

Effects Of Imagery With Music On Ability To Perform Techniques Of Rhythmic Gymnastics

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Abstract. The purpose of this research is to study the effects of imagery with music on the ability to perform rhythmic gymnastics techniques. The sample was 20 rhythmic gymnasts and aged from 13 to 18. They were divided into 2 groups, with 10 gymnasts in each group. The first experimental group participated in imagery training and rhythmic gymnastics techniques and the second experimental group participated in imagery with music training and rhythmic gymnastics techniques, and trained for 3 days a week for 6 weeks. The results of the study were as follows: (1) the first experimental group participated in imagery training and rhythmic gymnastics techniques when comparing the ability to perform rhythmic gymnastics techniques in the Pre-Test, Post-Test One, Post-Test Two and Post Test Three with a statistically significant difference of .05; (2) the second experimental group participated in imagery with music training and rhythmic gymnastics techniques and their ability to perform rhythmic gymnastics techniques in the Pre-Test, Post-Test One, Post-Test Two and Post Test Three had a statistical significance of .05; (3) the second experimental group participated in imagery with music training and rhythmic gymnastics techniques are were better than the first experimental group in terms of their participation in imagery training and rhythmic gymnastics techniques.

Keywords: Imagery with music, Performance, Rhythmic gymnastics techniques

1 Introduction

Gymnastics, a sport which is included in the Olympic Games, has a total of 8 categories such as Men's Artistic Gymnastics, Women's Artistic Gymnastics, Rhythmic Gymnastics, Acrobatic Gymnastics, Aerobic Gymnastics, Trampoline Gymnastics, Gymnastics For All, and Parkour. Each of the movements of gymnastics mainly focuses on flexibility, excellent use of the muscles' strength, and good coordination. In addition, Rhythmic Gymnastics emphasizes greatly on the facial expression and character of movement with the apparatus, as well as being correlated to the music of choice [1]. Rhythmic Gymnastics is performed on the gymnastics carpet with one or more of the 5 apparatus such as rope, hoop, ball, clubs, and ribbon. There are 2 main categories of Rhythmic Gymnastics : Individual and Group Exercise. It is crucial that during a performance, rhythmic gymnasts must perform all the 3 groups of Difficulty of Body (DB) which includes Jump, Balance, and Rotation elements as described in the Rhythmic Gymnastics Code Of Points published by the Federation Internationale of Gymnastics (FIG).

Other than the apparatus movements with the technical or fundamental elements, every performance in Rhythmic Gymnastics must have dancing movements which manifests the style and rhythm of the music; all of the following must be performed altogether to create such unity and harmony. This is the reason why it is crucial for gymnasts, not only to excel in the body and apparatus skills but also to have an understanding of the music as it is absolutely necessary to take music and rhythm into consideration. If the gymnast doesn't move according to the music, the score will be deducted as one of the artistic faults. Being an elite gymnast is not easy; the gymnast must go through consistent and intensive training programs. Apart from the physical fitness, the gymnast should also have great mental fitness to be able to cope with stress or excitement (e.g. while performing complex elements, while being pressured by the coach, the association, or stress from any other external sources) because both can affect the overall performance of the gymnast.

Sports psychology is one of the principles of Sports Science, combining psychological knowledge into sports in order to achieve the optimal performance of the athlete and to study the relationship between the mental factors (the mind, emotions, thoughts, etc.) and how well the athlete does in competitions [2]. When the psychological techniques have been enforced correctly, it can be a good influence to the mental health and to the sport career. Nowadays, people give more attention to psychological training since it is a great tool to help athletes pursue their dreams and achievements better [3]. As for Rhythmic Gymnastics, psychological training is also important as it reinforces the mind and has a great impact in reducing stress levels. Music can also be calming and help relieve stress. Listening to competition music in rhythmic gymnastics while picturing the elements in the performance/routine can help with memorization and revision.

Music is another factor that can help athletes concentrate on the competition. Listening to music can assist imagination and the ability to simulate a setting or situation which can enhance the athletes' performance. According to [4], the research found that music can develop the sense of movement. Music can be used as a medium to guide the body movements. Other than just listening to the competition music, the researcher also attempted to picture each and every element in the routine with the music. Results are outstanding: better concentration, boosted confidence, and reduced anxiety. According to [5], the research states that listening to classical music together with the use of imagery training can help improve basketball shooting skills better than just using imagery training alone.

Imagery is a psychological technique that has been widely accepted in the sports psychology world. Imagery training is the action of picturing movements or skills inside the brain, rehearsing, before the physical event is done. The clearer the picture, the better presentation of the body as well as the better control of anxiety and better pain tolerance [6]. Therefore, athletes that went through imagery training can be better with self management and problem solving than those who didn't. The research [7] found that Sepak Takraw players who applied imagery with music to their ball-serving training had improved in the accuracy of their serves. Imagery with music can motivate athletes into learning the skill as it helps clear out the picture during the imagery process. For the stated reason, it is suggested that rhythmic gymnasts incorporate imagery into the current training regime to minimize competition mistakes, boosting confidence, and to increase the potential of each individual. The only condition is that imagery training must be repeated until the subject is able to picture all the movements clearly and as if they were watching a video of them performing inside their head

then imagery could be beneficial and efficient in boosting the process of learning the physical skill.

From the stated, sports psychology and imagery has a positive impact on the training of the rhythmic gymnasts. The problem to be solved is that most gymnasts needed improvements in their Jump, Balance, and Rotation elements as well as how to incorporate technical elements to go with the flow of the music. The capability of doing so requires both the body and mental abilities to be fully expressed, so, only refining the technical elements is not sufficient to succeed. Therefore, mental development by means of imagery with music must be promoted for a benefit in both the development of the technical elements with the routine music of each individual and to flourish Rhythmic Gymnastics in Thailand.

2 The Purpose of Research

- a. To study the effects of imagery and the effects of imagery with music on ability to perform techniques of Rhythmic gymnastics.
- b. To compare the effects of imagery and the effects of imagery with music on ability to perform techniques of Rhythmic gymnastics.

3 Method

Participants

The sample that is used in the study are 20 rhythmic gymnasts from all over the country, being under Gymnastics Association of Thailand, ever had experience competing in the Youth Games (or higher), have ever been a representative of a province, and have been training together at the National Gymnastics Training Center of Thailand from 13 to 18 years of age. They were divided into two groups, with 10 gymnasts in each group. selected by simple random sampling (scores from the ability to perform techniques of Rhythmic gymnastics, Sort scores high-low, alternately). The first experimental group participated in imagery training and rhythmic gymnastics techniques and the second experimental group participated in imagery with music training and rhythmic gymnastics techniques.

Instruments

- a. Imagery training program

It is a practice of thinking and sequencing the steps of doing rhythmic gymnastics techniques in 3 groups, including jump group, balance group, rotation group and routine (the one that is choreographed by the researcher). Practicing with experimental Group One, using only imagery training program. The duration of the experiment is 6 weeks and the imagery training session is done 3 times a week: on Tuesdays, Thursdays, and Saturdays.

b. Imagery with music training program

It is a practice of thinking and sequencing the steps of doing rhythmic gymnastics techniques in 3 groups, including the jump group, balance group, rotation group and routine with music (the one that is choreographed by the researcher). The length of the music is 45 seconds. Practicing with experimental Group Two, using only imagery with music training program. The duration of the experiment is 6 weeks and the imagery with music training session is done 3 times a week: on Tuesdays, Thursdays, and Saturdays.

c. Rhythmic gymnastics technique training program

Practice with the first experimental group. And the second experimental group. The duration of the experiment is 6 weeks and the technique of Rhythmic Gymnastics training session is done 3 times a week: on Tuesdays, Thursdays, and Saturdays. Practice of technical elements for 30 minutes, and routine practice with music for 1 hour (the one that is choreographed by the researcher). Practice 3 groups of rhythmic gymnastics techniques together with apparatus, including the balance group, rotation group and jump group.

The jump group

- Split leap



Fig. 1. Split leap created by the researcher

- Stag leap with back bend of the trunk



Fig. 2. Stag leap with back bend of the trunk created by the researcher

- Turning split leap (Jeté en tournant)



Fig. 3. Turning (Jeté en tournant) created by the researcher



Fig. 4. Split leap (Jeté en tournant) created by the researcher

The balance group

- Split with hand support



Fig. 5. Split with hand support created by the researcher

- Arabesque : high leg with trunk forward



Fig. 6. Arabesque : high leg with trunk forward created by the researcher

- Ring with hand support



Fig. 7. Ring with hand support created by the researcher

The rotation group

- Ring with support



Fig. 8. Ring with support created by the researcher

- Fouetté: Passé



Fig. 9. Fouetté: Passé step 1 created by the researcher



Fig. 10. Fouetté: Passé step 2 created by the researcher

- Penché : body bent at the horizontal, leg in back split, rotation on flat foot



Fig. 11. Penché : body bent at the horizontal, leg in back split, rotation on flat foot created by the researcher

d. Rhythmic gymnastics technique assessment form

This form of rhythmic gymnastics technique is assessed. The researcher has adapted a lot from assessment form for rhythmic gymnastics athletes' training for selection of athletes. Created by the Gymnastics Association of Thailand (2019), the researcher developed this test as a tool to test the ability to perform rhythmic gymnastics techniques. There are a total of 3

judges. The scoring criteria are as follows: Each exercise has a score of 5 points, including 9 exercises for a total of 45 points, and the other 5 points come from the overall listening of music.

Procedure

Firstly, the 30 gymnasts are allowed to stretch and warm-up for 30 minutes before they go through the evaluation process. The researcher then gives out 2 sets of pre-choreographed 45-second routines with music to each of the gymnasts, each is a different apparatus. The criteria is evaluated by how well the gymnasts perform the technical movements of rhythmic gymnastics that have been assembled in the routine. The researcher will then record the scores of each and every performance of the gymnasts. After ranking, the top 20 gymnasts will be ranked using the scores of their ball routine.

Imagery and imagery with music can be achieved by picturing and practicing the movements in their thoughts, chronologically. The differences are Group One only does imagery while Group Two does imagery with music. The duration of the experiment is 6 weeks and the imagery training session is done 3 times a week: on Tuesdays, Thursdays, and Saturdays, each group will only have 15 minutes for each imagery training session. Training procedures will be as follows. Group One only does imagery training for 15 minutes and Group Two does imagery with music for 15 minutes. The two groups will then have a small break of 5 minutes and a stretch and warm-up session for 30 minutes. Next will be a practice of technical elements for 30 minutes, small break for 5 minutes, and routine practice with music for 1 hour. The routine used in this experiment is the one that the researcher has choreographed by combining the technical elements of rhythmic gymnastics with music to be performed similarly to a competition routine, the difference is the duration: the experimental routine is shorter, only 45 seconds.

The process of thinking in each and every imagery training will be as follows. Both groups will be trained to rehearse the whole day of practice, starting from how they warm-up and how they will continue to practice the technical elements, picturing how they will do each Balance, each Rotation, and each Jump. Next, they will continue imagining the experimental routine (the one that is choreographed by the researcher), from the starting pose to the end. Both groups practiced the same, differences are Group One from experimental will have the routine is imagery without music. Group Two from will have the routine is imagery with music. The duration of the experimental routine is 45 seconds. The number of times repeating this exercise depends on the training program of the week.

Data Analysis

Data collected from the experiment is the scores evaluated by how well the technical elements are performed in the experimental ball routine. Each experimental group is evaluated every two weeks, before and after the practice of week 2, 4, and 6, and the data is recorded as Pre-Test and Post-Test One, Two, and Three. Analysis of the data is done by using Statistical Package for the Social Science (SPSS) which is a program specialized in data analysis. Statistical approaches associated with the experiment are as follows:

- a. To calculate the mean and the standard deviation calculated from the data of the ability to perform the technical elements at Pre-Test, Post-Test One, Two, and Three of each experimental group.

b. To compare the difference in the mean and the standard deviation values of the ability to perform the technical elements of each group by using the Paired t-test approach between the data at Pre-Test, Post-Test One, Post-Test Two, and Post-Test Three.

c. To compare the difference in the mean and the standard deviation values of the ability to perform the technical elements between experimental group One and experimental group Two, ordered by Pre-Test, Post-Test One, Two, and Three. The t-value is then tested using the Statistical Independent t-test approach.

d. To conduct the experiment with a Statistical Significance level of .05

4 Results

Tables 1. Mean and Standard Deviation of the evaluation on the ability to perform the technical elements in rhythmic gymnastics (ball apparatus) of both of the experimental groups at Pre-Test, Post-Test One (after practice in week 2), Post-Test Two (after practice in week 4), and Post-Test Three (after practice in week 6).

Demonstrates the ability to perform the technical elements in rhythmic gymnastics (ball event) of each group. The values of Group One (who did imagery without music) reflected that there is an improvement as shown in the gradual increase of the values in each test, Pre-Test, Post-Test One, Post-Test Two, and Post-Test Three, respectively. For Group Two (who did imagery with music), there is also an improvement as shown in the gradual increase of the values in each test, Pre-Test, Post-Test One, Post-Test Two, and Post-Test Three, respectively. Comparing the mean values, it is shown that Group Two (who did imagery with music) had a greater development in the ability to perform the technical elements in rhythmic gymnastics than Group One (who did imagery without music).

The evaluation on the ability to perform the technical elements in rhythmic gymnastics (ball apparatus)	Group One Imagery without music		Group Two Imagery with music	
	\bar{X}	SD	\bar{X}	SD
Pre-Test	26.66	6.24	26.68	5.49
Post-Test One (after practice in week 2)	28.36	5.45	30.0	4.08
Post-Test Two (after practice in week 4)	33.36	4.00	36.17	4.23
Post-Test Three (after practice in week 6)	42.70	4.44	44.30	3.11

Tables 2. A comparison of the ability to perform the technical elements in rhythmic gymnastics (ball apparatus) within each experimental group at Pre-Test, Post-Test One, Post-Test Two, and Post-Test Three.

Displays the comparison within each group, comparing at the Pre-Test, Post-Test One, Post-Test Two, and Post-Test Three, Group One (imagery training without music) and Group Two (imagery with music). Results from this comparison is that there is a difference in the ability to perform the technical elements in rhythmic gymnastics at a .05 statistical significance for both Group One and Group Two. In addition, the levels of rhythmic gymnastics ability at Post-Test One is different from the levels at Post-Test Two and Post-Test Three. Respectively, the level at Post-Test Two is different from Post-Test Three.

The evaluation on the ability to perform the technical elements in rhythmic gymnastics (ball apparatus)	Group One Imagery without music		Group Two Imagery with music	
	t	p	t	p
Pre-Test and Post-Test One (before vs after week 2)	-3.91	.04*	-6.88	.00*
Pre-Test and Post-Test Two (before vs after week 4)	-9.21	.00*	-17.90	.00*
Pre-Test and Post-Test Three (before vs after week 6)	-20.40	.00*	-20.43	.00*
Post-Test One and Post-Test Two (after week 2 vs after week 4)	-9.54	.00*	-19.10	.00*
Post-Test One and Post-Test Three (after week 2 vs after week 6)	-24.15	.00*	-33.45	.00*
Post-Test Two and Post-Test Three (after week 4 vs after week 6)	-24.19	.00*	-20.27	.00*

* significance level of .05

Tables 3. The comparison of the ability to perform the technical elements in rhythmic gymnastics (ball apparatus) between Group One and Group 2 at Pre-Test, Post-Test One, Post-Test Two, and Post-Test Three.

Displays the differences of both groups, at Pre-Test, Post-Test One, Post-Test Two, and Post-Test Three, Group One (imagery training without music) and Group Two (imagery with music). Results from this comparison is that there is a not difference or difference between Group One and Group Two but it does not go under the .05 statistical significance.

The comparison in the effects of imagery versus imagery with music	The ability to perform the technical elements in rhythmic gymnastics (ball apparatus)	
	t	p
Pre-Test	-.01	.99
Post-Test One (after practice in week 2)	-.80	.43
Post-Test Two (after practice in week 4)	-1.52	.14
Post-Test Three (after practice in week 6)	-.93	.36

5 Discussion

This research reveals the comparison of the ability to perform the technical elements in rhythmic gymnastics (ball apparatus) within each group, before and after Group One's imagery training and Group Two's imagery with music training. The result was there is a Statistical Significance level of .05 within both groups and within the paired tests. The reason was both imagery and imagery with music were sports psychology approaches that could help improve the skills in doing technical elements in Rhythmic Gymnastics, leading the gymnasts to execute the technical elements better. When done regularly and continuously, imagery training can help improve levels of learning, perceiving, and effective movement development, both mental and physical skills. As [8] said, using imagery to

experience certain events in the mind is a great method of learning as it improves the concentration which leads to better execution. When imagery combines with music, music can also help build the imagination and thinking process. Moreover, the research stated that music can be helpful for the improvement of motor skills of athletes, aids in the creation of any particular atmosphere or event, and can be helpful for the improvement of the athlete's efficiency. Studies of [9] stated that imagery is the origin of the human's emotions. When a human is triggered by an external stimuli, first it creates an image which can be stored in the memory, then it can be expressed through feelings throughout the mind and body. For instance, to picture the arrangement of any movements with rhythm or music can create the same set of emotions as if the act was done physically. Even just thinking of the word 'happiness' or 'victory' can unconsciously put a smile on someone's face.

Further in this research, how much is the difference in the comparison of the ability to perform the technical elements in rhythmic gymnastics (ball apparatus) of each group, before and after Group One's imagery training and Group Two's imagery with music training, was studied. It turns out that the difference was not under the .05 Statistical Significance level but there was a greater improvement in the technical skills of Group Two. How Group Two had developed the skills better than Group One is approximate to the hypothesis. Although the difference was not under the .05 Statistical Significance level, the skills development of the two groups went into the same direction. Because both of the groups were given the same training programs, the only difference is music. Group Two did have their imagery training with music but Group One didn't. This represented the process of using imagery with/without music to learn the process of how to do the technical elements of rhythmic gymnastics and how to advance them correctly. The stated process must be done regularly and continuously to improve the ability to perceive and picture the movements in order to achieve better execution [10]. According to, imagery is a skill that needed regular and continuous training. The principles to imagery training include relaxation, realization, regularity, and using of tools to enhance the effects of imagery. However, good and effective imagery also depends on the capabilities of the athlete. From the study [11], imagery in Olympic athletes is stated. Although the athletes didn't receive imagery training in the first place, the experiment came out great because they had been receiving regular and systematic training. This shows that the effectiveness in bodily movements influences the ability to receive imagery training. In addition, the use of music (e.g. music for rhythmic gymnastics routines) to integrate with imagery training can help the athletes feel more relaxed and train effectively with better concentration. The reason why imagery with music can aid in movement and improve the functioning of the musculoskeletal nervous system is because when the picture inside a person's imagination is clear and vivid, the nervous system sends a nervous signal as a command to the muscles, as if the action was actually executed. Moreover, imagery can also stimulate the central nervous system. Imagery is a process of creating a print in the mind and is remembered as a picture of success or as a perfect execution of that certain skill. [7] matches the findings of [5] in using imagery with music to increase the accuracy of basketball players in doing free throws. It is found that the players who did imagery with music had better accuracy in their free throws than those who only did imagery.

From this experiment to study the effect of imagery with music, the ability to execute technical elements in rhythmic gymnasts is being tested in two experimental groups: imagery training with and without music. Results found that the skills of the gymnasts in both experimental groups have been improved significantly. Although the comparison between Group One and Group Two did not go under the .05 statistical significance, there is a difference displaying the fact that imagery with music can help improve the ability to execute the technical elements better than imagery alone.

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