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Research Paper

The Effect of Motivational and Cognitive Imagery on Flow and Shooting performance

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ABSTRACT: *The aim of this study was to compare the effects of motivational and cognitive imagery on Flow and 10m Air rifle shooting performance.15semi-professional men shooters were classified on a voluntary basis and divided into three groups of five people: 1) physical exercise, 2) physical exercise with cognitive imagery, 3) physical exercise with motivational imagery. Each group participated in 18 exercise sessions. Before and after intervention, participants did the shooting test and then completed the Flow state scale-2. Data analysis was done by one-way ANOVA. The results showed that the flow and performance of physical exercise group had significantly higher improvements with motivational imagery in comparison to the other groups. Based on the results, it seems thatthe use of motivational imagery by coaches and sport psychologists in comparison with cognitive imagery will be leads to more effective increase in the Flow rate and performance of 10m Air rifle shooting.*

Keywords*: Motivational imagery, Cognitive imagery, Flow, shooting performance*

I. INTRODUCTION

10m Air Rifle discipline scores have risen dramatically in recent years and this success is due to the technological advances in weapons making, equipment design, and greater emphasis on increasing mental and relaxation techniques.10m Air Rifle is one of the international Shooting Sport Federationeventsthat shots are fired from the standing position only. In 10m Air Riflediscipline, Men fire the 60 shots for 105 minutesthat means the most point possible in a "perfect form" for men is 600 points.

Sport psychology literature clearly shows that there are at least three different concepts in implementing successful sports. The first concept is flow (Csikszentmihalyi, 2000), which is defined as an inner enjoyable experience. The second concept is peak performance is (Privette, 1981, Privette, 1983) which is defined as part of the excellent and better performance, and the third concept is experience of the peak, which has been defined as very precious moment (Maslow, 1972). Ravizza (1977) and Privette (1983) have stated that people at a certain situation may experience more than one of these phenomena. In fact, the comparative analysis of these phenomena showed that, they are involved in many same qualities as the attraction, engagement, happiness, value, their identity, responsibility, spontaneity, freedom, awareness of power, loss of time and space and temporality (Privette, 1983).Evidence suggests that these phenomena are related to each other, so that, in the specific circumstances of the experience of one of the phenomenon, the second phenomenon may also be started and even third phenomenon (Privette, 1983; Privette and Brundrick, 1991). For this reason, Grove and Lewis (1996) have suggested that the three experiences can be called flow state (Grove and Lewis, 1996).Csikszentmihalyistated that the key to experience flow is the relationship between challenge and skill. This relationship initially was developed by Csikszentmihalyiand Bennett (1971) in the flow model, and then was presented by Csikszentmihalyi (1975).There is flow, when the balance is established between challenge and skill. In contrast, when the perception of opportunities does not act in accordance with his abilities, he will experience fatigue, worry or anxiety depending on the fluctuation of practice opportunities (challenges) and practice abilities (skills). However, the flow occurrence in particular depends on the person' image of his challenges and skills, however, it can be opposed to his actual conditions; therefore, different people may experience one of the flow states, anxiety, worry and boredom under the same goal of practice opportunities.

Moreover, it seems that many variables affect this relationship (Csikszentmihalyi, 2000). Although this model has obvious limitations, but its direct impacts still are significant. An important aspect of the flow experience in an activity or competition is perception of personal performance. For example, it seems that

athletic performance is dependent on the severity of flow experienced. However, a lot of qualitative and story-like evidences support this guess (for example. Ravizza, 1984), however, there is little empirical evidence (Jackson and Csikszentmihalyi, 1999).

Recent studies have examined possible the relationship between the flow and athletic performance. The results show that, this case is associated with high levels of performance, and is considered as a very positive experience. According to Privette (1983), flow is an issue which often has been discussed in relation to peak performance, so that in a mutual expression, we can say that the flow experience is related to peak performance, or vice versa (Privette, 1983).

In this regard, Csikszentmihalyi (1993) reported a positive association between flow and performance. It seems that, based on research findings and theoretical discussions, there is a cause and effect relationship between flow and performance, which in this regard, performancehas a significant impact on flow, and on the other hand, flow has a significant impact on performance. (Csikszentmihalyi, 1993).Mental imagery is one of the main interventions in sports psychology (Cornelius, 2002) that is defined as the use of one or more senses to create or recreate athletic skill or position (White and Hardy, 1998). Schmidt (2005) stated that mental imagery is an effective way to review skills. It is possible almost every time and does not require any device (Schmidt, 2005).Paivio (1985) emphasized in the context of his comments on the cognitive and motivational orthogonal role of imagery on performance and learning motor skills (Paivio, 1985). Martin et al (1999) in his conceptual model dividedcognitive and motivational functions of imagery into motivational exclusive imagery, motivational general imagery, cognitive exclusive imagery and cognitive generalimagery.

For example, the use of exclusive and generalfunctions of cognitive imagery, respectively, includes images of specific motor skills and comprehensive strategies of the game. Martin et al (1999) demonstrated that motivational functions of imagery are provided with images of specific objectives, optimal arousal and successful confrontation (Martin, Moritz and Hall, 1999).In this regard, a series of studies have examined on the effect of psychological intervention on flow and performance.

Pates and Maynard (2000) examined the effect of hypnosis intervention on flow and performance in golf. Participants included three 21-year old athletes. Using pretest-posttest and retention research projects, flow and performance of participants in golf chip shot was tested. Performance was evaluated by measuring the distance between the final position of the ball and the hole through the accuracy of chip shot. Pates and Maynard provided ahypnosis trainingconsisting of four stages of relaxation, induction, Back and control techniques, the stimulus. In order to experience the optimal performance again, music as a stimulus was selected by thegolfers. Participants received an audio recording of the training session to continue listening at home for more than seven days and on the day of intervention. Post-intervention phase began after receiving report of the subjects on the experience of optimal performance, which could be stimulated to recall certain music. Participants were asked to remember the music selected before each chip shot. The results showed that, on average flow of two participants after the intervention increased, while the average flow of one of the participants was reduced. For all participants, the overlap was observed at the numbers of data points between the base stage and post-intervention phase. At the start of phase two, participants began to shot without the use of stimulants. The scores of flow for participants or was equal to the first grade, or reduced to the lower scores. In all three golfers, the accuracy of performance from the base stage to post-intervention stage rose, and then was reducedfromthe post-intervention phase to the next phase (Pates and Maynard, 2000).Pates et al (2001) examined the effect of hypnosis on the performance of basketball. Experience of flow during the base phase and post-intervention phase was conducted by successive interviews. Three male college basketball players were 17 and 19 years old. Using a pretest-posttest and retention practices, the performance of participants were assessed in the surrounding area of free throws and penalty stroke from the free throw line.

After completing the basic function, four hypnosis intervention phases were introduced to the participants similar to the previous method of hypnosis (for example. Pates and Maynard, 2000). Participants to re-experience their optimum performanceselected a word as a stimulus. Each participant received an audio recording of the training session to continue listening for seven days at home at the listening days. Finally, participants were asked to use the stimulus word before running the penalty stroke or jump stroke. The results showed a significant increase in these shoots. Following of the study, and when the stimuluswas removed between the intervention phase and retention phase, a significant reduction was observed in the execution of penalty stroke and jump stroke.Participants in successive interviews stated that with the use of stimulants during the intervention phase, they perceived confidence, focus and positive thoughts during execution.These results indicate that, in addition to direct effects of performance on intervention, many cognitive processes that are not explicitly addressed in the intervention, but have been associated with performance can arise as a product by intervention or performance can be increased.Pates et al (2001) stated that based on these findings, the intervention components must be evaluated separately to determine their effects on performance and cognitive factorsrelated to performance (Pates and Maynard and Westbury, 2001).In compared to two first studies, consecutive interventional studies have been done on flow, pretest-posttest way so that participants do not need

to return to basic position. Pates et al (2001) studied the effect of hypnosis on flow and golf performance. Five 21-year old persons participated in this study.The accuracy of performance includedPater standardized stock by measuring the distance between the ball and the hole. Initially, participants received a live session of hypnosis similar to hypnosis therapy of the study of Pates and Maynard (2000). Participants also received an audio recording of the training session to listen for seven days until the post-intervention phase begins.Taking Golf Potterwas chosen as a natural and standard stimulus to liberalization experiences of best competitive practices. The results showed that flow and performance of Potter stroke had increased foe all five participants from base stage to post-intervention stage (Pates, Oliver and Maynard, 2001).

Pates et al (2002) examined the effect of hypnosis on the flowand performance of a **three**-point shot in basketball. Participants were five college basketball players from 19 to 23 years. Performance of three-point shot from standard situations was measured. Pate set al used basketball as a natural and standard stimulant, and used the method of hypnosis similar to the study of Pates and Maynard (2000).

Audio tape was used for seven days and the time between the completion of the first stage and start the post intervention stage was marked. The results showed that flow and performance of all participants has been increased (Pates, Cummings and Maynard, 2002).Pates et al (2003) examined the effect of imagery and self-selected music on flow and performance. Participants were three University Netball players who were 12 to 19 years old. Performance includes shooting Netball, with four beats of each of the land, in a series of 11 performance tests. Flowwas evaluated through flowstate scale (Jackson and Marsh, 1996) retrospectively and after the completion of eachperformance test.Pates et al after the basic stage presented a description of the flow properties to the participants. Participants initially remembered the images and experiences which reflected the personal experience of flow for them and repeated the image of their flow and performance internally. Participants at the end of the imagery were trained to select the music to facilitate the flow. After reporting on the experiences of flow by participants when listening to self-selected music,performance tests of post-intervention phase began.Participants did Netball shot from situations similar to the basic stage, but this time they listened to self-selected music. The results showed that, flow in two of three participants increased, and performance for all three participants increased (Pates, Karageorghis & fryer, and Maynard, 2003).The results showed that flow in two of three participants was increased and performance ofall three participants increased (Potts, Karageorghis, Fryer, and Maynard, 2003).

In summary, the results of Pates et al. (2000, 2001, and 2002) showed that hypnosis interventions are effective in increasing flow and performance. In addition, the results of the Pates et al (2003) are evidence of the positive effect of imagery-based intervention on flow and performance. Because it seems that since researchers may not be trained to do the hypnosis intervention, imagery interventions can be a good option forflowimprovement and performance.

Lindsay et al (2005) used four hypnosis intervention stages to assess flow and performance in cycling. Participants were competitive elite cyclists who were 21 to 32 years old. Lindsay et al. (2005) examined hypnotic influence on the competitive situation using a natural and personal stimulant to increase flow. Initially, participants were guided through hypnosis living education. Then a stimulant such as Tic-TacAudio **cassette** was chosen at the bicycle rear wheel and look of the finish line. Participants listened every day to teach hypnosis in the audio cassette. The results showed that flow of all participants was increased from the base phase to post intervention phase. However, the increase wasrevealed in the data points betweenpre-interference phase and post-interferencephase for two participants with the highest scores in their flowat the base phase.Lindsay et al concluded that hypnosis intervention was helpful for one of the participants who experiencedan effective increase in his flow. In addition, they showed that mean performance scores for two participants was improved. Scores of the data point was widely different that indicated there were inconsistent patterns between the base and the post-intervention phase**.** Lindsay et al. (2005) to evaluate the effectiveness of hypnosis intervention in a competitive environment, argued that people who lack a positive attitude toward intervention and showed the ability of limited use to produce images, experienced similar improvements as well as other participants in the performance (Lindsay, Maynard and Thomas, 2005).Several researchers have emphasized that, individual preconditions such as belief and practice in the use of imagery and hypnosis are important aspects for successful implementation of the interventions (Liggett, 2000; Sheehan and Robertson, 1996). Lindsay et al. (2005) provided evidenceson the effect of interventions to increase flow and performance in valid environmental competitive fields. Kohen et al (2014) examined the effect of intervention on the increase in flow and performance in a tennis competitive environment. Four male teenagers aged 13 to 15 participated in the study. All participants had at least three years' experience and two years of experience to participate in Tennis tournament, respectively. Participants were participated in Tennis tournament at least six times a year. The research was conducted using the pretest-posttest method. In the first phase, flow and performance of athletes was monitored for six weeks and six weeks in the next phase using hybrid relaxationby imagery techniques. The results showed an increase in experience of flow for threeparticipants and performance improvement of all four participants (Kohen, Morris and Watts, 2014).

Sardon et al (2015) examined the impact of the imagery intervention on flow and performance in tennis using a Sport Imagery Ability Questionnaire (SIAQ) and Flow State Scale-2 (FSS-2). Five men and three women aged 18 to 22 with at least nine years of experience of tennis, and six years of competitive experiencewhich attended at least five annual competitions, participated in the study.

The accuracy of shot after the ball hit the ground, the accuracy of service, and shot depth after hitting the ball into the ground according to the International booklet tennis scores were examined. Data analysis with t-test showed significant difference in flow between the pre-intervention stage and the poet-intervention stageof the imagery group in the exercise session ($P<0.05$, $-12.23 = t$) and imagery group outside the exercise session ($P<0.05$, $-7.78 = t$).Imagery group in exercise showed a higher significant difference (mean = 55.25) compared to the imagery group outside of exercise (mean = 31.50). Results of grades for imagery group out of exercises showed significant difference in accuracy to hit the ball after hitting the ground ($P<0.05$, $-3.69 = t$) and shot depth after hitting the ball with of ground ($P <0.05$, $t=-3.61$).No significant difference was observed in accuracy of services of both imagery groups in exercise and imagery outside exercise. These results suggest that in order to improve flow, imageryduring exercise sessions must be used, while the imagery outside of exercise sessionsis effective on performance improvement and should be included in exercise programs outside the exercise session (Mazaulan&Mohamed and Mohamed, 2015).Kohen and Diaz (2016) examined the impact of imagery on the increasing flow ofthe teen elite endurance runners of an academy with excellent performance in Qatar as a case study usingpre-intervention and post-intervention method. At the base stage, each of the participants met the fixed criteria related to flow. Three participants did imagery writings during four intervention weeks. The results of post-intervention stage showed a moderate increase in flow of participants (Kohen and Diaz, 2016).

In summary, studies have provided evidence that indicate imagery interventions can improve effectively flow and performance. Interventions using imagery have shown significant increase in flow and performance in exercise environments. The results show that overlapping was observed about the data point of scores for flow and performance between the base stage and post-intervention stage in a competitive situation (Lindsay et al., 2005). It seems that controlled exercise environment has fewer distractions than competitive fields that can facilitate flow and better performance.

Research on the impact of imaging on flow, so far have not been examined the possible differences in the effectiveness of motivational and cognitive imagery on flow, and there is need for research in this field. Accordingly, the aim of this study was to investigate the effect of motivational and cognitive imagery on flow and 10mair rifle shooting performance.

Research methodology

The method of this study was quasi-experimental with pretest-posttest design and control group. This study was carried out to compare the effects of two types of cognitive and motivational imagery on flow and performance of 10m Air Rifle Shooting among semi-professional shooters with at least one year of shooting.

Population and the sample

The population included all 18 to 32-year-old semi-professional shooters in Tehran in2016 who had at least one year experience of 10m air rifle shooting. The statistical sample at the first phase of the study included fifty 18-29 year-old shooters with an average age of 23.42 years which in the second stage of the study, fifteen19 -27- year old shooter with an average age of 23.40 constituted the sample, they were selected using convenience sampling method.

Measuring tools

Sport Imagery Ability Questionnaire

Sport Imagery Ability Questionnaire has been developed by Williams and Cummings (2011) which measures the ability of athletes in imagery of a variety of situations. The questionnaire has15 items which have been ranked based on seven-point Likert scale (1 = very difficult to 7 = very easy).Skill imagery has been developed in three items of 1, 6 and 13; emotions imagery in three items of 4, 7 and 11, target imagery with items of 5, 9 and 14, expertiseimagery in three items of 2, 10 and 15.Scores of each item is considered equal to 1-7. To assess the internal consistency of items with each other and with total Questionnaire, Cronbach's alpha coefficient was used. Total Cronbach's alpha coefficient calculated is equal to 0.902 for 150 athletes. Cronbach's alpha for the subscales of skill imagery has been reported equal to 0.929, strategy imagery, 0.930, expertise imagery, 0930, target imagery, 0.929. Confirmatory factor analysis of the Persian version supports the Sport Imagery Ability Questionnairewith 3 factors and 15 items (Hatami, Shahmiri and Tahmasebi, 2015)

Flow State Scale-2 (FSS-2): Flow State Scale-2 (FSS-2**)** has been developed by Jackson and Eklund (2002). The reason for this tool are studies which have shown Flow State Scale-2 has the ability for assessment the status of flow and providing a coherent conceptual and statistical measurement of glow in physical activities. Flow State Scale-2 (FSS-2**)** has 36 items, each of which is divided into nine subscales and each

subscalemeasures flow experience separate. The 9 features include: 1. balance of challenge-skill, 2- clear goals, 3- action-awareness merging, 4- unambiguous feedback, 5- intense focus on the task at hand,6-a sense of control, 7- loss of consciousness, 8- change the time, 9- The experience of inner determination and planning. To extract the correct information required by each of these features, four items are designed in this tool. The response of each item is recorded using a five-point Likert scale ranging from 1 (strongly disagree) to five (strongly agree). Coefficient of internal consistency and reliability of this scale in research which was carried out by Zabihi et al (2015), has been reported equal to 0.91 and 0.91, respectively, (Zabihi, Zandi and Hemayat Talab, 2015).

10m Air Rifle shooting test (60 shots, 105 minutes): The purpose of this test was to measure the Semi-professional shooters performance. To run the test, shooters were present on the test site. Test time was 105 minutes and 60 shots were considered. Trick arrows were fired at the same time. There is no limit on the number of trick arrows, but after firing the first shot, the shooter was not allowed to trick shooting. Maximum test score was 600. Shooting test was performed before and after the intervention period.

Research method

First, Sport Imagery Ability Questionnaire was distributed among 50 10m Air Rifle Semi-professional shooters. Among shooters, 15 shooters with the higher scores who would like to participate in the study were selected and classified into three groups: physical exercise (5), physical exercise with cognitive imagery (5), physical exercise with motivational imagery (5).Then, in the pre-test, using Flow State Scale-2, and shooting test, flow and performance of all subjects were measured. After completing the pre-test, three groups were under training in two sessions of 90 minutes per week for 9 weeks (18 sessions). So that, physical exercise group began only exercise in any session, group of physical exercise with motivational imagery, in addition to physical exercise, also carried out motivational imagery, and the group of physical exercise with cognitive imagery, began cognitive imagery in addition to exercise. After 18 sessions, in a position similar to the pre-test, the performance of subjects was measured using shooting test and then using flow of shooters using a Flow State Scale-2.

Physical exercise group training program: Subjects began physical exercise in each session, so that in each session, 15 minutes first was dedicated to warm up, 60 to 65 minutes to perform skills in10 m air rifle shooting and 10 last minutes to cool them.

Physical exercise with cognitiveimagery group training program: Subjects at the first session became familiar with how to do imagery, and after general familiarity with the nature of imagery, they start doing exercises. Exercise related to the skills of this group was the same as physical exercise group (control). The difference is that, between each exercise, three to five minutes, they tried to have cognitive imagery, and after imagery, they did exercise again. In this group cognitive imagery, cognitive key phrases were used for shooting. Here we refer to the example of these words:

Before shooting: Turn right as much as 75 to 90 degrees, open your legs as much as shoulder width, rotate your torso to the left of the target, and a little elbow backwards, place the arm and elbow left hand directly under the gun. Take the gun with your right hand.

Aiming to shoot: Place the cheeks on butt stock, relax face and neck and place the line of sight right in the center of the bullseye, placeEye, loophole, sight defilade, eye ball along the each other

Shooting moment: fire

Physical exercise withmotivationalimagery group training program: It was similar to the previous group, with the difference that, in the context of imagery used for this group,motivationalkey terms was used. Examples of these statements include Imagine yourself with confidence; you are doing the best shot, and imagine that to will achieve best result; observe that the shot hits the center of target, you feel good about the result.In the end, after collecting data, the mean and standard deviation were calculated. To ensure data normality and homogeneity of variances, the Kolmogorov-Smirnov test and Levene were used, respectively. As well as to determine the consistency of groups before the intervention, the ANOVA was used and in order to determine differences between groups, ANOVA test and then Games-Howell and Tukey post hoc test was used. Results were tested at a significance level of $P<0.05$.

II. Results

Data in Table 1 is related to variance analysis of sport imagery ability of the groups before intervention programs. As mentioned above, using the sport imagery ability questionnaire developed by Williams and Cummings (2011), sport imagery ability of participants was measured, and 15 students with the highest scores who were willing to participate in the study were selected for the study. According to Table 1, an average of sport imagery ability is more than 97, and on the other hand, based on analysis of variance, sports imagery

ability level of the participants in the three groups showed no significant difference (P<0.89). In other words, the three groups were similar in terms of sport imagery ability.

Table 1- ANOVA test on sport imagery ability score of the research groups

Experimental Group	Sport imagery ability score (mean ± SD)	F ratio	significance
Physical exercise (control) (5 persons)	97.00 ± 1.09		
Physical exercise with cognitive imagery	97.60 ± 1.12	0.10	0.89
Physical Exercise with motivational imagery	97.60 ± 0.92		

The significance level of 0.05 > P is intended.

Table 2 shows the descriptive results of data related to the scores of flow. As you can see in Table 2 subjects in physical exercise with motivational imagery group showed the most
Flow improvementcompared to subjects in physical exercise group (control) and physical exercise with cognitive imagery group. Also, the physical exercise with cognitive imagery group had more flow improvement compared to physical exercise group.

Table 2- Descriptive findings on theflowimprovement

Group	The average progress	The standard deviation	Standard deviation
Physical exercise with cognitive imagery	57.60	16.62	7.43
Exercise with Physical motivational imagery	71.60	27.92	12.48
Physical exercise (control)	14.60	3.57	1.60

Table 3 shows the variance between groups (test of homogeneity of variance). In the first column, you'll see the statistic leven value. Due to the resulting significance amount, which is equal to 0.002, and is slightly smaller than 0.05, it can be concluded that the sample variance is heterogeneous, so Braun Forsyth statistic is used to evaluate the mean of the groups.

Table 3. Leven statistic to test the homogeneity of the variances in the score of the **Flowimprovement of subjects**

Leven statistic	The degree of freedom 1	The degree of freedom 2	Significance
11.281	2	12	0.002

The significance level of 0.05 > P is intended.

Table 4 shows the results of the one-way ANOVA. Due to the significance amount obtained which is equal to 0.006 and smaller than 0.05, so the null hypothesis, the average flow improvementof three groups is the same, is rejected. That means the flow improvement of three groups is not equal. According to rejection of the assumption of the equality of mean and variance heterogeneity, theGames-Howelltest was used to evaluate differences between groups.

Table 4- Summary of analysis of variance to examine the impact of cognitive and motivational imagery on flow

	Sum of squares	Degree of freedom	Mean Square	Brown-Forsythe test	Significance Level
Intergroup	8823.333	2	4411.667	12.382	0.006
Within a group of	4275.600	12	356.300		
Total	13098.933	14			

The significance level of 0.05 > P is intended.

The resultsof the Games-Howell test in Table 5 shows a significant difference between physical exercise with cognitive imagery group and physical exercise group (0.008 = P) as well as physicalexercise with motivational imagery group and physical exercise group (0.021 = P). A significant difference wasn't observed between physicalexercise with motivational imagery group and physical exercise with cognitiveimagery group (0.622 = P). Finally, line graph of the average score of the flow of three groups that shows there is more differencesbetween physicalexercise with motivational imagery group and physical exercise group.

Table 5- The results of Games-Howell test to evaluate the impact of cognitive and motivational imagery on the flow

Group (I)	Group (J)	The difference between mean	Significance level
Physical Exercise with motivational imagery	Physical exercise with cognitive imagery	14.00	0.622
	Physical exercise (control)	57.00	0.021
Physical exercise with cognitive imagery	Physical exercise (control)	43.00	0.008

Figure 1. The average score of flow improvement in each group

Table 6. Descriptive findings on data related to the test subjects' performance in10m Air Rifle Shooting test

Group	**Average the progress**	**The standard deviation**	**Standard deviation**
Physical exercise with cognitive imagery	41.40	11.28	5.04
Physical Exercise with motivational imagery	78.00	21.82	9.76
Physical exercise (control)	31.60	12.09	5.40

The significance level of 0.05 > P is intended.

Table 7, shows the variance between groups (test of homogeneity of variance). In the first column, the value of leven statistic can be seen. According to significance amount which is equal to 0.522 and is greater than 0.05, so we can conclude that the sample variance is homogeneous. Therefore, Fisher statistic is used to study the differences between groups.

Table 7. Leven statistic to test the homogeneity of the variances in the10m Air Rifle shooting performance scores

Leven statistic	The degree of freedom 1	The degree of freedom 2	Significance
0.687	2	12	0.522

The significance level of 0.05 > P is intended.

Table 8 shows the results of the one-way ANOVA. According to significant amount, which is equal to 0.001 or smaller than 0.05, therefore null hypothesis,performance improvement of all groups in the 10m Air Rifle shooting is the same, is rejected, i.e., performance progress of physical exercise group, physical exercise with cognitive imagery group and physical exercise with motivational imagery group, are not equal.

Table 8. Summary analysis of variance to examine the impact of cognitive and motivational imagery on performance of 10m Air Rifle Shooting

	Sum of squares	**Degree of freedom**	**Mean Square**	**Ratio F**	**Significance level**
Intera-Group	5980.933	2	2990.467	11.960	0.001
Inter-Group	3000.400	12	250.033		
Total	8981.333	14			

The significance level of 0.05 > P is intended.

According to rejection of the assumption of the equality of mean and homogeneity of variance in the groups, in order to observe a significant difference between groups, Tukey's test was used. The results of Tukey's test in Table 9, shows the mean difference between the physical exercise with motivational imagery group and physical exercise group (0.008 = P) as well as physical exercise with motivational imagery group and physical exercise with cognitive imagery group (0.002 = P). No significant difference was observed between

physical exercise and cognitive imagery group and physical exercise group (0.603 = P). Finally, you can see line graph of the average performanceimprovement of10m Air rifle shooting in three groups thatshows the greater difference between physical exercise with motivational imagery group and physical exercise group and a little difference between physical exercise group and physical exercise with cognitive imagery group.

Table 9. The results of Tukey's test to evaluate the impact of cognitive and motivational imagery on performanceimprovement of 10m Air Rifle Shooting

Group (I)	Group (J)	The difference between mean	Significance level
Physical exercise with motivational imagery	Physical exercise with cognitive imagery	36.60	0.008
	Physical exercise (control)	46.40	0.002
Physical exercise with cognitive imagery	Physical exercise (control)	9.80	0.603

The significance level of 0.05 > P is intended.

Figure 1. The average performanceimprovement of 10m Air Rifle Shooting in each group

III. Discussion and conclusion

The results of this study show that flow in physical exercise groups and imagery (motivational and cognitive) compared to physical exercise has had significant improvement which is consistent with the studies carried out by Pates and Maynard (2000), Pates et al. (2001, 2002, 2003), Kohen et al. (2014), Sardon et al. (2015) and Kohen and Diaz (2016). The results of this study are consistent with the study of Lindsay et al. (2005) with the difference that there was no interference between pretest and posttest scores. It seems that the competitive environment controlled has less stressful factorsthan competitive fields that can facilitate the flow. More research is needed to assess the impact of imagery interventions in the competitive fields and provide more valid environmental results. Also, results showed further flow improvement in physical exercise with motivational imagery compared to physical exercise with cognitive imagery group. It seems that motivational imagery for athletes who are in the semi-professional level in terms of skills and they are trained for base shills, they have a more positive effectiveness on flow than cognitive imagery. Given that flow has features including intense focus on the task at hand, clear goals, The experience of inner determination and planning, loss of consciousness, unambiguousfeedback, a sense of control, action-awareness merging, and motivational imagery has features including creating deep concentration, making sure of the result of the shooting, and a sense of control over the competition, increase self-confidence to imagine a victory and establishing clear goals, creating motivation for success, and inner resolve to reduce the anxiety and fear of failure and loss of self-consciousness and gain immediate feedback, control of negative emotions, control of stress (sense of control) is more effective than cognitive imagery and should be considered by coaches and psychologists. Finally, these results indicate that the effect of interventions on cognitive processes which must be evaluated to determine their impact on flow separately.

The results showed that the performance improvement of physical exercise with motivational imagery group in 10m Air Rifle Shooting was higher than compared to physical exercise, which is consistent with the results of Lindsay (2005), Pates and Maynard (2000) and Pates (2001, 2002, 2003), Cohen et al (2014), Sardon et al. (2015) and Kohen and Diaz (2016).On the other hand, a significant difference was not observed in the performance of physical exercise with cognitive imagery group with the physical exercise group, and was not consistent with the results of Lindsay (2005), Pates and Maynard (2000) and Pates (2001, 2002 , 2003). Cognitive imagery with emphasis on components of executing Shooting can help to run it properly, but it seems that since the athletes in the study all have at least one year experience in shooting and had relative control over the implementation of basic skills in 10m Air Rifle Shooting, so cognitive imagery didn't have a little effect on improve their performance. It seems that the relationship between cognitive imagery and running it is not clear that previous studies have shown (shorts and Monsma and shorts, 2002).

Shooting is a skill that requires concentration, a lot of confidence, paying attention to the target and decrease anxiety of the result of firing. Presumably, these psychological factors can be the causes of the effectiveness of motivational imagery, which are effective on Shooting, creating strong focus, making sure of the result of the shooting, increasing confidence, assuming a victory, and a sense of victory, followed by a positive attitude towards as a result of the shooting, reducing anxiety and fear of failure, control of negative emotions, stress and excessive arousal by motivational imagery in shooting are more than cognitive imagery. Motivational imagery can create a feeling of victory, that this type of imagery could be a factor in increasing shooters motivation for shooting carefully to record the best result.

More research is needed to increase flow and improve performance during competition, because it has important implications for athletes, coaches and sports psychologists which will have a special value. It is suggested that future research examine the effect of imagery on flow and performance in professional competitive fields.
It is suggested that sports coaches at training sessions use imagery relying on motivational aspects of them. When the coaches pay attention to the motivational feedback in exercise sessions, it could also lead to an increase flow and improve the performance of athletes.

Previous studies on the impact of imagery interventions on flow and performance has shown that imagery has a positive impact on increasing flow and improving performance. This study showed that cognitive imagery interventions compared to motivational imagery has a more positive effect on increasing flow and improving performance.

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