given the different imagery at a moment of answer question, individual will show different notions person and thus, standard deviation of mean will be different. However, the test for equality of sample means was done before starting experiment.

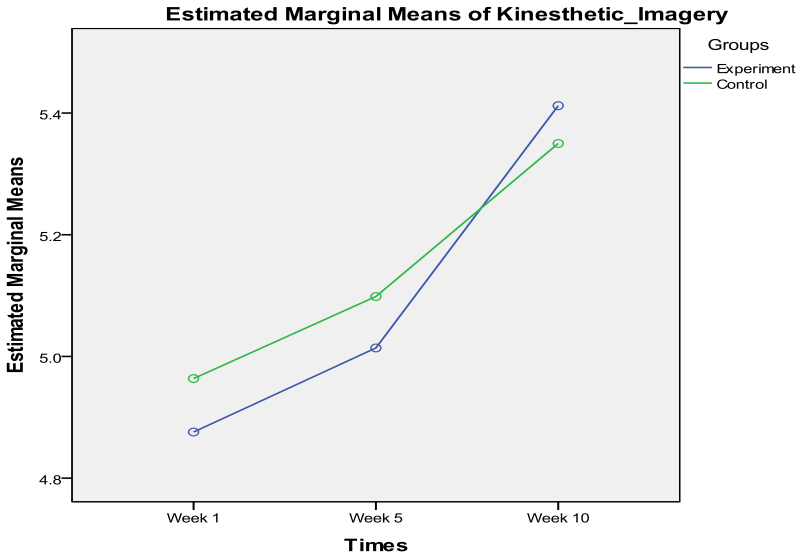

Figure 2 Graph Estimated Marginal Means of Kinesthetic Imagery Ability (KI) Score between Experiment and Control Groups at Week 1, Week 5, and Week 10

Findings and Discussion

Result confirmed that cyclist after completing physical training program with a combination of visual imagery (imagery program) and physical skill shown increased and better cycling in terms of the visual imagery (VI). This result has given a positive and improving imagery as found in previous study. According to Horn (2008), athlete can improve the images of visualization due to their experiences such as recalling picture about game, building a new picture forward, vividness of coping skills, in terms of getting the picture into the performances setting.

Based on the result; it can be explained that the imagery ability influences the cyclist in high school students (Lampang Sport School, Thailand). They can be able to use the activity of imagery practice to create mental imagery ability in terms of vividness of the visualization. It is the ability of focusing aspect for appearance of successful scenario. As said by Morris et al., (2005), Collins, Smith and Hale (1998), imagery ability is the ability of a performer to successfully detect by using perceives with focusing on important sensory information. Moreover, imagery ability is the involvement of two concepts i.e., visual and kinesthetic sensory. Especially, because of visual imagery cyclist will see more vividness related experiences. That would be capability of the individual to have clear view- mind directly involved in game of strong imagination. When they had practiced, interval of video or picture is shown with a relaxation aspect.

From the above explanation, we can confidently confirm that this is effect of program imagery practice. One reason to improve the visual could be the time and periods of practice (continuing for 10 weeks). The change of image was found at week 5 to week 10 (5 weeks long duration) (Mean difference=.35750>.0682, Table 4). Result given that the cyclist needed either a several time or enough long span for practicing. If, time is sufficient for imagination, it caused appearance a concentration skill, vividness image for visualization and kinesthetic. When compared, the result of the experimental group and the control group found that there were improvement for visualization at $p<.05$ statistic set.

The findings of kinesthetic imagery found that there was a significant difference after completion of week 1, week 5, and week 10. This finding recommends that cyclist who did not practice imagery they could not yield. The imagery required them to work on aspects of their sport performance such as technique, tactics, and mental preparation. Gregg and Hall (2005) noted the capability to facilitate successful imagery practices enhance due to athlete had engaged in a variety of circumstances recalling imagery. In the related, the kinesthetic ability made cyclist feeling moving bike and recalling their experiences during executing image. Feeling, even if appearing for only a minute, may evoke real situation further. Then, it helps athlete to carry-on the task of competitive situation without any worries, because they already feel the circumstances. Moreover, kinesthetic imagery also connected athlete image because they seen picture at the same time they felt the aspect appearing. To explain it, this is ability of cyclist image given visual experiences transformation. Especially, the athlete who just liked expert learning more for new experiences to be clear in future movement for them (Rattanakoses, 2008). According to Isacc (1992) and Short et al., (2002), the effectiveness of imagery practice is more sympathetic of skill than that novice is. Yandell (1999) indicated that skill' players do possess ability to visualize and feel the mechanics compared to novice player. Hence, after completing this experiment, cyclist is successful and has enormous amount of kinesthetic experiences such as a feeling related picture, and their ability to use kinesthetic sensory imagery.

Moreover, the kinesthetic test is significant because of accomplishment of program activities that can help cyclist emphasize the internal imagery as a planning vision. As a good planning in game is the view to plan before games. Many problems have destroyed from the image before game especially in sport situation, the sharpest imagery focusing on the task would be accurate for skill acting for athlete. According to Boonweeraboot (1998), the accurate acting skill will be perfect, if ultimate practice is done as a similar activity in daily life. In addition, in many practices imagery ought to have clear pictures that decrease anxiety. The athlete has to have well connection between muscle movement and body symptom such as feeling and emotions that would have more power for imagery process, if they experience less anxiety. Thus, we can say that the kinesthetic imagery is a co-operate working between muscles and thinking pattern for relaxation state during practice program.

Conclusion

The imagery program does improve mental skill of Thailand adolescent cyclists in visual and kinesthetic. Thus, coach and cyclist should overview the benefit of imagery practice and match it to rehearsal routines. The implication of imagery ability by using visual (internal and external imagery), and kinesthetic (e.g. feeling seeing, olfactory), was high influential and affected the cyclist performance in terms of mental ability and physical fitness combination.

References

Bandura, A. (1996). Ontological and epistemological terrains revisited. *Journal of Behavior Therapy and Experimental Psychiatry, 27,* 323-345.

Baron, S.H. (2000). *An investigation of absorptive capacity in the efficacy of imagery training in performance of an instep kick by selected youth soccer players*, 61, (2000): 2265.

Barr, K.A., & Hall, C.R. (1992). The use of imagery by rowers. *International Journal* of *Sport Psychology, 23,* 243-261.

Boonweeraboot, S. (1988). *Sport Psychology*. 1st ed. Chonburi Printing: Chonburi, Thailand.

Branta, C., Haubenstricker, J., & Seefeldt, V. (1984). Age changes in motor skills during childhood and adolescence. In R.L Terjung ed. *Exercise and Sport Science Reviews, 12,* 465-520.

Callow, N. & Hardy, L. (2001). Types of imagery associated with sport confidence in netball players of varying skill levels. *Journal of Applied Sport Psychology, 13,* 1-17.

Callow, N., & Hardy, L. (2004). The relationship between the use of kinesthetic imagery and different visual imagery perspective. *Journal of Sport Science, 22,* 167-177.

Callow, N., & Roberts, R. (2010). Imagery research: An Investigation three issues. *Psychology of Sport and Exercise, 11,* 325-329.

Cleary, T., & Zimmerman, B. (2001). Self-regulation differences during athletic practice by expert, non-experts, and Novices. *Journal of Applied Sport Psychology, 13* 185 206.

Cohen, J. (1988). *Statistic power analysis for the behavioral science.* 2nd ed. New York: Academy Press.

Collins, D.J., Smith, D., & Hale, B. (1998). Imagery perspective and karate performance. *Journal of Sports Science, 16*, 103-104.

Cornelius, A., Silva, J., Conroy, D., & Petersen, G. (1997). The projected performance model: relating cognitive and performance antecedents of psychological momentum. *Perceptual and motor Skill, 84*, 475-485.

Cumming, J.L. (1998). *The cognitive and motivation effects of imagery training from different visual perspective.* Master Thesis, University of Ottawa, Canada. National Library of Canada.

Cumming, J., & Ste-Marie, D.M. (2001). The cognitive and motivation effects of imagery training: A matter of perspective. *The Sport Psychologist, 15*, 276-287.

Cumming, J.L. (2002). *Competition athletes's use of imagery and the deliberate practice framework*. Doctoral Thesis, University of Western Ontario.

Darling, T.V. (2008). *Podcasting mental Imagery technological application of sport imagery.* Docteral Thesis, Health and Human Performance, Oklahoma State University.

Dominikus, Fauzee, Abdullah, Meesin, & Choosakul, (2009). Relationship between mental skill and anxiety interpretation in secondary school in hockey athletes. *European of Social Science, 9, 4,* 651-657.

Eslinger, O.W. (2002). *Mental imagery ability in high and low performance collegiate Basketball players.* Doctoral Thesis, Boston University.

Felts, D.L., & Landers, D.M. (1983). The effect of mental practice on motor skill learning and performance: A meta-analysis. *Journal of Sport Psychology, 5,* 25-57.

Gammage, K.L., & Hall, C. (2006). Measurement of sport and exercise imagery. *Journal of Sport Science and Recreation, 2,1*, 13-39

Garza, D.L., & Feltz, D.L. (1998). Effects of selected mental practice on performance, self efficacy, and competition confidence of figure skaters. *Journal of Sport Psychologist, l, (12),* 1-15.

Gregg, M.J., & Hall, C. (2005). The imagery ability, imagery use, and performance relationship. *The Sport Psychology, 19,* 93-99.

Gregg, M.J, & Hall, C. (2006). The relationship of skill level and age to the use of imagery by golfers. *Journal of Applied Sport Psychology, 18*, 363-375.

Gregg, M.J, Hall, C., & Butler, A. (2007). The MIQ-RS: A Suitable Option for Examining Movement Imagery Ability. *Kinesiology and Applied Health,* Winnipeg University, Canada.

Gordon, B. R. (2004). *The effect of mental imagery practice on the performance of selected psychomotor tennis skills of secondary student.* Doctoral Thesis, Graduate School Education, Oral Robert University. Printed: UMI. Access Octorber 3, 2009.

Hall, C.R., Bernoties, L., & Schmidt, D. (1995). Interference effects of imagery on a motor task. *British Journal of Sport Psychology, 86, 2,* 181-190.

Hall, C.R., & Martin, K.A. (1997). Measuring movement imagery abilities: A revision of the Movement Imagery Questionnaire. *Journal of Imagery, 21, (1-2)*, 143-154.

Hall, C.R. (1998). Lew Hardy's third myth: A matter of perspective. *Journal of Applied Sport Psychology, 9,* 310-387.

Hall, C.R. (2000). *Imagery in Sport and Exercise.* In Singer, R.N.; Hausenblas, H.A.; Janelle,C.M. ed, Handbook of sport psychology, 529-549.

Hall, C.R. (2001). *Imagery in sport and exercise.* In R.N. Singer, H.A. Hausenblas, & C.M. Janelle (Eds). Handbook of psychology. 2nd ed. 529-549. New York: John Wiley & Sons.

Hardy, L., Jones, G., & Gould, D. (2001). *Understanding psychological preparation for sport: Theory and practice of elite performances.* Chichester John, Wiley & Son.

Hogg, M. (2002). *Mental skills for swim coaches.* 2nd ed. Sport Excel Publishing Inc.

Horn, T.S. (2008). *Advance in Sport Psychology*. 3rd ed. Printer: Edwards Brothers: Publishes: Human kinetic, 312-313.

Isacc, A. (1992). Mental practice-dose it works in the filed. *Sport Psychologist, 6,* 192-198.

Isacc, S., & Michael, W. (1995). *Hanbook in research and evaluation: for educational and behavioral sciences*. 3rd ed. Publisher: EdITS, P.O. San Diego, California.

Justine, B.A., & Shaw, S. (2008). Sport and exercise psychology. *Journal of Sport & Exercise Psychology, 30*, 146-251.

Keatkankra, P. (2001). *The effect of self-concentrate and Imagery ability on Petongue athlete performance*. Master Thesis, Khon kaen University. Retrieved January 10, 2010, form Library Khon Kaen University, Thailand. Original Thesis.

Klung, J.J. (2006). *Effects of an imagery training program on free throw self-efficacy and performance of high school basketball players.* Master Thesis, Miami University, Oxford, Ohio State.

Loehr, J.E. & Mclaughim, P.J. (1986). *Mental tough*. New York: M. Evans and Company, Inc.

Mahoney, M.J., & Avener, M. (1977). Psychology of the elite athlete: An exploratory study. *Cognitive Therapy and Research, 12,* 135-141.

Malouff, J.M., McGee, J.A., & Halford, H.T. (2008). Effect of pre-competition positive imagery and self-instructions on accuracy of serving in tennis. *Journal of Sport Behavior, 31,* 271-273.

Martin, K.A., S.E. Morite, & Hall, C.R. (1999). Imagery use in sport: A literature review and applied model. *Journal of Sport Psychologist, 13*, 245-268.

McQuown, S. (2001). *The effects of a cognitive international strategy on state anxiety and free throw shooting performance.* Dissertation Abstracts International.

Morgan, W. P., & Costill, D. (1972). Physichological characteristics of the marathon runner. *Journal of sports Medicine and physical fitness, 12*, 42-46.

Moritz, S.E., Hall, C.R., Martin, K.A., & Vadocz, E.A. (1996). What are confident athletesimaging? An examination of image content. *Journal of Sport Psychologist, 10,* 171-179.

Morris, T., Spittle, M., & Watt, A.P. (2005). *Imagery in sport.* Printer: Brothers, E. Published:Champaign, IL: Human Kinetics.

Mumford, B., & Hall, C.R. (1985). The effects of internal and external imagery on performing figures in figure skating. *The Canadian Journal of Applied Sport Sciences, 10,* 171-177.

Murphy, S.M. (1990). Model of imagery in sport psychology: A review. *Journal of mental imagery, 14,* 153-172.

Murphy, S.M., & Jowdy, D.P. (1992). *Imagery and mental practice*. In T.S. Horn, ed. Advances in sport psychology, 221-250. Champaign, IL: Human Kinetics.

Nordin, S.M., & Cumming, J. (2006). Measuring the content of dancer's images: Development of the Dance Imagery Questionnaire (DIQ). *Journal of Dance Medicine and Science, 3,* 85-98.

Omar-Fauzee, Wan Rezawana Binti Wan Daud, Rahim Abdullah, & Salleh Abd Raisid (2009). The effectiveness of imagery and coping strategies in sport. *Journal of Social Science, 9, 1.*

Paivio, A. (1985). Cognitive and motivational functions of imagery in human performance, *Canadian Journal of Applied Sport Science, 10, 4*, 225-285.

Pie, J.S. (1996). Imagery Orientation and Vividness: Their Effect on a Motor Skill Performance. *Journal of Applied Sport Science, 10,* 22-28.

Ploszay, A.J., Genter, N.B., & Skinner, H.C. (2006). The effect of multisensory imagery in conjunction with physical movement rehearsal on golf putting performance. *Journal, Published online: 22 November 2006, 15,* 249-257.

Rattanakoses, R. (2008). *Basic training cycling*. 1st ed. Chomromdek: Publishing house, Bangkok, Thailand.

Richardson, A. (1969). Mental practice: a review and discussion (part 1). *Research Quarterly, 38,* 95-107.

Rout, C., Hall, J., & Shapior, R. (2004). *The effect of positive self-review on self-efficacy and motor skill performance accuracy.* Dissertation Abstracts International. (Order No. DA3123820).

Sailes, G. (2001). Mental toughness: *The champions edge. ADD vantage: The Magazine for Men and Women Tennis-Teaching Professionals, 4,* 20-23.

Sherman, C.P. (1999). Integrating mental management skills into the physical education curriculum. *Journal of Physical Education, Recreation, and Dance, 70,* 25-31.

Short, S.E., Bruggerman, J.M., Engel, S.G., Marback, T.L., Wang, L.J., Willadsen, A., & Short, M.W. (2002). The effect of imagery function and imagery direction on self-efficacy and performance golf-putting task. *The Sport Psychologist, 16*, 48-67.

Shukadaung, V. (2009). *The effect of practice the anapanasati meditation and mental imagery on shooting accuracy of sportmans in Khon kaen University.* Master Thesis. Khon Kaen, University, Thailand.

Silbernagel, M.S., Short, E.S., & Ross-Stewart, L.C. (2007). Athletes' Use of Exercise Imagery During Weight Training. *Journal of Strength and Conditioning Research, 21, 4,* 1077-1081.

Stewart, S.M. (2006).*The effect of mental imagery, video modeling, and physical practice on the rate of acquisition of a new figure Skating skill*. MasterThesis. Alberta University, Canada.

Stephen, G.P. (1989). *Cycling racing riding to win*. Publishes: Penguin Group, London, England, 144.

Sosovec, L.G. (2004) *Internal visual imagery and its effect on penalty kicks soccer.* Master Thesis. Sout Dakota State Univerity.

Thomson, K.A. (2003). *The effectiveness of imagery in indoor group cycling*. Master Thesis, School of Human Kinetic, Ottawa University.

Thomas, J.R., Nelson, J.K., & Silverman, S.J. (2005). *Research method in physical activity*. 5th ed. Champaign, IL: Human Kinetics.

Vealey, R.S. (2004). Self-confidence in Athletes. *In Encyclopedia of Applied Psychology, 3,* 361-368.

Vealey, R.S. (2005). *Coaching for the inner edge*. Morgantown, WV. : Fitness Information Technology.

Wallsbeck, M. (2009). *Ice Hockey Players' Understanding and Exercise of Imagery.* School of Social and Health Sciences, Halmstad University, C-essay in Sport Psychology, 69-90.

Wang, J., Marchant, D., & Moriss, T. (2004). Coping Style and Susceptibility to Choking. *Journal of Sport Behavior,27, 1,* 75-92.

Wei, G., & Luo, J. (2009). Sport expert's motor imagery: Functional imaging of professional motor skills and simple motor skills. *Journal online of Science:* laboratory of mental Health, Institute of Psychology, Chinese Academy of Sciences(CAS), 100-101 Beijing, China.

Weinberg, R.S., & Gould, D. (2003). *Foundations of sport and exercise psychology*.3rded. Champaing, IL: Human Kinetics.

Weinstein, M. (2006). Ready or not, here comes podcasting. *Training, 43, 22-23.*

Weinberg, R. S., & Gould, D. (2007). *Foundations of sport and exercise psychology*. 4th ed. Champaign, IL: Human Kinetics.

Yandell, J. (1999). *Visual tennis: Using mental imagery to Perfect your stole technique.* 2nd ed. Champaign.