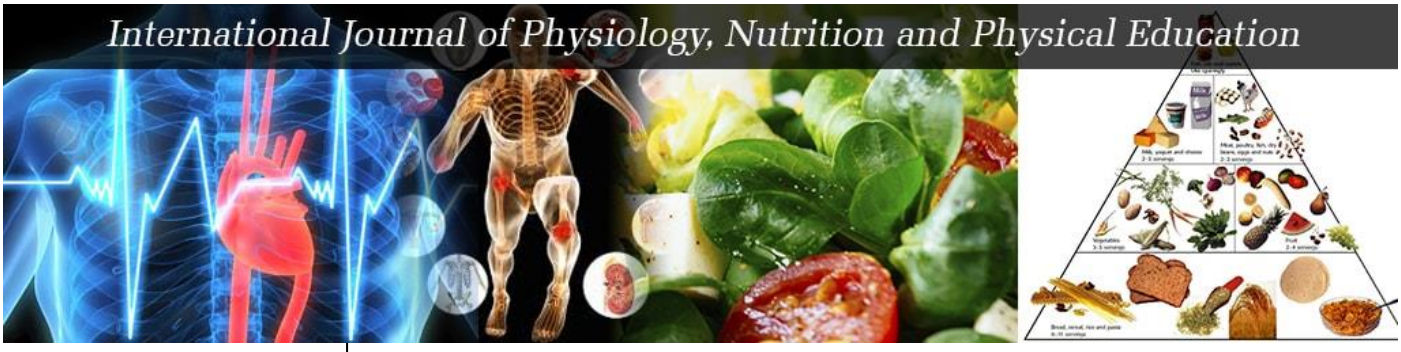

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Effect of visual motor behavior rehearsal (VMBR) intervention on learning archery

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Abstract
The present study investigated the effectiveness of Visuo-Motor Behavior Rehearsal (VMBR) intervention on learning archery shooting skill among beginners. The participants were 20 male physical education trainees with age ranging from 22 to 30 years. The trainees were randomly assigned into experimental group and control group. The experimental group underwent 4 sessions VMBR training whereas the control group performs regular archery skill training as usual for 16 sessions. A significant difference was observed, indicating that the physical practical group performs better than the VMBR group on the archery shooting skill after the completion of 4 weeks (4 days/week) of archery training.

Keywords: Visuo-motor behavior rehearsal, archery, imagery, AAHPER

Introduction
In the recent past, the archery sports have become highly competitive in nature and it is part of most of the international meets like Olympic, Asian and Common Wealth Games. There is a common belief that sport is a war of nerves. At elite level competitions, the athletes who have a mental edge over opponent win the match often. Archery is peripheral sports in nature and psychological skills like; imagery, peaking under pressure, goal setting, concentration, confidence, and motivation are equally important along with the physical fitness and skill. Athletes, coaches and sports psychologist always believe that psychology plays a significant role in the success of athletes in competitions. Therefore, Sports psychologist employed various psychological interventions to improve the performance of the athletes, the mental skills training program is one of the popular intervention of improving athletic performance.

Many studies have been conducted in sports psychology domain to find the effectiveness of various psychological interventions programs on the performance of athletes, these studies have been conducted on elite athletes who compete at world and international level competitions. In 1971, Richard M. Suinn developed a technique called Visuo-Motor Behavior Rehearsal (VMBR, Suinn, 1986), this technique consists of relaxation combined with mental imagery, it is believed that relaxations reduce physiological arousal and that imagery improves motor skill learning. This method has been used successfully, especially with closed motor skills, in a number of sports including tennis (Noel, 1980) [29], Karate (Weinberg, Seabourne, & Jackson, 1981) [47], basketball (Gray & Fernandez, 1989; Onestak, 1997) [14, 30] racquetball (Gray, 1990) [13], Archery (Zervas, Y. & Kakkos, V., 1991) [49] and cross-country running, golf, track and field, gymnastics, and diving (Lohr & Scogin, 1998) [24]. The VMBR involves three phases, first, an initial relaxation phase to retrieve a psychological state conducive for mental imagery, second, visualizing performance through various imagery techniques, and finally, performing the actual skill under realistic conditions Behncke L. (2004) [3]. But there is very limited literature available on novice and beginners archers, and it is hoped that finding of this study will shed some light on this very limited area of research. In doing so, it is hoped that coaches will be better able to serve the athletes.

Significance of psychology in sports
The procedure adopted for selecting the participants, variables, research design, criterion measure along with the procedure used in the collection of data and the statistical techniques used in the analysis shall be described in the following.

Participants

Participants were twenty physical education (PE) students selected from Directorate of Physical Education and Sports University of Kashmir, Srinagar India with the age ranging from 22 to 28 years old. Participants were divided into two groups: Experimental group 10 participants, Control group 10 participants. Both the groups were trained in archery for 4 weeks, at the same time the experimental group was exposed to VMBR (experimental treatment) for 4 sessions whereas the control group was exposed to physical practice only.

Procedures of Experimental Program

Randomized Post-test only control group design was used for this study, the participants were randomly divided into experimental group and control group. Both the groups were trained in archery for 4 weeks (4 days/week), at the same time the experimental group was exposed to VMBR for 4 sessions whereas the control group was exposed to physical training only. The VMBR as invented by Suinn (1986) which includes three Phases. Phase-1 focused on relaxation training. The technique was based on Jacobson's (1938) [21] progressive muscle relaxation and included learning the use of cue-control signals to tense and relax. Phase-2 concentrated on aspects of visualization including visualizing a successful competition scene. Finally, Phase-3 put the relaxation and visualization skills together for VMBR for specific performance enhancement. Each participant in the VMBR training group was asked to sit comfortably, close his eyes, take a deep breath to relax, and visualize an aspect of skills from start to finish. After completing 4 weeks (4 days/week) of training both the groups was assessed on the basis of archery shooting performance.

Table 1: Experimental program (4 weeks Archery Training & VMBR intervention 1 session per week for 4 weeks)

	1st Week				2nd Week				3rd week			4th week				
Teaching Archery & Practice	Introduction to Archery				Practice with elastic band				Practice at 10 Mtrs distance with bow			Practice at 20 Mtrs distance with bow				
Experimental Group	D 1	D 2	D 3	D 4	D 1	D 2	D 3	D 4	D 1	D 2	D 3	D 4	D 1	D 2	D 3	D 4
Control Group	D 1	D 2	D 3	D 4	D 1	D 2	D 3	D 4	D 1	D 2	D 3	D 4	D 1	D 2	D 3	D 4

D=Day, D4=VMBR Session

Tools used for the Collection of data

The criterion measure for this study was the archery performance of the participants after the successful completion of the training schedule. The AAHPER Archery Test was used to evaluate the performance in the fundamental skills of archery.

Administration of Test

Archery shooting performance was taken by administrating AAHPER Archery Test. For the purpose of testing the archers were organized into a squad of 5 archers in each squad, the members of one squad shoot at a common target one after the other. After the proper instruction and briefing, the participants were asked to take a position at 10 yards shooting line of their respective targets. Each participant was asked to shoot, two rounds of six arrows each (total of twelve arrows). The participant who could not score at least 10 points, are disallowed to continue the test from the next further distance. As soon as participants finished shooting from one distance, an assistant is asked to withdraw the arrows and record score for each arrow shot. The participant qualifying from 10 yards are allowed to repeat the entire process of shooting from 20 yards shooting lines, and the participants qualifying from 20 yards shooting lines and participants qualifying from 20 yards were asked to repeat the process from 30 yards shooting lines. The arrow which hits in the innermost circle (golden), get nine-point followed by 7, 5, 3 and 1 point respectively for the arrows hitting the respective circles outside the central circle. The sum of points of 12 arrows has been taken the score for performance at each distance (Kansal, D. K., 2012, p 342-43).

Statistical Technique used

Independent t-test was applied to find a significant difference between the experimental and control group. Statistical software (SPSS Version 19) was used to calculate the independent t-test

Results and Discussion

Table 2: Descriptive Statistics of Archery Skill Test Scores of Experimental and Control Groups

Group	N	Mean	Std. Deviation	Minimum	Maximum
Control	10	118.70	10.70	105.00	137.00
Experimental	10	103.60	12.24	86.00	119.00
Total	20	111.15	13.61	86.00	137.00

The Table No. 2 shows that Mean value of performance of Control group is 118.70 out of 180 (Maximum Score), whereas Experimental group mean archery performance score is 103.60, out of 180 (Maximum Score) and standard deviation values 10.70 and 12. 24 respectively, which means there is more variability in archery performance score of experimental group as compared to control group.

Table 3: Independent Sample t- test between the archery performance of Experimental and Control Groups

F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
.20	.65	2.93*	18	.009	15.10	5.14

*Significant at 0.05 Level of Significance

Table No. 3 shows that the group means are statistically significantly different because of the value in the "Sig. (2-tailed)" row is less than 0.05. Looking at the Descriptive statistics table (Table 2), we can see that archery performance of VMBR intervention group is lower than the group who did physical archery practice.

The analysis indicates that there is a significant difference between the experimental and control group in archery performance (P≤0.05). The performance of the control group was better than the experimental group (VMBR intervention). Thus, the hypothesis is rejected and it is concluded that 4 sessions of VMBR intervention is not sufficient to bring significant improvement in archery performance. Several studies have indicated that prior experience with the task is necessary for effective mental practice (Corbin, 1967, 1968) [6]. In terms of motor ability, Start (1962) found that performers of high ability were more effective in the use of the mental practice, while Start (1964) [37] later found no difference according to skills level. It is not clear why interactions between mental practice and experience or ability have occurred in some studies and not in other, however, it is possible that in the present study, the participants don't have prior experience of playing archery. The archery was first time introduced to these participants, so in term of skill level, these participants were beginners, so the participants don't have a successful performance experience to imagine. Thus, it is possible that participants in the VMBR group are not able to visualize a clear image of the archery skill performance. Noel R. C. (1980) [29] reported that practice in mental rehearsing the tennis serve while relaxed may facilitate serving performance under actual tournament condition, but only for high ability players, whereas, in the present study, trainees are new to the sports performance task (archery). This finding is not consistent with those showing relaxation- and imagery-based interventions were effective in improving athletes' performance in competitive situations (e.g., Greenspan & Feltz, 1989) [11]. Moreover, the present result doesn't agree with previous research showing mental practice improved participants' performance on similar self-paced (closed) motor tasks such as foul shooting, ball serving, and dart throwing (Clark, 1960; Mendoza & Wichman, 1978; Shick, 1970) [10, 27, 33]. But the present study is consistent with another study conducted by Zervas and Kakkos (1991) [49] in which they have reported that VMBR training has not improved the archery performance in elite (National Level) Archers, but relaxation has been experienced by these archers.

Conclusions

This study couldn't provide evidence on the effectiveness of VMBR intervention to facilitate in learning archery shooting skill among the beginners, the reason might be that the beginner archers could benefit more from actual practice rather than from mental rehearsal, additional research might profit from an exploration of this problem. Future research needs to be conducted by recruiting both beginner archers and skilled archers to see the effectiveness of such psychological intervention in facilitating archery learning. Long sessions of VMBR rehearsal should be incorporated in studies so that the long-term effect of the VMBR could be determined.

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