

Effect of Motor Improvisation on Motor Creativity and Vanillylmandelic Acid (VMA) in Rhythmic Exercises in Girls at Faculty of Physical Education.

Samah Hassan Farag Mohamed

Department of Rhythmic Training Exercise, Faculty of Physical Education for Girls, Helwan University, Egypt.

Abstract

The objective of the current research was to establish a program for motor improvisation and to know its effect on motor creativity and stress hormone (phenyl mandelic hormone). The researcher applied the experimental method of pre and post-measurements of one experimental group and the research community was selected intentionally and randomly from girls in the 3rd grade at Faculty of Physical Education for Girls, Helwan University, in 2013-2014 academic year. The sample included (32) girls and (12) girls were picked for the exploratory study and the experimental sample finally comprised (20) girls. The results showed that the motor improvisation program positively affected motor creativity (fluency, originality, extension and flexibility) and stress hormone (phenyl mandelic hormone).

Introduction:

Man improvises hundreds of movements daily particularly when he is alone. Improvisation occurs when we react with senses of sympathy, aggression, escape or cooperation. So, motor improvisation is free, spontaneous, involuntary, informal and not pre-planned performance we do it to express an idea or feeling by movement in a non-verbal way (8: 29).

Safia Ahmed Mohiuddin (2007) stated that improvisation was generally a form of physical activity and communication without words where all movements previously learnt such as walk, run, hop, glide, all components of body movements such as jumps, waves, flexibilities, balances and all emotional responses such as vibration, shaking and expressive gestures could be used (13: 84, 85).

Amal Sayed Morsi (2001) indicated that motor improvisation stimulated free movements in a form of instant body responses by the effect of the stimulus and motivation that could be vocal, music or a behavior issued by another person or group of persons. It made the individual be familiar with his distinguished technique as his movement components developed according to his personal imagination. The behavior included the composition and performance processes simultaneously. It was set on the subjectivity and personal imagination of the improviser (1: 107).

Lila Sharaf El-Din (2006) indicated that motor improvisation was a motor reaction resulted from a spontaneous or automatic stimulus expressing an idea of specific situation (6: 10).

Motor improvisation is associated with the individual's psychological comfort as through improvisation the

individual can get free from tension psychological stresses that Sayeda Ali Abdel Aal (2008) stated that motor improvisation together with music and its content of relaxation exercises helped the individual improve his psychological problems and be away from fears dominating him (15: 100).

This was in agreement with Safia Ahmed Hamdy (2007) who suggested that motor improvisation achieved the feeling of psychological comfort, releasing the individual's daily concerns and emotions and getting free from stress as through improvisation the individual was allowed to express and to get free from stresses with the result that tension was released and this was showed particularly in ambitious students characterized by competition as they did their best to support themselves (13: 88).

Osama Kamel Rateb (2007) mentioned that stress was a common psychological phenomenon spread as it was occurred in our daily life.

Man's life was not free from tension and anxiety and when he planned for his future and outlined objectives for himself many problems that may be difficult to be solved confronted him leading to feeling of tension and anxiety because he was unable to confront reasons of this case. Increasing tension could lead to negative physical and mental effect, consequently, this could affect the athlete's abilities and performance (10: 27)(21).

Tension is the response of individuals to the environment in a form of stimulation that is the dimension associated with the intensity of behavior. Several changes may be occurred as a result of tension. Those changes are psychological, behavioral and physiological e.g. increasing heart beats, muscular tension, disability to

concentrate and to guide attention and raising adrenaline secretion.

Adrenaline, noradrenaline and dopamine are chemical carriers in the central nervous system and they called (catecholamines). Noradrenaline is the main chemical carrier in these catecholamines. Adrenaline and noradrenaline are secreted from the adrenal gland marrow and their secretion is increased in emergency cases as they prepare the body for changes accompanied with the occurrence of any emergency case such as fear, anxiety, tension or performance of physical activity. Vanillylmandelic acid (VMA) is the end product of adrenaline and assessment of the amount of Vanillylmandelic acid in urine indicates the amount of catecholamines secreted in the plasma and consequently, this is useful to identify stress conditions. Searching for understanding how to treat stress it is important to consider all aspects of stress, hence, the role of improvisation is emerged and its association with relaxation exercises. Through improvisation it is possible to encounter stress (10:271: 274), (12:44:47), (22), (24).

Exercising relaxation helps develop the strength of self-control and quickly get rid of emotions, anxiety and psychological stress as the individual can use it when feeling nervous tension, anxiety, fear or before the encounter of specific situation like the athletic championship. Also relaxation plays an important role in changing abnormal ideas, in understanding the nature of stress and in inspiring self-confidence when the individual feels of disability to control his emotions (23), (24).

Rashad Ali Abdel Aziz and Seham Ahmed Al-Hattab (2004) stated that the creative person had stress due to the exposure to different pressures while trying to solve the problem through a creative technique (11: 15). They agreed with Marwa Mohamed Ibrahim (2013) who emphasized that there was a negative correlation between motor creativity and psychological stress and there was a direct correlation between motor creativity and emotional balance in players (16: 123).

Motor creativity is a high form of sorts of human activities and it is a rich image of the human behavior that is the route to develop the human, the growth of humanitarian and the progress of the entire world (4: 15).

The concept of creativity is wide as it includes all scientific discoveries, inventions and artistic and literary creations. Creativity is a mental process resulted from creative thinking and some individuals have simple ability to think or to create and others have great ability to create and to renew and the creative person is able to give us new ideas for several problems related to the daily life or scientific studies and hence, the creation is a new idea that has been achieved and can be used in life (4: 15: 18).

Ebraham (2001) mentioned that the creative individual had the ability to generate and to produce a greater possible number of unique and serious correlations by using a clear criterion (7: 4).

Kamal Abdel Hamid, Abdel Mohsen Mubarak and Ezz El-Din Hosni (2012) stated that the creative person was merged totally in the performed activity for creation, innovation and creativity and this applied to performers of athletic activities (5: 47).

Mohamed Hassan Allawi (1998) pointed out that physical activities helped develop various creative abilities that allowed recalling previous experiences quickly the individual has passed. Such abilities had established on the individual's knowledge, information, skills and motor experiences the individual had gained while performing such activities (9: 25).

Motor creativity constitutes operations unique to human and the uniqueness property is the axis of creativity and this property and motor originality are important factors characterize the creativity process in addition to motor fluency, motor flexibility and extension (7: 18).

Rhythmic exercises are motor activities that consider creativity the most important main constituent. They represent important fields through which creative abilities can appear and bloom. They greatly contribute to create what new through their various skills and difficulties shown when forming motor statements and in their content of difficulties of body movement elements such as jumps, gabs, balances, turns, flexibilities and waves in addition to the specific artistic value divided by the artistic creative planning (choreography) that includes creativity and control (brilliance), the use of tools and music (14: 211, 212) (18: 101).

Samia Al-Hagrasi and Baraksan Othman (2004) illustrated that there were some concepts associated with rhythmic exercises like choreography meaning artistic creative planning including some operations like motor improvisation, hence, it is the automatic collapse stage, sequential and continuous growth of the motion that contributes and helps in creativity process and building ideas and new and modern correlations (14: 189).

Research problem:

Multiple motor performance of rhythmic exercises requires mental and psychological properties in the athletic performer to enable him to perform on all levels as the subject of rhythmic exercises are prolific and their tendencies and usage are diversified. For that the girl becomes under several psychological stresses and tension to be able to meet the specific requirements of the subject to raise her level to the limit required for the success in the subject of the exercises.

Through her existing in the practical test committee, the researcher noticed that the level of the creative statement the girls should perform was low and moreover, the girls' scores in the creative statement could be weak or a girl could get the highest score exclusively. Searching for the reason, the researcher found that such girl created the creative motor statement without help or weak help from her mates. Referring to the characterization of the subject of rhythmic exercises for the 3rd grade particularly the theoretical part, it has nothing to assist, to improve or to increase the girl's ability to create and referring to the practical part of that subject, the researcher noticed that girls were enforced to create a motor statement from their planning. Questioning girls about improvisation and motor creativity, they were not familiar with the requirements of creativity and they stated that creativity was difficult and not pleasure and when thinking of a creative statement they got upset, tensioned and psychological stress due to their disability to create a creative motor statement characterized by strength, superiority and admired by the exam committee.

Reviewing scientific references, theoretical readings and previous studies related to improvisation and creativity and through the foregoing, the researcher found that researches of improvisation and related to creativity were in need of more studies to know the effect of the motor improvisation program on creativity and stress facing the girl. From this stand point the research idea was originated.

Research objective:

To establish a motor improvisation program and to know its effect on motor creativity and vanillylmandelic acid (VMA).

Research hypotheses:

The motor improvisation program effects positively on motor creativity (fluency, originality, expansion, flexibility).

Motor improvisation program positively effects on vanillylmandelic acid (VMA).

Research procedures:

Method: To achieve the research objective and its hypotheses the researcher applied the experimental method through the pre and post-measurement of one group to suit the nature of the research.

Sample: It was selected intentionally and randomly from girls in the 3rd grade at Faculty of Physical Education for Girls, Helwan University in 2013-2014 academic year where the original community of the 3rd grade included (174) girls and where (44) girls were chosen by (25%). Five injured girls, (4) expatriate girls who were not residing in Cairo and (3) girls who were not attending the training program regularly were excluded. The sample became (32) girls and then (12) girls were taken for the pilot study and the final experimental sample comprised (20) girls. Statistical treatments were carried out on the sample in descriptive variables and Table (1) illustrates that the sample was subject to the normal curve.

Table (1)

Arithmetic mean, standard deviation and skewness coefficient of descriptive variables (n=32)

No.	Variables	Measuring unit	M	S.D	Skewness coefficient
1	Age	Year	20.71870	0.45680	-1.022
2	Height	Cm	162.3438	2.32253	-1.254
3	Weight	Kg	60.65620	5.02644	0.320
4	Fluency	Score	21.78130	2.72070	0.369
5	Originality	Score	00.84380	1.32249	1.377
6	Expansion	Score	2.40630	0.71208	0.352
7	Flexibility	Score	41.8750	7.61895	0.535
8	Total creativity	Score	66.5937	9.40096	0.568

Data in Table (1) illustrate that the skewness coefficient was between (± 3) in descriptive variables of the research indicating that the sample was subordinated under the normal curve.

Table (2)
Arithmetic mean, standard deviation and skewness coefficient of the descriptive variables
of the experimental sample (n=20)

No.	Variables	Measuring unit	M	S.D	Skewness coefficient
1	Age	Year	20.7500	0.44426	-1.251
2	Height	Cm	162.5000	1.53897	-0.193
3	Weight	Kg	61.8500	5.21410	-0.009
4	Fluency	Score	22.0500	2.94645	0.234
5	Originality	Score	0.9500	1.35627	1.225
6	Expansion	Score	2.4000	0.82078	0.355
7	Flexibility	Score	44.3000	7.89470	0.168
8	Total creativity	Score	69.2000	9.74733	0.347

Data in Table (2) show that the skewness coefficient was between (± 3) in descriptive variables of the research indicating that the sample was subordinated under the normal curve.

Tools of collecting data:

The researcher used devices, tools and tests and medical analyses as follows:

I. Equipment and instruments:

1. Forms of recording information and measurements of the research group (Attachment 3).
2. A restameter to measure height in cm.
3. A medical balance to measure weight in kg.
4. A Stopwatch
5. A ball of rhythmic exercises.
6. A rope of rhythmic exercises.
7. Hoop of rhythmic exercises.
8. Laptop and CDs
9. Video camera.
10. A set of sterile plastic cubs and glass tubes with tight caps to keep urine till taking to the lab to determine vanillylmandelic acid (VMA).

11- Instrument of determining amino acids to measure vanillylmandelic acid concentration in μg .

II. **Motor creativity tests (Attachment 2):** The researcher used the motor creativity test in the rhythmic

exercises designed by Amany Wahid and Sana'a Mamoun (2008). The test consists of four axes (fluency, originality, flexibility and expansion) and their total represents the score of motor creativity.

III. **Medical analyses:** The researcher hired a lab technician to collect urine samples from the research sample to carry out medical analyses of the physiological variable i.e. vanillylmandelic acid that were taken to the lab where they were analyzed by a specialist doctor in medical tests.

IV. The proposed program: Attachment (1)

Reviewing scientific literatures, researches and previous studies related to the research topic, the researcher made a layout of the training program as follows:

The program units were divided as follows:

1. Preliminary part (20) min
2. The main part (60) min.
3. The final part (10) min.

The preliminary part included (5) min. for changing clothes and taking absenteeism, (15) min. for relaxation exercises to release stresses and tension for all body parts (from the first to the sixth lessons). From the seventh to the twelfth lessons, the preliminary part included warming exercises for all body parts (head, shoulders, arms, trunk and legs).

Table (3)
The main part (60) min.

The 1 st training unit		The 2 nd training unit		The 3 rd training unit	
Lesson 1	Identification by improvisation and improving body consciousness	Lesson 5	Improving creativity and deriving improvisational ideas.	Lesson 9	Developing creativity by using the ball tool.
Lesson 2	Improving space consciousness (directions).	Lesson 6	Developing creativity by using the foregoing skills.	Lesson 10	Developing creativity by using the hoop tool.
Lesson3	Improving space consciousness (levels, concentration, paths).	Lesson 7	Developing creativity by using elements of body movements (jumps, turns).	Lesson 11	Developing creativity by using the rope tool.
Lesson4	Connecting movement elements and using body to perform some expressive movements.	Lesson 8	Developing creativity by using elements of body movements (balances, flexibilities, waves).	Lesson 12	Developing creativity by using the tape tool.

The final part (10) min. included mini games calming exercises.

Program time division:

The program involved (3) training units of (4) lessons each and so the program contained (12) lessons. It was applied for (8) weeks (2) times a week and the training lesson took (90) minutes. Each week included (2) lessons till the 4th week and then lessons were fixed from the 9th to the 12th lessons that each week contained one lesson. The program was applied on Mondays and Wednesdays from 2 to 3.30 PM.

Pilot study:

The researcher conducted a pilot study from (13/2/2014 to 20/2/2014) on a sample of (12) girls from the original society but outside the research sample. The validity and stability of motor creativity test was computed.

Scientific treatments of tests (motor creativity test):

Validity:

The researcher computed the validity coefficient by differentiation through finding the upper quartile and the lower quartile of the pilot study of (12) girls.

Table (4)

Significance of differences between the differentiated and undifferentiated groups in tests under investigation (n=12)

No.	Variable	Measuring unit	Differentiated group		Undifferentiated group		Two mean difference	t	Significance
			M	SD	M	SD			
1	Creativity test	Score	69.33	9.01	53.66	2.51	15.66	2.898*	0.044

Tabulated (t) value at (0.05) level = 2.898.

Table (4) illustrates that there are statistically significant differences between the differentiated and undifferentiated groups indicating that the test was valid to measure what it was intended to be measured.

Stability:

The researcher applied the test to the sample of the pilot experiment of (12) girls from the original community but outside the research sample to find out the stability coefficient by applying the test on (13/2/2004) and re-applied it on (20/2/2014) under the same circumstances and effects.

Table (5)

Significance of differences between the 1st and 2nd applications (n=12)

No.	Variable	1 st application		2 nd application		r
		M	SD	M	SD	
1	Creativity test	62.2500	7.21268	67.8333	6.50641	0.880**

The value of tabulated (r) at (0.01) level = (0.880).

Table (5) shows that there is a statistically significant correlation at (0.01) level in creativity test between the 1st and 2nd applications indicating that the test was stable.

Main study:

- Pre-measurement:

The pre-measurements were conducted on (24/2/2014) and on (26 & 27/2/2014) for descriptive variables such as height, weight and age which were recorded in the form of information and measurements by the researcher assisted by members of the teaching board. Also the pre-measurements of the motor creativity test were conducted that before attending to perform the test, the girl gave a urine sample as this time was mostly suitable to measure the level of vanillylmandelic acid (VMA) where its concentration was at the highest level as the girl was in the situation of competition and the stress was at its highest level. Urine was taken by the girl and the specialized

doctor analyzed it and after submitting the sample the girl performed the creativity test.

- Application of the proposed training program:

The researcher applied the training program in the period from (3/3/2014 to 5/5/2014) for (8) weeks two times a week by (3) training units of (4) lessons each which took (90) minutes. The proposed training program (motor improvisation) was applied on Mondays and Wednesdays from 2:00 to 3:30 PM.

- Post-measurement:

The researcher conducted the post-measurement from (7/5/2014 to 8/5/2014) as she did in the pre-measurement. The urine sample was taken from girls before applying the motor creativity test and the sample sent to the laboratory to be analyzed by the specialized doctor.

Statistical treatment:

Data of the research variables were tabulated and then the statistical treatments were conducted by computer with (SPSS) software. The following treatments were used:

(Arithmetic mean, standard deviation, skewness coefficient, Wilcoxon and Mann Whitney method).

Presentation of results:

Table (6)

Significance of differences and proportion of variation between the pre and post-measurements of the experimental group in variables under investigation

No	Tests	M. unit	Pre-measurement		Post-measurement		Difference of means	t	Significance
			M	SD	M	SD			
1	Fluency	Score	22.05	2.94	50.95	9.75	-28.90	-16.117**	0.000
2	Originality	Score	0.95	1.35	1.35	1.50	-0.60	-2.565*	0.019
3	Expansion	Score	2.40	0.82	3.20	0.69	-0.80	-5.812**	0.000
4	Flexibility	Score	44.30	7.89	81.15	6.45	-36.85	-33.045**	0.000
5	Total motor creativity	Score	69.20	9.74	137.30	15.35	-68.10	-31.44**	0.000

** Level of significance at (0.01).

*Level of significance at (0.05).

Data in Table (6) show that the computed (T) value ranges from (-2.565 to -33.045) indicating that there are significant differences between the pre and post-measurements of the experimental group in favor of the post-measurement.

Table (7)

Significance of differences and proportion of variation between the pre and post-measurements of the experimental group in vanillylmandelic acid (VMA) under investigation (n=20)

Variable	M. unit	Pre-measurement		Post-measurement		Difference of means	t	Significance
		M	SD	M	SD			
Vanillylmandelic acid (VMA)	µg	5.65	0.74	2.80	0.76	2.85	17.105**	0.000

The value of tabulated (t) at (0.01) level =17.105.

Data in Table (7) illustrate that there are statistically significant differences between the pre and post-measurements of the experimental group in favor of the post-measurement.

Discussion of results:

Through the statistical treatments of the research data, in the light of the measurements used and according to the research objectives and hypotheses, the results were presented and discussed as follows:

Data in Table (6) show that there are statistically significant differences between the pre and post-measurements of the experimental group in favor of the post-measurement in variables of (fluency, expansion, flexibility, total motor creativity) as the computed (t) value ranges from (-2.565 to -33.045) at (0.01) significance level. The researcher attributed this result to the motor improvisation program that has been applied to girls. The program contained exercises and stimuli exciting the free movement appeared in a form of instant body responses they helped the girl gain several motor experiences,

increase her information stock of the nature of her body, her different motor abilities and her capacity express with her style to reach new creative movements and in addition to use movements nested and settled in her mind and those she had learnt. Consequently, girls were able to create new motor statements and to increase her creative ability since the program contained all movements that have been previously learnt such as walk, run, hop, slide and all elements of body movements such as jumps, turns, waves, flexibilities, balances and all emotional responses such as shaking and expressive gestures, to diversify skills and to feel of the space (directions, paths, levels, concentration).

This agreed with indications of Safia Hamdy (2006) that motor improvisation increased imagination and improved the imaginary ability and consequently, creativity was improved (10). Also this was in agreement with that of Ebrahim (2001) that the creative individual had the ability to generate and produce the greatest possible number of unique connections (15). This moreover tallied with studies of Amal Moursi (2001), Soha Fekry (1999) and Hanson

(1995) who indicated that using motor improvisation program with its content of tools and music had positive effect on raising the level of motor creativity (1), (16),(20).

Referring to data in Table (6), there are significant differences between the pre and post-measurements of the experimental group in favor of the post-measurement in the variable of originality but at (0.05) level of significance. The researcher related the difference in the level of significance to the scores of originality recorded upon the selection of unique movements and difficulties and no repetition was allowed between the girl and her mates. Moreover, during applying the program, girls were trained in one place leading to similarity and quote from a girl to another, however, the motor improvisation program allowed the girl to express freely and to help her extract and produce new creative and not repeated ideas.

This agreed with that of Wesam Adel Amin (2009) who stated that originality was the ability to produce creative motor responses not or less repeated in comparison with traditional responses known, hence, the less common motor response the score of its originality was increased (17:28).

This achieved the 1st hypothesis stating, "The motor improvisation program effects positively on motor creativity (fluency, originality, expansion, flexibility)".

Referring to data in Table (7) there are significant differences between the pre and post-measurements of the experimental group in favor of the post-measurement in vanillylmandelic acid (VMA) variable. The researcher attributed this result to the motor improvisation program as it contained relaxation exercises helped girls release psychological stress, develop the strength of their self-control, get rid of emotions, anxiety and psychological stress quickly, be able to use the same when feeling of nervous tension, anxiety or fear, make girls free to express their inner via expressive movements without any stress or criticism leading to the release of emotions, tension, daily concerns and burden and support girls via relaxation exercises to be in a state of mental serenity where the mind is in an emotional and unconscious status leading to mental imaginary of the skill and to perform the creative work very well.

This was in agreement with that of Safia Hamdy cited from Richard Sion (2007) that mental imaginary of the skill performance helped show the best performance provided that relaxation exercises should be practiced prior to mental training and the key of imagination and fiction was the ability to relax. Also creativity scientists have mentioned that mental status being in harmony with good creative work and successful solutions for emotional

and unconscious problems required a relaxed body to some extent (10:97).

Also this was in harmony with Sayeda Ali Abdel Aal (2008) who indicated that motor improvisation together with music and its content of relaxation exercises helped the individual improve psychological problems and be away from fear dominating him (9).

Also this was coinciding with that of Lila Sharaf Al-Din (2006) who stated that the motor improvisation program helped get and feel of the sense of psychological comfort leading to the release of emotions, stresses and tension and she added that the improvisation program contained relaxation exercises helped girls feel of relaxation (6:73, 75).

The same result agreed with that of Dawn Clark (1993) who illustrated that when the atmosphere around the individual was free and empty of stresses, creative capacities were flourishing and became tangible reality (19: 13).

The same result coincided with that of Fatima Al-Azzab (1993) who indicated that using motor improvisation in teaching allowed the student better understanding the artistic process and consequently, he was provided with psychological preparedness and excitement for the creative work (3: 174) (19).

This achieved the 2nd hypothesis stating, "Motor improvisation program positively effects on vanillylmandelic acid (VMA)".

Conclusions:

- 1- The proposed training program (motor improvisation) positively affected motor creativity.
- 2- The proposed training program (motor improvisation) had significant effect on vanillylmandelic acid (VMA).

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