

Comparison of long - Term Effects of Internal Imagery and Progressive Muscle Relaxation on Brunel Mood among Malaysian and Iranian Taekwondo athletes

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Abstract. The aim of the present study was to investigate the long term effects of two different techniques, namely internal imagery and progressive muscle relaxation (PMR) on the mood among taekwondo players in Malaysia and Iran. This method was designed by eighty eight taekwondo players (Mean age: 12.79) were randomly assigned into 4 groups, 1) imagery exercise, 2) progressive muscle relaxation, (PMR) 3) combined imagery exercise and progressive muscle relaxation and 4) control group. Mood State Adolescents have been measured after the 8th, 16th, 24th, intervention session and the measurement were repeated after the completion of 24th follow up's sessions (without any intervention). Using 4 (groups) x 5 (trials) repeated measured ANCOVA, the results revealed experimental groups is significantly better than control group in positive and negative of mood in both countries during the post measurement and after completion of 24 follow up sessions. In comparison between the groups, combined and imagery groups is significantly better than relaxation group.

Keywords: progressive muscle relaxation, internal imagery Mood State scale.

1. Introduction

An athlete's mood at any one time is a product of both personality and situation; therefore it is a much more valid measurement of their psychological state during performance. The first reason includes some study that demonstrate elite athletes who frequently have a mood profile that was lower in negative moods (tension/anxiety, depression, anger, fatigue and confusion) and higher in vigor [8]. Secondly mood has regular effect on individuals' daily lives [2]. Several techniques affect mood such as progressive muscle relaxation that is a physical relaxation techniques and imagery that is cognitive practice [6]. These two techniques changed the body temperature which can result in reduced muscle tension, leading to increased feelings of relaxation and stress reduction; increased level of endorphins which some studies have reported lead to improved mood states [7]. Some researcher believed that the effects of various relaxation and imagery techniques may differ on several dimensions and every technique also have specific effects [1]. For instance Wood studied about effects of three different methods, relaxation, visualization, yogic breathing and stretch. The range of age was 21 to 76 years old. Thus, a 30 min programmed of yogic stretch and breathing exercises have significantly increase positive mood, in this study have used been a six sessions of training that may effect on results [12] and Hashim studied about progressive muscle relaxation and autogenic on mood and didn't find any interaction effects on mood. In this study used twelve training sessions [4]. Indeed, it is not clear how many sessions are require before mastery of technique is achieved and effect is produced. Holmes who studied about comparative imagery and self-talk on mood, after three sessions results have been showing imagery condition would showing a greater increase in positive effect and results suggest that positive training can be enhanced through imagery as opposed to verbal processing. The type of methodology effect on results for example some of the study measured variables immediately after

completed the training but some study attention to long term effects [3]. McKinney et al, studied about Guided Imagery and Music sessions on mood and cortisol. Participants divided in to two groups (control conditions and combined group) experimental sections were 13 week and also 6 weeks follow-up. Results demonstrated that after 6 sessions, participants reported significant decreases between pre- and post session depression, fatigue, and total mood disturbance and had significant decreases in cortisol level by follow-up. Pretest to follow-up decrease in cortisol was significantly associated with decrease in mood disturbance, although according the previous study the level of plays and the range of age effects on mood's results [7]. In this regard, there is a need to identify appropriate combination that is important to ensure its effectiveness, identify the effects of extended sessions of both imagery and PMR training and identify the long term effects of extended sessions of both imagery and PMR training. In terms of skills acquisition, although internal imagery and PMR has been suggested to produce the best effects, contradictory findings were still found in the literature review Therefore the aim of this study is investigated in progressive muscle relaxation and imagery on psycho physiological parameters, psychomotor, and physical performance among adolescent Taekwondo athletes.

2. Methodology

2.1. Participants

This study consisted of two phases. The first phase was conducted in Malaysia and second phase was conducted in Iran. Eighty eight taekwondo players (Malaysia taekwondo players=40, Iranian taekwondo players =48) aged 8-17 years were recruited in this study. The subjects reported that they had never received any relaxation and imagery.

2.2. Instrument

Questionnaire: Mood states were measured using Brunel Mood Scale (BRUMS) [10]. Their responses contain 24 simple mood descriptors such as negative and positive. Respondents indicated on a five point scale. Ranging from 0 =not at all to 4 = extremely)

Relaxation and imagery instrumentation: pre-recorded progressive muscle relaxation and internal imagery were used for relaxation and imagery training along with other relaxation and imagery training accessories (e.g., mats, CD players and headphone). The relaxation instructions followed a script proposed by Greenberg [14].

2.3. Procedures

Permission to conduct the study was obtained from the relevant authorities. Furthermore, the study protocol was approved by the Research Ethics' Committee (Human) of the author's institution. Three coaches provided scores of the participants' reverse swing kick technique at the baseline measurement and the groups were matched according this score, age and gender. They were then randomly assigned into 4 groups, 1) imagery exercise, 2) progressive muscle relaxation, (PMR) 3) combined imagery exercise and progressive muscle relaxation and 4) control group. Relaxation, imagery and combined group listened to pre-recorded audio-tape two times per week. Mood questionnaire were measured after 8th, 16th, 24th intervention session. The measurement were repeated (without any intervention) after 3 months (24 sessions) of completion of intervention.

3. Statistic Analysis

Two statistical analyses were used. Descriptive statistics were used for data screening and two way repeated measurements ANCOVA was used to examine between groups differences. Data were analyzed using SPSS (V. 18).

3.1. Study I

4. Results

The data were checked for accuracy, distributional properties, and missing values. No missing values or outliers were present, and the distributional properties were within normal range. Descriptive statistics are presented in Tab: 1.

Table 1. Means and s.d. Values for measured parameters in the four experimental groups across the experimental trial.in malaysia

| | Group | Positive Mood | | Negative Mood | |
|--------------------|----------------|---------------|----------------|---------------|----------------|
| | | Mean | Std. Deviation | Mean | Std. Deviation |
| First measurement | Control | 7.0000 | 3.20713 | 17.4444 | 12.29950 |
| | Relaxation | 5.0000 | 2.44949 | 21.6667 | 12.19631 |
| | Combine Groups | 4.8750 | 3.31393 | 18.8000 | 8.01110 |
| | Imagery | 4.6667 | 2.87228 | 16.0000 | 8.86942 |
| Second measurement | Control | 7.2500 | 1.98206 | 17.7778 | 9.76957 |
| | Relaxation | 6.1429 | 3.33809 | 19.8889 | 15.67996 |
| | Combine Groups | 8.8750 | 1.95941 | 13.3000 | 8.19282 |
| | Imagery | 7.8889 | 2.08833 | 15.0000 | 7.48331 |
| Third measurement | Control | 6.6250 | 2.55999 | 19.5556 | 14.10772 |
| | Relaxation | 7.7143 | 4.46148 | 18.5556 | 12.29950 |
| | Combine Groups | 9.7500 | 3.01188 | 11.5000 | 7.60482 |
| | Imagery | 8.6667 | 3.96863 | 12.3000 | 11.36320 |
| Fourth measurement | Control | 7.5000 | 3.66450 | 19.6667 | 11.04536 |
| | Relaxation | 8.5714 | 3.35942 | 17.4444 | 8.15646 |
| | Combine Groups | 10.0000 | 4.34248 | 10.6000 | 4.50185 |
| | Imagery | 9.3333 | 5.80948 | 10.4000 | 6.44981 |
| Fifth measurement | Control | 8.1250 | 4.08613 | 25.1111 | 12.93681 |
| | Relaxation | 11.0000 | 3.78594 | 10.5556 | 6.78438 |
| | Combine Groups | 12.7500 | 3.91882 | 12.2000 | 7.18331 |
| | Imagery | 14.0000 | 4.00000 | 14.4474 | 8.28385 |

The differences in the Mood across the independent variables were analysis using two way repeated measurement ANCOVA and for measurement between groups LSD post hoc has been used. Based on Mauchly's test of sphericity, no significant differences in the variances of the differences in all of the subscales were found across the test sessions. Therefore, the assumption of the homogeneity of variance was met. The results revealed in positive mood found significant differences between the groups. In the fourth measurement, control group has significant difference with combined ($p < 0.00$) and in the fifth measurement the control group has significant difference with the combined and imagery group ($p < 0.00$) and no significant differences were not discovered in between experimental groups.

Table 2. Compare Groups In Across Five Measurements of Positive Mood

| Times | (I) Groups | (J) Groups | Mean Difference (I-J) | Std. Error | Sig. ^a |
|--------------------|------------|-------------------|-----------------------|------------|-------------------|
| First measurement | Control | Relaxation Group | 2.000 | 1.549 | 0.207 |
| | | Combined Group | 2.125 | 1.497 | 0.167 |
| | | Imagery Group | 2.333 | 1.454 | 0.120 |
| | Relaxation | Combined Group | .125 | 1.549 | 0.936 |
| | | Imagery Group | .333 | 1.508 | 0.827 |
| | | Combined Group | -.208 | 1.454 | 0.887 |
| Second measurement | Control | Relaxation Groups | 1.107 | 1.222 | 0.373 |
| | | Combined Group | -1.625 | 1.181 | 0.180 |
| | | Imagery Groups | -.639 | 1.147 | 0.582 |
| | Relaxation | Combined Group | -2.732 [*] | 1.222 | 0.034 |
| | | Imagery Groups | -1.746 | 1.190 | 0.153 |
| | | Combined Group | -.986 | 1.147 | 0.397 |
| Third measurement | Control | Relaxation Group | -1.089 | 1.842 | 0.559 |
| | | Combined Group | -3.125 | 1.780 | 0.090 |
| | | Imagery Group | -2.042 | 1.730 | 0.248 |
| | Relaxation | Combined Group | -2.036 | 1.842 | 0.279 |
| | | Imagery Group | -.952 | 1.794 | 0.600 |
| | | Combined Group | -1.083 | 1.730 | 0.536 |
| Fourth measurement | Control | Relaxation Group | -1.071 | 2.322 | 0.648 |
| | | Combined Group | -2.500 | 2.243 | 0.275 |
| | | Imagery Group | -1.833 | 2.180 | 0.408 |
| | Relaxation | Combined Group | -1.429 | 2.322 | 0.543 |
| | | Imagery Group | -.762 | 2.261 | 0.739 |
| | | Combined Group | -.667 | 2.180 | 0.762 |
| Fifth measurement | Control | Relaxation Group | -2.875 | 2.048 | 0.171 |
| | | Combined Group | -4.625 [*] | 1.978 | 0.027 |
| | | Imagery Group | -5.875 [*] | 1.923 | 0.005 |
| | Relaxation | Combined Group | -1.750 | 2.048 | 0.400 |
| | | Imagery Group | -3.000 | 1.994 | 0.144 |
| | | Combined Group | 1.250 | 1.923 | 0.521 |

The results found significant differences between groups in negative mood. Control group has significant difference with the combined and imagery groups and relaxation group has significant difference with imagery and combined group in the fourth measurement ($p < 0.00$). In the fifth measurement the control group has significant difference with experimental group ($p < 0.00$).

Table 3. Compare Groups in Accroce Five Measurements of Negative Mood

| Times | (I) Groups | (J) Groups | Mean Difference (I-J) | Std. Error | Sig. ^a |
|--------------------|------------|-------------------|-----------------------|------------|-------------------|
| First measurement | Control | Relaxation Group | -4.222 | 4.908 | 0.396 |
| | | Combined Group | -1.356 | 4.784 | 0.779 |
| | | Imagery Group | 1.444 | 4.784 | 0.765 |
| | Relaxation | Combined Group | 2.867 | 4.784 | 0.553 |
| | | Imagery Group | 5.667 | 4.784 | 0.244 |
| | Imagery | Combined Group | -2.800 | 4.656 | 0.552 |
| Second measurement | Control | Relaxation Groups | -2.111 | 5.009 | 0.676 |
| | | Combined Group | 4.478 | 4.882 | 0.365 |
| | | Imagery Groups | 2.778 | 4.882 | 0.573 |
| | Relaxation | Combined Group | 6.589 | 4.882 | 0.186 |
| | | Imagery Groups | 4.889 | 4.882 | 0.324 |
| | Imagery | Combined Group | 1.700 | 4.752 | 0.723 |
| Third measurement | Control | Relaxation Group | 1.000 | 5.414 | 0.855 |
| | | Combined Group | 8.056 | 5.277 | 0.136 |
| | | Imagery Group | 7.256 | 5.277 | 0.178 |
| | Relaxation | Combined Group | 7.056 | 5.277 | 0.190 |
| | | Imagery Group | 6.256 | 5.277 | 0.244 |
| | Imagery | Combined Group | .800 | 5.136 | 0.877 |
| Fourth measurement | Control | Relaxation Group | 2.222 | 3.674 | 0.549 |
| | | Combined Group | 9.067* | 3.581 | 0.016 |
| | | Imagery Group | 9.267* | 3.581 | 0.014 |
| | Relaxation | Combined Group | 6.844 | 3.581 | 0.064 |
| | | Imagery Group | 7.044 | 3.581 | 0.057 |
| | Imagery | Combined Group | - .200 | 3.485 | 0.955 |
| Fifth measurement | Control | Relaxation Group | 14.556* | 4.270 | 0.002 |
| | | Combined Group | 14.511* | 4.161 | 0.001 |
| | | Imagery Group | 12.911* | 4.161 | 0.004 |
| | Relaxation | Combined Group | -.044 | 4.161 | 0.992 |
| | | Imagery Group | -1.644 | 4.161 | 0.695 |
| | Imagery | Combined Group | 1.600 | 4.050 | 0.695 |

3.2. STUDY II

5. RESULTS

The data were checked for accuracy, distributional properties, and missing values. No missing values or outliers were present, and the distributional properties were within normal range. Descriptive statistics are presented in Tab: 3.

Table 4. Means and s.d. Values for measured parameters in the four experimental groups across the experimental trial in iran.

| | Group | Positive Mood | | Negative Mood | |
|--------------------|---------------|---------------|----------------|---------------|----------------|
| | | Mean | Std. Deviation | Mean | Std. Deviation |
| First measurement | ontrol | 8.0833 | 2.60971 | 30.5833 | 14.51932 |
| | elaxation | 9.8333 | 2.58785 | 24.2500 | 11.90206 |
| | ombine Groups | 7.6667 | 3.98482 | 24.3333 | 8.88649 |
| | magery | 8.8333 | 3.37998 | 33.3333 | 17.10042 |
| Second measurement | ontrol | 9.5000 | 1.67874 | 34.9167 | 17.66073 |
| | elaxation | 11.5833 | 2.60971 | 10.5833 | 7.27959 |
| | ombine Groups | 9.8333 | 1.80067 | 17.2500 | 9.57388 |
| | magery | 9.8333 | 1.99241 | 24.0000 | 14.32100 |
| Third measurement | ontrol | 9.6667 | 2.14617 | 35.3333 | 15.20965 |
| | elaxation | 12.1667 | 1.74946 | 9.9167 | 5.48483 |
| | ombine Groups | 12.3333 | 1.87487 | 13.5833 | 6.33114 |
| | magery | 11.4167 | 1.72986 | 22.5833 | 11.71990 |
| Fourth measurement | ontrol | 9.9167 | 2.57464 | 35.5000 | 9.07043 |
| | elaxation | 12.4167 | 2.19331 | 10.7500 | 3.59608 |
| | ombine Groups | 12.8333 | 2.28963 | 13.2500 | 3.88763 |
| | magery | 12.1667 | 2.12489 | 20.9167 | 5.75971 |
| Fifth measurement | ontrol | 8.6667 | 2.22928 | 31.1667 | 5.98230 |
| | elaxation | 12.6667 | 1.43548 | 10.5833 | 4.31611 |
| | ombine Groups | 12.8333 | 1.74946 | 11.7500 | 3.72034 |
| | magery | 12.1667 | 2.08167 | 15.6667 | 4.29235 |

The differences in the mood scores across the independent variables were analysis using two way repeated measurement ANCOVA and for measurement between groups LSD post hoc has been used. Based on Mauchly's test of sphericity, no significant differences in the variances of the differences in all of the subscales were found across the test sessions. Therefore, the assumption of the homogeneity of variance was met. The results revealed significant differences between groups in positive moods. In second, third, fourth and fifth measurement, control group has significant difference with the experimental groups ($p < 0.00$)

Table 5. Compare Groups In Across Five Measurements Of Positive Mood

| Times | (I) Groups | (J) Groups | Mean Difference (I-J) | Std. Error | Sig. ^a |
|--------------------|------------|-------------------|-----------------------|------------|-------------------|
| First measurement | Control | Relaxation Group | -1.750 | 1.304 | 0.186 |
| | | Combined Group | .417 | 1.304 | 0.751 |
| | | Imagery Group | -.750 | 1.304 | 0.568 |
| | Relaxation | Combined Group | 2.167 | 1.304 | 0.104 |
| | | Imagery Group | 1.000 | 1.304 | 0.447 |
| | | Combined Group | 1.167 | 1.304 | 0.376 |
| Second measurement | Control | Relaxation Groups | -2.083* | .838 | 0.017 |
| | | Combined Group | -.333 | .838 | 0.693 |
| | | Imagery Groups | -.333 | .838 | 0.693 |
| | Relaxation | Combined Group | 1.750* | .838 | 0.043 |
| | | Imagery Groups | 1.750* | .838 | 0.043 |
| | | Combined Group | .000 | .838 | 1.000 |
| Third measurement | Control | Relaxation Group | -2.500* | .769 | 0.002 |
| | | Combined Group | -2.667* | .769 | 0.001 |
| | | Imagery Group | -1.750* | .769 | 0.028 |
| | Relaxation | Combined Group | -.167 | .769 | 0.829 |
| | | Imagery Group | .750 | .769 | 0.334 |
| | | Combined Group | -.917 | .769 | 0.239 |
| Fourth measurement | Control | Relaxation Group | -2.500* | .940 | 0.011 |
| | | Combined Group | -2.917* | .940 | 0.003 |
| | | Imagery Group | -2.250* | .940 | 0.021 |
| | Relaxation | Combined Group | -.417 | .940 | 0.660 |
| | | Imagery Group | .250 | .940 | 0.791 |
| | | Combined Group | -.667 | .940 | 0.482 |
| Fifth measurement | Control | Relaxation Group | -4.000* | .775 | 0.000 |
| | | Combined Group | -4.167* | .775 | 0.000 |
| | | Imagery Group | -3.500* | .775 | 0.000 |
| | Relaxation | Combined Group | -.167 | .775 | 0.831 |
| | | Imagery Group | .500 | .775 | 0.522 |
| | | Combined Group | -.667 | .775 | 0.394 |

Negative mood results showed the control group has significant difference with the experimental groups and the relaxation group has significantly difference with the imagery and combined groups in second, third, fourth and fifth measurement($p<0.00$).

Table 5. Compare Groups In Across Five Measurements of Negative Mood

| Times | (I) Groups | (J) Groups | Mean Difference (I-J) | Std. Error | Sig. ^a |
|--------------------|------------|-------------------|-----------------------|------------|-------------------|
| First measurement | Control | Relaxation Group | 6.333 | 5.492 | 0.255 |
| | | Combined Group | 6.250 | 5.492 | 0.261 |
| | | Imagery Group | -2.750 | 5.492 | 0.619 |
| | Relaxation | Combined Group | -.083 | 5.492 | 0.988 |
| | | Imagery Group | -9.083 | 5.492 | 0.105 |
| | | Combined Group | 9.000 | 5.492 | 0.108 |
| Second measurement | Control | Relaxation Groups | 24.333* | 5.251 | 0.000 |
| | | Combined Group | 17.667 | 5.251 | 0.002 |
| | | Imagery Groups | 10.917 | 5.251 | 0.043 |
| | Relaxation | Combined Group | -6.667 | 5.251 | 0.211 |
| | | Imagery Groups | -13.417* | 5.251 | 0.014 |
| | | Combined Group | 6.750 | 5.251 | 0.205 |
| third measurement | Control | Relaxation Group | 25.417* | 4.276 | 0.000 |
| | | Combined Group | 21.750* | 4.276 | 0.000 |
| | | Imagery Group | 12.750* | 4.276 | 0.005 |
| | Relaxation | Combined Group | -3.667 | 4.276 | 0.396 |
| | | Imagery Group | -12.667* | 4.276 | 0.005 |
| | | Combined Group | 9.000* | 4.276 | 0.041 |
| fourth measurement | Control | Relaxation Group | 24.750* | 2.445 | 0.000 |
| | | Combined Group | 22.250* | 2.445 | 0.000 |
| | | Imagery Group | 14.583* | 2.445 | 0.000 |
| | Relaxation | Combined Group | -2.500 | 2.445 | 0.312 |
| | | Imagery Group | -10.167* | 2.445 | 0.000 |
| | | Combined Group | 7.667* | 2.445 | 0.003 |
| Fifth measurement | Control | Relaxation Group | 20.583* | 1.900 | 0.000 |
| | | Combined Group | 19.417* | 1.900 | 0.000 |
| | | Imagery Group | 15.500* | 1.900 | 0.000 |
| | Relaxation | Combined Group | -1.167 | 1.900 | 0.542 |
| | | Imagery Group | -5.083* | 1.900 | 0.010 |
| | | Combined Group | 3.917* | 1.900 | 0.045 |

6. Discuses

The main objectives of the present study were to investigate the effects of progressive muscle relaxation and internal imagery and to compare the relative effectiveness of these two techniques on mood but Wood utilized 6 sessions and didn't find any significant difference for imagery and relaxation [11]. The present results indicated that 24 sessions of relaxation training induced long-term effects on mood. We consider that the period in which the measurement were taken would have influenced the results. Variables in the present study were measurement of the 24 sessions after the completion of the relaxation training, and in resting condition and they had international competition after the third measurement this competition may affected the results. Our objective was to study the effect of progressive muscle relaxation and internal imagery on positive mood in Malaysia and Iran. In these results, we found all experimental groups have significantly shown increase compared with control group in Iran but in Malaysia combined and imagery have

significantly improve compared with control group, although relaxation group has improved. In recently results we thought the number of sample size has effects on results although, Holmes found imagery have significant better than verbal training group in positive mood [3]. results show experimental groups have significantly lower negative mood compared to control group in both country but combined and imagery groups have significantly decrease compare with relaxation group. Naoi, studied about cognitive and relaxation, he found cognitive intervention (one week) have affected on mood score compare them with relaxation group [12]. Our results raised another question. Specifically, how many sessions are required for an individual to really master the technique in order to produce the long-term effects? However, it is difficult to determine the number of sessions required for the trainee to have sufficient experience with the technique but we believed 24 sessions of training might be supported for stability effect of training. McKinney et al found significant improvement in 88 subjects that undertaking imagery after 13 weeks of training and also after 6 weeks follow up [7]. In summary, our findings revealed experimental groups have significant is improve in the mood's aspects in post measurements and after completion of 24 follow-up's sessions in both countries.

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