Effect of Visuo-Motor Behavior Rehearsal on enhancing Mental Toughness of Soccer Players

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Abstract
The present study aimed to evaluate the effect of six weeks of Visuomotor Behavior Rehearsal on Enhancing Mental Toughness of Soccer Players. For the purpose of study forty (n=40) soccer players in the age groups of 17 to 21 years belong to Th. Birchandra Singh Football Academy (TBSFA), Imphal West, Manipur were selected. Subjects were divided into Treatment and controlled group (20 players in each group). The data was collected through the administration of the Psychological Performance Inventory (PPI) by James E. Loehr (1996) containing 42 items. To find out the significant effect of the Psychological Skills Training Program on Selected Psychological Variables of Soccer Players, MANOVA for psychological variables was used and the level of significance was set at 0.05. The findings of the study revealed that there was a significant effect of soccer players on those who underwent the PST program as compared to the players in the controlled group.

Keywords: Visuo Motor Behavioural Rehearsal, Mental Toughness, self-confidence, negative energy control, attention control, Visual & imagery control, motivational level, positive energy control and attitude control.

1. Introduction

Psychological skill Training comprises of many interventions techniques which leads to develop the psychological skills of a players. Out of all Visuo Motor Behavioral Rehearsal (VMBR) is one of the interventions which include visualization training (i.e. mental imagery) and relaxation techniques. VMBR was introduced and developed by Suinn (1972; 1970).

In applied sports psychology Visuo Motor Behavioral Rehearsal provides the pillar of all mental skill training programmed. VMBR mainly help to improve self-confidence, performance enhancement and to reduce stress, emotions, negative thoughts and mainly anxiety of players. The main objective of this study is to evaluate the VMBR technique on developing mental toughness of soccer players.

Mental toughness is as importance as physical toughness (Lynch, 2008). Mental toughness can make the difference between success and failure in sports (Cascarino 2009). In soccer it has been suggested that on the ground mental toughness of players is a most important attribute that is required to execute the performance.

According to Jim Loeher's 1986, mentally tough performer are disciplined thinkers who respond to pressure in way which enable them to remain feeling relaxed, calm and energized because they have the ability to increase this flow of positive energy in crisis and adversity under the competitive pressure mentally tough performer can continue to think positively, realistically and productively (Loeher,1995)

The purpose of this study was to evaluate the VMBR training and their significant effect in developing mental toughness of soccer players. Focusing on professional soccer, (Richard Thelwell, Weston, & Greenless 2005) aimed to examine the definition and attributes of mental toughness within a specific soccer population. The mentally tough soccer players should always (as oppose to 'generally') cope better than their opponents with the demands of the sports. In soccer a key role of developing mental toughness is to develop the ability to deal with pressure and maintain confidence, determination, game sense, leadership, regulation of performance state and regulation of attention focus (Holland, Woodcock, Cumming, & Duda, 2010). So in this study the researcher intention was to assess the role of Visuo Motor Behavioral Rehearsal on developing the soccer players mentally as well as physically tough.

2. Methodology

Participants: A total of forty (n=40) male soccer players, who accepted voluntarily to be the part of the study, were selected as the subject from Th.Birchandra Singh Football Academy (TBSFA), Imphal West, Manipur. The subjects were ranging from 17 to 20 years.

Criterion Measures:

- Visual Motor Behavior Rehearsal was given as a training tool for 6 weeks.
- Psychological Performance Inventory (PPI) developed by Jim E Loeher, 1986 was used for assessing the mental toughness.

3. Procedure:

Visuo Motor Behavior Rehearsal was imparted 5 days a week. Each session lasted 30 minutes per day. All the session was conducted in the morning time. Prior to the training program Pre-Data were collected from both the groups i.e. Treatment and Control Group. The Treatment group was given both the sub technique i.e. Imagery and Relaxation, thrice in a week. The first intervention given to the experiment group were Imagery, the participants were instructed to create a mental picture of a skill by using all the senses of a body to rehearse the game situation and to recreate as realistically as possible. . Participants are asked to practice the techniques for 15 minutes and 5 min break to relax their mind and next session for 10 minute was practiced again.

Second intervention is relaxation techniques i.e. Breathing techniques, in this session Participants were instructed to sit down on the floor in a comfortable position and with their eyes closed. The participants were then asked to breathe in through their nose and hold it for the maximum of 5 seconds followed by exhalation through their mouth and open their eyes slowly at the same time. The techniques were performed five times and each breathes lasted for 10 second approximately (5 second each for inhaling and 5 seconds for exhaling). After completion of the six (6 weeks) VMBR training Program Post Data was collected from both the groups.

4. Statistical Technique

To find out the effect of training the following Statistical Procedure was adapted: Descriptive statistics was used and to analyze the effects of Psychological Skill Training Program MANOVA was applied. The level of significance was set at 0.05 level.

5. Results:

Table 1. Descriptive Statistics of Mental Toughness of Treatment and Control Groups in pre and post test

	GROUP	TEST	Mean	Std. Deviation	N
SELFCONFIDENCE	TREATMENT	PRE TEST	22.95	4.06	20
		POST TEST	26.15	1.69	20
	CONTROL	PRE TEST	23.30	3.11	20
		POST TEST	23.05	2.98	20
NEGATIVE ENERGY CONTROL	TREATMENT	PRE TEST	19.25	3.64	20
		POST TEST	22.20	3.04	20
	CONTROL	PRE TEST	20.90	2.53	20
		POST TEST	21.20	3.11	20
ATTENTION CONTROL	TREATMENT	PRE TEST	19.10	3.28	20
		POST TEST	25.60	1.57	20
	CONTROL	PRE TEST	20.90	2.88	20
		POST TEST	20.80	2.38	20
VISUAL & IMAGERY	TREATMENT	PRE TEST	22.75	4.10	20
		POST TEST	25.60	1.96	20
	CONTROL	PRE TEST	23.85	3.45	20
		POST TEST	23.60	3.08	20
MOTIVATIONAL LEVEL	TREATMENT	PRE TEST	23.30	3.96	20
		POST TEST	25.75	1.71	20
	CONTROL	PRE TEST	25.95	2.50	20
		POST TEST	24.80	2.55	20
POSITIVE ENERGY CONTROL	TREATMENT	PRE TEST	23.25	4.02	20
		POST TEST	25.55	1.79	20
	CONTROL	PRE TEST	25.15	2.86	20
		POST TEST	23.20	2.24	20
ATTITUDE CONTROL	TREATMENT	PRE TEST	24.05	3.69	20
		POST TEST	23.60	3.36	20
	CONTROL	PRE TEST	24.45	4.16	20
		POST TEST	23.05	4.49	20

Table 1 shows the descriptive statistics of Mental Toughness in the sub-factor of self confidence in pre and post-test of Treatment is 22.95 ± 4.06 & 26.15 ± 1.69 and control group is 23.30 ±3.11 & 23.05 ± 2.98, negative energy control is 19.25 ± 3.64 & 22.20 ± 3.04 and 20.90 ± 2.53 & 21.20 ± 3.11, attention control is 19.10 ± 3.28 & 25.60 ± 1.57 and 20.90 ± 2.88 & 20.80 ± 2.38, visual &

imagery control is 22.75 ± 4.10 & 25.60 ± 1.96 and 23.85 ± 3.45 & 23.60 ± 1.71, motivational level is 23.30 ± 3.96 & 25.75 ± 1.71 and 25.95 ± 2.50 & 24.80 ± 2.55, positive energy control is 23.25 ± 4.02 & 25.55 ± 1.79 and 25.15 ± 2.86 & 23.20 ± 2.24 and attitude control is 24.05 ± 3.69 & 23.60 ± 3.36 and 24.45 ± 4.16 & 23.05 ± 4.49 respectively.

Table 2. Box's Test of Equality of Covariance Matrices

Box's M	1.275E2
F	1.263
df1	84
df2	1.310E4
Sig.	.053

Table 2 shows Box's Test of the assumption of equality of covariance matrices. This statistic tests the null hypothesis that the co variance matrices of the dependent variables are equal across groups. The result found non-significant (p=.053) which is greater than 0.05, hence the covariance matrices are equal and the assumption is accepted which mean there is homogeneity between groups.

Table 3. Multivariate Analysis of Mental toughness of Treatment and Control Group

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.242	3.192^{a}	7.000	70.00	.005	.242
Wilks' lambda	.758	3.192^{a}	7.000	70.00	.005	.242
Hotelling's trace	.319	3.192^{a}	7.000	70.00	.005	.242
Roy's largest root	.319	3.192^{a}	7.000	70.00	.005	.242

Table 4. Univariate Analysis of the sub factors of Mental Toughness of Treatment and Control Group

Dependent Variable		Sum of Squares	df	Mean Square	F	Sig.
SELFCONFIDENCE	Contrast	37.81	1	37.81	3.99	.049
	Error	720.65	76	9.48		
NEGATIVE ENERGY CONTROL	Contrast	2.112	1	2.11	.22	.641
	Error	731.95	76	9.63		
ATTENTION CONTROL	Contrast	45.00	1	45.00	6.63	.012
	Error	515.60	76	6.78		

VISUAL & IMAGERY	Contrast	4.05	1	4.05	.39	.537
	Error	799.90	76	10.53		
MOTIVATIONAL LEVEL	Contrast	14.45	1	14.45	1.84	.179
	Error	596.10	76	7.84		
POSITIVE ENERGY CONTROL	Contrast	1.25	1	1.25	.153	.696
	Error	619.70	76	8.15		
ATTITUDE CONTROL	Contrast	.45	1	.45	.029	.866
	Error	1185.30	76	15.60		

*significant at 0.05 level   **F.05 (1,76)=   3.96**

Table 4. showed the result of univariate (one way) analysis of variance for seven sub factors of mental toughness of Treatment and control groups. The level of significance for 'f' value tested was set at 0.05 level (Bonferroni).

Table 5. Pairwise Comparison of Mental Toughness of Treatment and Control Group

Dependent Variable	(I) GROUP	(J) GROUP	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
SELFCONFIDENCE	TREATMENT	CONTROL	1.375[*]	.689	.049	.004	2.746
	CONTROL	TREATMENT	-1.375[*]	.689	.049	-2.746	-.004
NEGATIVE ENERGY CONTROL	TREATMENT	CONTROL	-.325	.694	.641	-1.707	1.057
	CONTROL	TREATMENT	.325	.694	.641	-1.057	1.707
ATTENTION CONTROL	TREATMENT	CONTROL	1.500[*]	.582	.012	.340	2.660
	CONTROL	TREATMENT	-1.500[*]	.582	.012	-2.660	-.340
VISUAL & IMAGERY	TREATMENT	CONTROL	.450	.725	.537	-.995	1.895
	CONTROL	TREATMENT	-.450	.725	.537	-1.895	.995
MOTIVATIONAL LEVEL	TREATMENT	CONTROL	-.850	.626	.179	-2.097	.397
	CONTROL	TREATMENT	.850	.626	.179	-.397	2.097
POSITIVE ENERGY CONTROL	TREATMENT	CONTROL	.250	.639	.696	-1.022	1.522
	CONTROL	TREATMENT	-.250	.639	.696	-1.522	1.022
ATTITUDE CONTROL	TREATMENT	CONTROL	.150	.883	.866	-1.609	1.909
	CONTROL	TREATMENT	-.150	.883	.866	-1.909	1.609

Based on estimated marginal means
*. The mean difference is significant at the .05 level.
a. Adjustment for multiple comparisons: Bonferroni.

Table 6. Multivariate Analysis of Mental toughness of Pre-Test and Post Test of participants

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.438	7.803	7.00	70.00	.000	.438
Wilks' lambda	.562	7.803	7.00	70.00	.000	.438
Hotelling's trace	.780	7.803	7.00	70.00	.000	.438
Roy's largest root	.780	7.803	7.00	70.00	.000	.438

Table 7. Univariate Analysis of the sub factors of Mental Toughness of Pre Test and Post Test

Dependent Variable		Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
SELFCONFIDENCE	Contrast	43.51	1	43.51	4.59	.035	.057
	Error	720.65	76	9.48			
NEGATIVE ENERGY CONTROL	Contrast	52.81	1	52.81	5.48	.022	.067
	Error	731.95	76	9.63			
ATTENTION CONTROL	Contrast	204.80	1	204.80	3.02	.000	.284
	Error	515.60	76	6.78			
VISUAL & IMAGERY	Contrast	33.80	1	33.80	3.21	.077	.041
	Error	799.90	76	10.53			
MOTIVATIONAL LEVEL	Contrast	8.450	1	8.45	1.07	.303	.014
	Error	596.10	76	7.84			
POSITIVE ENERGY CONTROL	Contrast	.800	1	.800	.098	.755	.001
	Error	619.70	76	8.15			
ATTITUDE CONTROL	Contrast	39.20	1	39.20	2.51	.117	.032
	Error	1185.30	76	15.60			

*significant at 0.05 level $F.05 (1,76)= 3.96$

Table 8. Pairwise Comparison of Mental Toughness of Pre Test and Post Test

Dependent Variable	(I) TEST	(J) TEST	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
						Lower Bound	Upper Bound
SELFCONFIDENCE	PRE TEST	POST TEST	-1.475*	.689	.035	-2.846	-.104
	POST TEST	PRE TEST	1.475*	.689	.035	.104	2.846
NEGATIVE ENERGY CONTROL	PRE TEST	POST TEST	-1.625*	.694	.022	-3.007	-.243
	POST TEST	PRE TEST	1.625*	.694	.022	.243	3.007
ATTENTION CONTROL	PRE TEST	POST TEST	-3.200*	.582	.000	-4.360	-2.040
	POST TEST	PRE TEST	3.200*	.582	.000	2.040	4.360
VISUAL & IMAGERY	PRE TEST	POST TEST	-1.300	.725	.077	-2.745	.145
	POST TEST	PRE TEST	1.300	.725	.077	-.145	2.745
MOTIVATIONAL LEVEL	PRE TEST	POST TEST	-.650	.626	.303	-1.897	.597
	POST TEST	PRE TEST	.650	.626	.303	-.597	1.897
POSITIVE ENERGY CONTROL	PRE TEST	POST TEST	-.200	.639	.755	-1.472	1.072
	POST TEST	PRE TEST	.200	.639	.755	-1.072	1.472
ATTITUDE CONTROL	PRE TEST	POST TEST	1.400	.883	.117	-.359	3.159
	POST TEST	PRE TEST	-1.400	.883	.117	-3.159	.359

Based on estimated marginal means
*. The mean difference is significant at the .05 level.
a. Adjustment for multiple comparisons: Bonferroni.

6. Discussion:

The purpose of the study was to evaluate the effect of six-month Visuo Motor Behavioral Rehearsal training on enhancing mental toughness of soccer players. To achieve the purpose of the study the multivariate analysis (MANOA) was applied and the results which measure the sub-factors of mental toughness between treatment and control groups were discussed in table 3. Among four multivariate test Wilk's Lambada was considered as appropriate test and the value is .758, (F=3.192 and p=.005) between Treatment and control group. Since, multivariate was found significant further univariate test was applied. The interpretations of univariate test are further discussed in table 4 and the result of univariate (one way) analysis of variance for seven sub factors of mental toughness of Treatment and control groups was found significant mean difference in self-confidence (F= 3.99, P=0.49) and attention control (F=6.63, P=0.12), as the calculated value (3.99 & 6.63) was greater than tabulated value (3.96). (Onestak, David Michael. Jun 1, 1997) conducted a study on 3 weeks VMBR training on free throw accuracy of male collegiate players and the results found significant improvement.

Whereas, in other sub factors there was no significant difference found in negative energy control (F= .22, P=.641), visual & imagery control (F= .39, P=.537), motivational level (F= 1.84, P=.179), positive energy control (F= .153, P=.696) and attitude control (F= .029, P=.866) as the calculated

value is lesser than the tabulated value. The level of significance for 'f' value tested was set at 0.05 level (Bonferroni). Further to indicates the significant mean difference among sub factors of mental toughness the pairwise comparison was applied and the result found significant mean difference in self-confidence (MD=1.375*; p=.004) and attention control (mean difference=1.50*; p=.012 and there was no significant difference was seen in other sub factors like negative energy control, visual & imagery control, motivational level, positive energy control and attitude control. The reason may be due to the participants doesn't take in a serious account in training session and the duration as well as frequency may be not sufficient to enhance the mental toughness in some of the parameters. In facts researcher doesn't found the supportive study regarding the insignificant factors.

Further the data between pretest and posttest was analyzed as same process as treatment and control group for the better understanding and the table 6 reveals the multivariate analysis results of the mental toughness and the value is .562, (F=7.80 and p=.000) between Pre-Test and Post Test. Since multivariate was found significant further univariate test was applied. The interpretations of univariate test are further discussed in the table 7 and result indicates a significant mean difference again in self-confidence (F= 4.59, P=0.35), negative energy control (F= 5.48, P=.022) and attention control (F= 3.02, P=0.00), as the calculated value (4.59, 5.48 & 3.022) was greater than tabulated value (3.96). Here negative energy control was added and found significant improvement between the pre and posttest. It means the training which include relaxation technique i.e. breathing techniques helps to reduce the negative thought of the players.

Whereas, in other sub factors there was no significant difference found in visual & imagery control (F= 3.21, P=.077), motivational level (F= 8.45, P=11.07), positive energy control (F= .098, P=.755) and attitude control (F= 2.51, P=.117) as the calculated value is lesser than the tabulated value and table 8 showed the pairwise comparison between pretest and posttest that indicates the mean difference of sub factors in Self-confidence (MD =1.475*; p=.035), negative energy control (mean difference=1.625*; p=.022) and attention control (mean difference=3.200*; p=.000) significant mean difference was observed between Pre Test and Post Test. There was no significant difference observed in other sub factors like visual & imagery control, motivational level, positive energy control and attitude control. The level of significance for 'f' value tested was set at 0.05 level (Bonferroni).

7. Conclusion:

The results of this study indicate the six-month Visuo-Motor Behavioral Rehearsal training shown significant improvement on enhancing mental toughness of soccer players. These results seem to be very logical which indicates the significant improvement on developing mental toughness of soccer player. Mental toughness comprises of many sub factors which is required for the players, among them self-confidence which is an important factor to be possess by soccer players for enhancing the performances at the time of main competition was found significant effect. Imagery session in visuo-motor behavioral rehearsal proved to be a significant predictor of self-confidence in soccer players. Findings indicate the benefits of VMBR technique for enhancing self-confidence through imagery session. Previous research has consistently shown a positive relationship between imagery use and self-confidence in elite adolescent and adult athletes (Callow & Hardy, 2001; Mills et al., 2001; Vadocz et al., 1997). Soccer players should be self-confidence during competition which leads to achieve success.

In providing an overview of the findings, it was apparent that the VMBR comprises of imagery and breathing technique which also enabled participants to achieve a significant effect on sub factors of attention control, negative energy control and at least small improvements for in some of the dependent variables. The marginally significant improvement can be explained by the belief that Visuo-Motor Behavioral Rehearsal helps to improve self-confidence, emotions, negative thoughts and mainly anxiety of the players as breathing techniques is given in form of relaxation technique to participants which help the players to remain calm and react the situations positively and to remain calm under pressure, negative energy control help to ignore the negative thought and distraction to remain focused on game, throughout the performance the emotions shall be control, opponents and enjoying the pressure and load associated with performance (Thelwell, Weston and Greenless, 2005). Previous research has consistently shown maximum improvement in mental toughness through psychological intervention. (Bhambri E., Dhillon P.K. & Sahni S.P, 2005).

1. Illustration

(a)

(b)

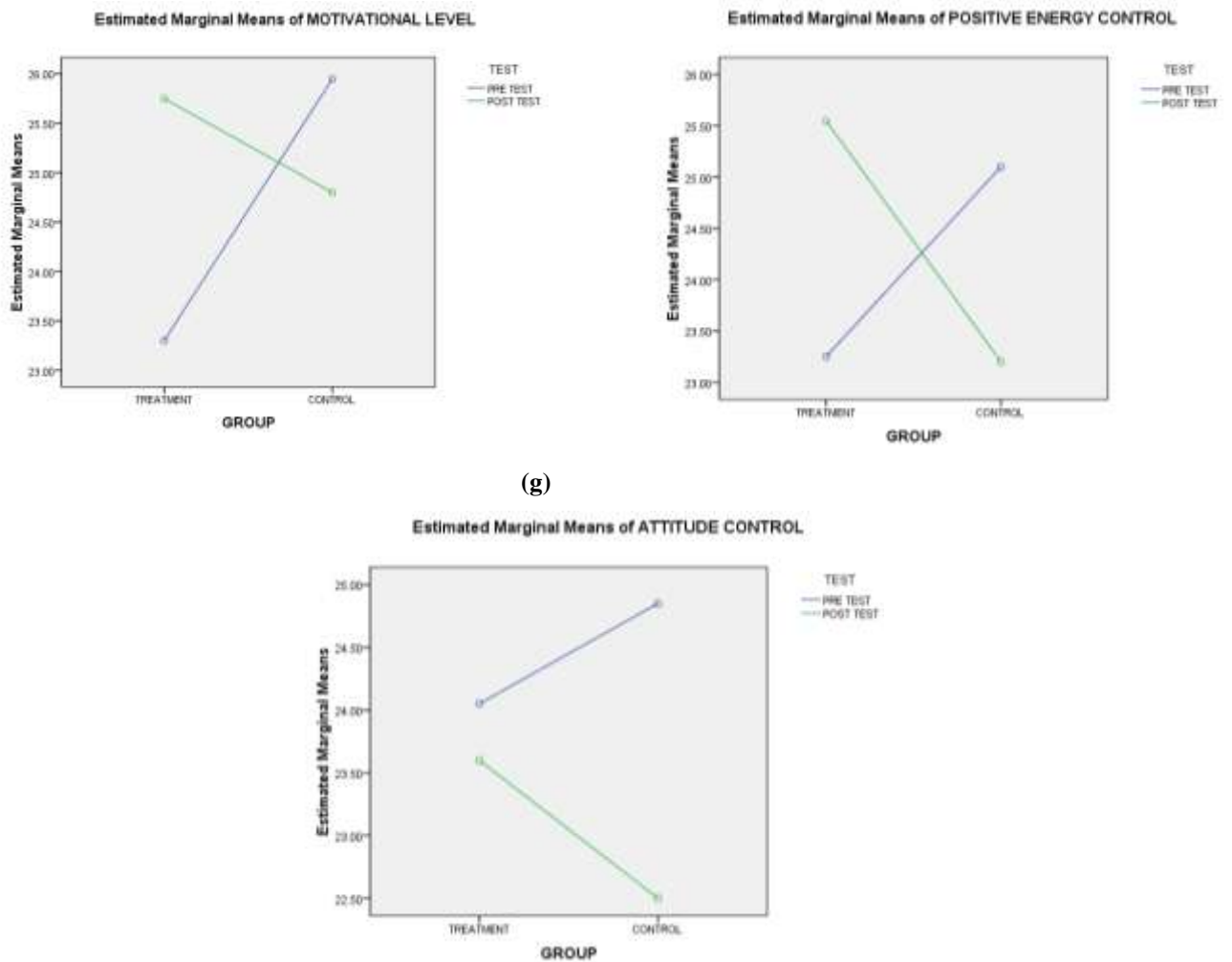**(c)**

(d)

(e)

(f)

(g)
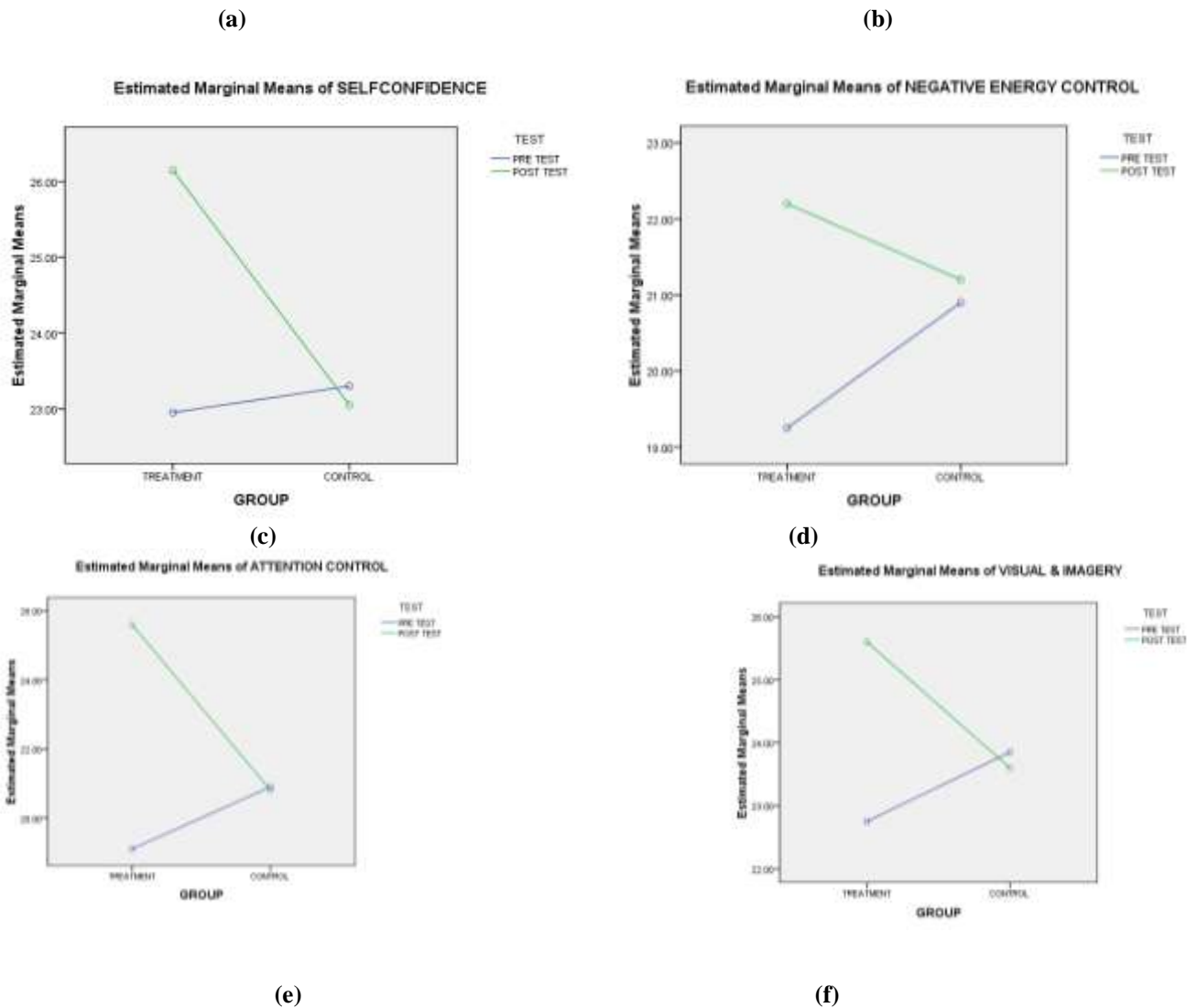
Fig. 1. Interaction between group and test in the sub factors (a) self-confidence; (b) negative energy control ; (c) attention control; (d) visual & imagery control; (e) motivational level; (f) positive energy control and (g) Attitude control.

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