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Research article

EFFECT OF MUSIC THERAPY ON SELECTED PSYCHOMOTOR SKILLS AND LEARNING SKILLS OF INTELLECTUALLY CHALLENGED CHILDREN

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Abstract

The purpose of the study was to find out the effect of music therapy on selected psychomotor skills and learning skills of intellectually challenged children. In this study sixteen intellectually challenged students were selected from Sri Ramakrishna Mission Vidyalaya T. A. T. Kalanilayam Middle School, Coimbatore randomly as subjects. The age group was between 8-12 year and 13 – 15 years and the selected variables were psychomotor and learning skills. The experimental group undertook their training in their concerned discipline .The pre-test was taken in the selected psychomotor and learning skill variables. The training prolonged for about a period of 12 weeks. The post- test were conducted in the same variables for this groups. The results showed that there was significant improvement in the 8-12 years age group due to the music therapy programme on Verbal Ability: number of words, speed of words and pronunciation. Numerical Ability: speed in numbers and addition. It was concluded that music therapy programme significantly improved Learning Variables: Verbal Ability – number of words, speed of words, pronunciation and Numerical Ability: speed in numbers and addition among 8-12 years age group. The music therapy programme significantly improved the Learning Variables: Verbal Ability – number of words, pronunciation. Numerical Ability – speed in numbers and addition among the 13-15 years age group. The 8-12 years age group had better improvement than the 13-15 years age group in Verbal Ability pronunciation. The 8-12 years age group had a trend in its favour than 13-15 years age group in, speed of words, pronunciation and hand eye co-ordination. It was concluded that 13-15 years age group had a trend in its favour than 8-12 years age group in number of words, speed in numbers, addition, association reaction time and finger eye co-ordination. This study proved that there was significant improvement in learning variable among the intellectually challenged children. Hence it was recommended that physical educationists and special education teachers to include music therapy to improve learning levels of intellectually challenged children. Hence it was recommended that physical educationists and special education teachers to include music therapy to improve learning levels of intellectually challenged children.

Key word: Music therapy, Learning variables, psychomotor skills

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INTRODUCTION

Music therapy is the systematic application of music in the treatment of the physiological and psychosocial aspects of an illness or disability. It focuses on the acquisition of nonmusical skills and behaviors, as determined by a board certified music therapist through systematic assessment and treatment planning. Music promotes development in the sphere of emotions along with developing the child's cognitive abilities. The emotional experience derived from music has an influence on the formation of child's normal and intellectual outlook. Music activities tend to develop imagination and creative thinking. A child is confronted with challenges in creating simple music. The tasks of his own become accustomed to independent artistic expression, and gains confidence in his own creative powers. Unquestionably all this is carried over to other spheres of thought and activity.

METHODS AND MATERIALS

SELECTION OF SUBJECTS

To achieve the purpose of the study sixteen intellectually challenged students 8 from the age group 8-12 year and 8 from the age group 13 – 15 years from Sri Ramakrishna Mission Vidyalaya T. A. T. Kalanilayam Middle School, Coimbatore were selected randomly as subjects.

SELECTION OF VARIABLES

The following psychomotor and learning skill variables are selected. The experimental group undertook their training in their concerned discipline .The pre-test was taken in the selected psychomotor and learning skill variables. The training prolonged for about a period of 12 weeks. The post- test were conducted in the same variables for this groups. In the present study the following variables were selected. Psychomotor skills: Reaction time, Hand eye co-ordination, Finger eye co-ordination. Learning skills: Verbal ability test, Numerical ability test

TESTING PROCEDURE

All the instruments and equipments used for the study was a standard one and high quality. None had any functional defect and was being used for the same purpose. Each instrument was tested several times and was used on subjects only being satisfied with the performance of the instruments. Reaction timer, finger dexterity and mirror tracing tester equipments used for measuring reaction time and co-ordination were acquired from a investigator who has been using it for diagnostic purpose on his student. Reaction timer, finger dexterity, was acquired from Maruthi College of Physical Education, Coimbatore. Reliability of data was established by test and retest processes were consistency in variants co-efficient for sixteen subjects on all the six variables.

TRAINING PROCEDURE

The time was divided into three training methods. First three weeks free hand exercise , second three weeks play activity and third three weeks cognitive

skills for about 40 minutes to improve the physical fitness and cognitive skills.

STATISTICAL TECHNIQUE

The analysis of covariance was applied to find out the significant difference between the 8 – 12 years of age group and 13 – 15 years of age group in the selected variables. The "t" ratio was applied to find out significant improvement in the selected variables by the 8-12 years of age group and 13-15 years of age group. To achieve this purpose of the study 16 students from Ramakrishna Mission Vidyalaya T.A.T Kalanilayam middle school were selected and they were divided into two groups each group consisting of eight subjects from each category. Eight students belonged to the age group of 8-12 and eight of them belonged to the age group of 13-15 years. The selected subjects of all groups were tested in the selected criterion variables before the test and after training. Analysis of co-variance (ANACOVA) was applied to find out the significant differences in each criterion variables among the groups.

TABLE- I

COMPUTATION OF "t" ratio FOR 8-12 YEARS AGE GROUP FOR THE PRE AND POST TEST MEAN VALUE OF SELECTED VARIABLES

S. NO	VARIABLE	Mean Diff	SD	DM	" t" ratio
1	Verbal ability (Numbers of words)	2.25	.70	.25	9.00*
2	Verbal ability (Speed of words)	3.75	.88	.31	11.96*
3	Verbal ability (pronounciation)	1.87	.64	.22	8.27*
4	Numerical ability (speed in numbers)	.077	.31	.011	6.85*
5	Numerical ability(addition)	.35	.016	.0056	6.17*
6	Associated Test	.043	.168	.0595	.734
7	Reaction Time	.0012	.00198	.00070	1.78
8	Finger Eye –Co-ordination	.0012	.025	.009	.137
9	Hand Eye Co-ordination	.0063	.010	.003	1.667

Required table value for degrees of freedom 1and 7 is 2.32 at0.05 level.

As per the table I the obtained " t" ratio 9.00,11.96, 8.27, 6.85 and 6.17 for verbal ability (number of words, speed of words, pronounciation) numerical ability (speed in numbers, addition) respectively are greater than the table value 2.32 Hence there is significant improvement at 0.05 level of confidence in these

variables . The obtained "t" ratio .734, 1.78, .137 and 1.667 for associated test, reaction time, finger eye co-ordination and hand eye co-ordination respectively are less than the table value 2.32. Hence there is no significant improvement at 0.05 level of confidence in these variables.

TABLE -II

COMPUTATION OF "t" ratio 13-15 FOR YEARS AGE GROUP FOR THE PRE AND POST TEST MEAN VALUE OF SELECTED VARIABLES

S. NO	VARIABLE	Mean Diff	SD	DM	" t" ratio
1	Verbal ability (Numbers of words)	2.88	1.55	0.55	5.24*
2	Verbal ability (Speed of words)	2.5	3.07	1.09	2.30
3	Verbal ability (pronounciation)	1.13	0.35	0.13	9.00*
4	Numerical ability (speed in numbers)	0.10	.012	0.04	2.32*
5	Numerical ability (addition)	0.05	0.02	0.008	5.48*
6	Associated Test	0.02	0.05	0.02	0.87
7	Reaction Time	0.002	0.004	0.002	1.36
8	Finger Eye Co - ordination	0.01	0.02	0.08	1.28
9	Hand Eye Co-ordination	0.006	0.04	0.012	0.505

Required table value for degrees of freedom 1and 7 is 2.32 at0.05 level

As per the tableII the obtained " t" ratio 5.24,9.00,2.32and 5.48 for verbal ability (number of words, pronounciation) numerical ability (speed in numbers, addition) respectively are greater than the table value 2.32 Hence there is significant improvement at 0.05 level of confidence in these variables.The obtained "t" ratio 2.30, 0.87, 1.36, 1.28 and 0.505 for verbal ability (Speed of words) associated test, reaction time, finger eye co-ordination and hand eye co-ordination respectively are less than the table value 2.32. Hence there is no significant improvement at 0.05 level of confidence in these variables.

TABLE- III

COMPUTATION OF ANALYSIS OF COVARIANCE OF VERBAL ABILITY NUMBER OF WORDS OF 8-12 YEARS AGE GROUP AND 13 TO 15 YEARS AGE GROUP

Age group	8 to 12 years	13 to 15 years	Sources of variance	Sum of squares	df	Mean squares	F Ratio
Pre test mean	7.75	13.625	Between Groups	138.06	1	138.06	30.499*
			Within Groups	63.375	14	4.527	
Post test mean	10	16.5	Between Groups	169	1	169	34.794*
			Within Groups	68	14	4.857	
Adjusted Post mean	12.572(a)	13.928(a)	Between Groups	2.311	1	2.311	1.549
			Within Groups	19.396	13	1.492	

Required table value at 0.05 level of significant with df 1 and 14 is 4.60 and df 1 and 13 is 4.36. From the table III the obtained “F” ratio of pretest mean 30.499 is greater than the table value 4.60 at 0.05 level of significance. The result of the study indicates that there is significant difference between 8 to 12 years age group and13 to 15 years age group. The obtained “F” ratio of post test mean 34.794 is greater than the table value 4.60 at 0.05 level of significance. The result of the study indicates that there is significant difference between 8 to 12 years age group and13 to 15 years age group. The obtained “F” ratio 1.549 for adjusted post mean is less than the table value, hence there is no significant difference between 8 to 12 years age group and13 to 15 years age group.

FIGURE - 1

ADJUSTED MEAN VALUE OF VERBAL ABILITY NUMBER OF WORDS OF 8-12 YEARS AGE GROUP AND 13 TO 15 YEARS AGE GROUP

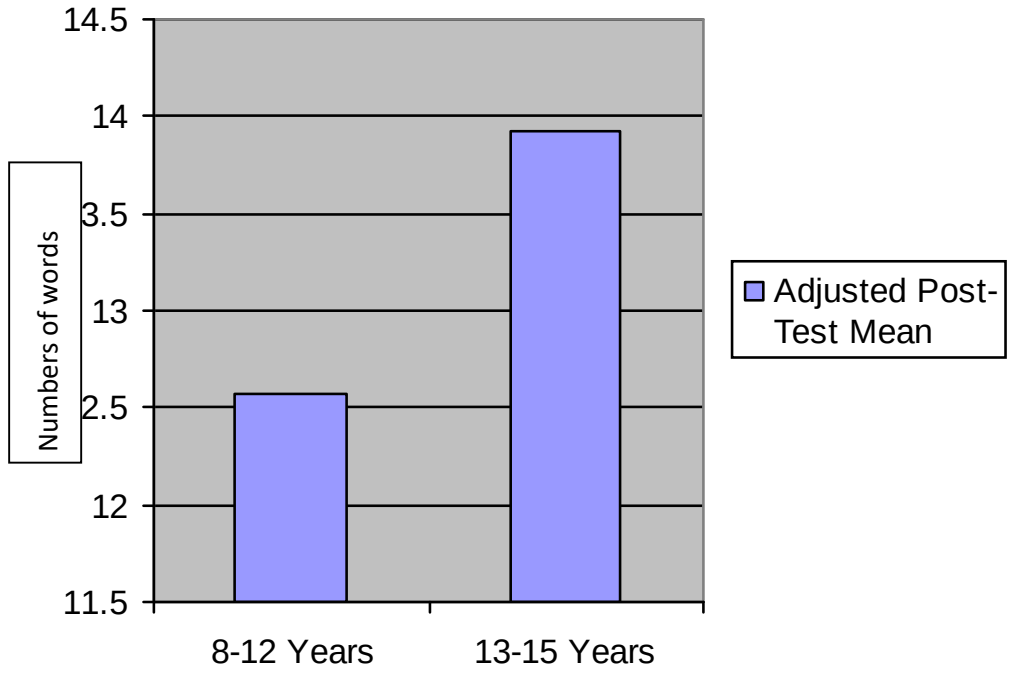

TABLE- IV

COMPUTATION OF ANALYSIS OF COVARIANCE OF VERBAL ABILITY SPEED OF WORDS OF 8-12YEARS AGE GROUP AND 13 TO 15 YEARS AGE GROUP

Age group	8 to 12 years	13 to 15 years	Sources of variance	Sum of squares	df	Mean squares	F Ratio
Pre test mean	36.625	59.375	Between Groups	2070.3	1	2070.3	4.725*
			Within Groups	6133.8	14	438.13	
Post test mean	32.875	56.875	Between Groups	2304	1	2304	5.655*

			Within Groups	5703.8	14	407.41	
Adjusted Post mean	43.785(a)	45.965(a)	Between Groups	14.213	1	14.213	3.017
			Within Groups	61.249	13	4.711	

Required table value at 0.05 level of significant with df 1 and 14 is 4.60 and df 1 and 13 is 4.36. The table value required for significant at 0.05 level with df 1 and 14 is 4.60 and df 1 and 13 is 4.36 . Fromthe TableIV the obtained "F" ratio of pretest mean 4.725 is greater than the table value4.60 at 0.05 level of significance. The result of the study indicates that there is significant difference between 8 to 12 years age group and13 to 15 years age group. The obtained "F" ratio of post test mean 5.655 is greater than the table value 4.60 at 0.05 level of significance. The result of the study indicates that there is significant difference between 8 to 12 years age group and13 to 15 years age group. The obtained "F" ratio 3.017 for adjusted post mean is less than the table value, hence there is no significant difference between 8 to 12 years age group and13 to 15 years age group.

FIGURE - 2

ADJUSTED MEAN VALUE OF VERBAL ABILITY SPEED OF WORDS OF 8-12YEARS AGE GROUP AND 13 TO 15 YEARS AGE GROUP

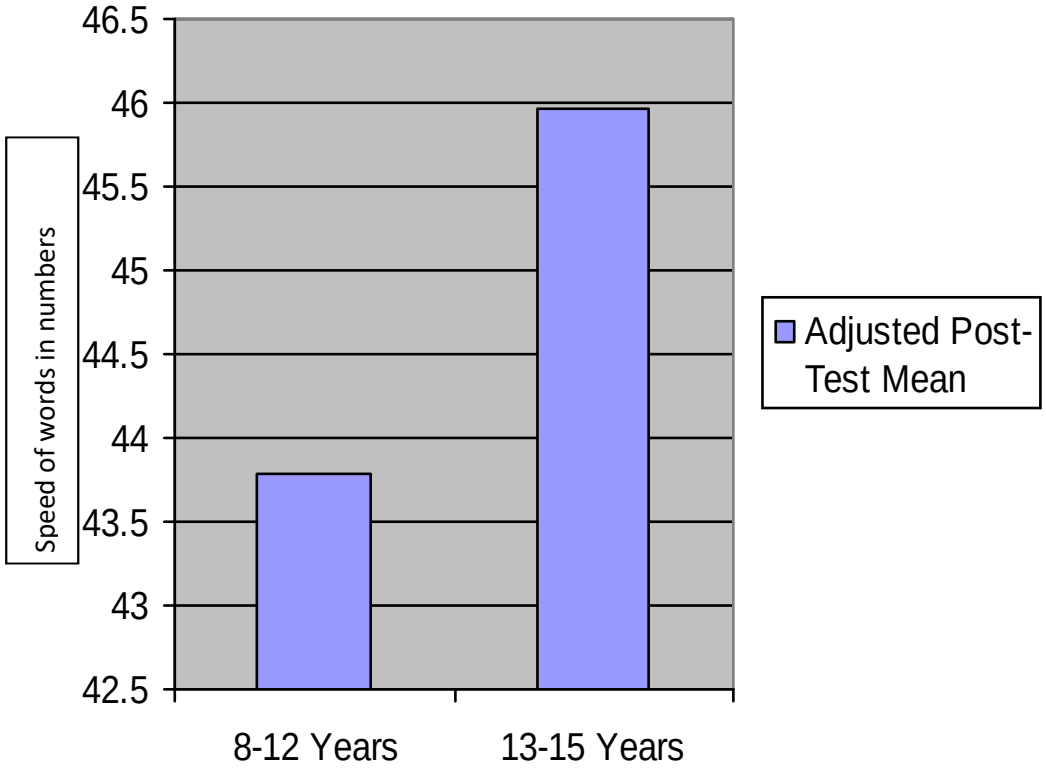

TABLE-V

COMPUTATION OF ANALYSIS OF COVARIANCE OF VERBAL ABILITY PRONOUNCIATION OF 8-12YEARS AGE GROUP AND 13 TO 15 YEARS AGE GROUP

Age group	8 to 12 years	13 to 15 years	Sources of variance	Sum of squares	df	Mean squares	F Ratio
Pre test mean	6	7.125	Between Groups	5.063	1	5.063	2.296
			Within Groups	30.875	14	2.205	

Post test mean	7.875	8.25	Between Groups	0.563	1	0.563	0.352
			Within Groups	22.375	14	1.598	
Adjusted Post mean	8.326(a)	7.799(a)	Between Groups	0.954	1	0.954	4.891*
			Within Groups	2.535	13	0.195	

Required table value at 0.05 level of significant with df 1 and 14 is 4.60 and df 1 and 13 is 4.36. From the table V the obtained "F" ratio of pretest mean 2.296 is less than the table value 4.60 at 0.05 level of significance. The result of the study indicates that there is significant difference between 8 to 12 years age group and13 to 15 years age group.The obtained "F" ratio of post test mean 0.352 is less than the table value 4.60 at 0.05 level of significance. The result of the study indicates that there is significant difference between 8 to 12 years age group and13 to 15 years age group. The obtained "F" ratio 4.891 for adjusted post mean is greater than the table value, hence there is significant difference between 8 to 12 years age group and13 to 15 years age group.

FIGURE - 3

ADJUSTED MEAN VALUE OF VERBAL ABILITY OF PRONOUNCIATION OF 8-12YEARS AGE GROUP AND 13 TO 15 YEARS AGE GROUP

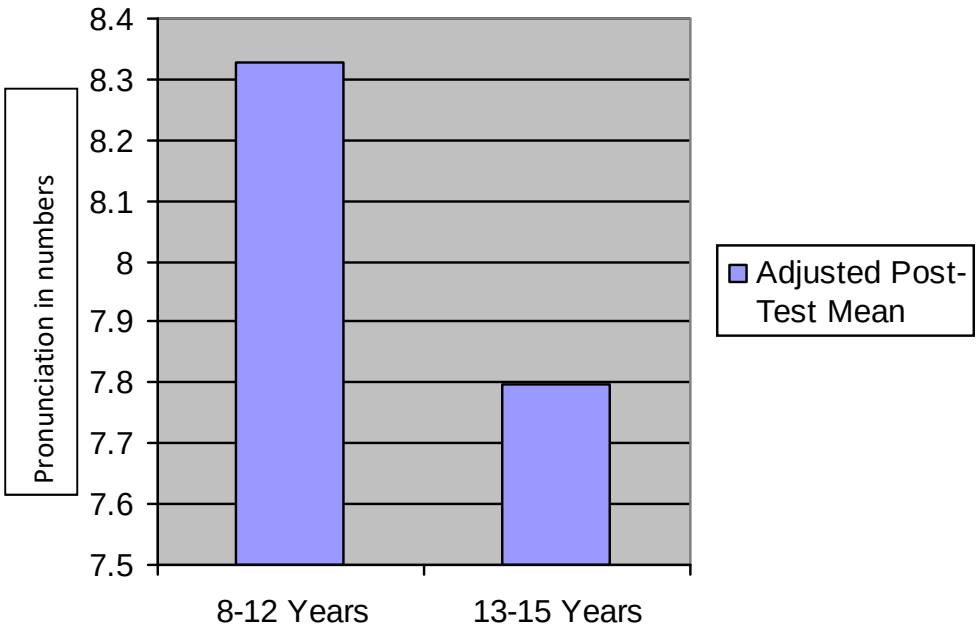

TABLE-VI

COMPUTATION OF ANALYSIS OF COVARIANCE OF NUMERICAL ABILITY SPEED IN NUMBERS OF 8-12YEARS AGE GROUP AND 13 TO 15 YEARS AGE GROUP

Age group	8 to 12 years	13 to 15 years	Sources of variance	Sum of squares	df	Mean squares	F Ratio
Pre test mean	3.4163	4.0913	Between Groups	1.823	1	1.823	1.522
			Within Groups	16.767	14	1.198	
Post test mean	3.3388	3.9963	Between Groups	1.729	1	1.729	1.405
			Within Groups	17.229	14	1.231	
Adjusted Post mean	3.680(a)	3.655(a)	Between Groups	0.002	1	0.002	0.291
			Within Groups	0.099	13	0.008	

Required table value at 0.05 level of significant with df 1 and 14 is 4.60 and df 1 and 13 is 4.36. From the table VI the obtained "F" ratio of pretest mean 1.522 is less than the table value 4.60 at 0.05 level of significance. The result of the study indicates that there is significant difference between 8 to 12 years age group and13 to 15 years age group. The obtained "F" ratio of post test mean 1.405 is less than the table value 4.60 at 0.05 level of significance. The result of the study indicates that there is significant difference between 8 to 12 years age group and13 to 15 years age group. The obtained "F" ratio 0.291 for adjusted post mean is less than the table value hence there is no significant difference between 8 to 12 years age group and13 to 15 years age group.

FIGURE -4

ADJUSTED MEAN VALUE OF NUMERICAL ABILITY SPEED IN NUMBERS OF 8-12 YEARS AGE GROUP AND 13 TO 15 YEARS AGE GROUP

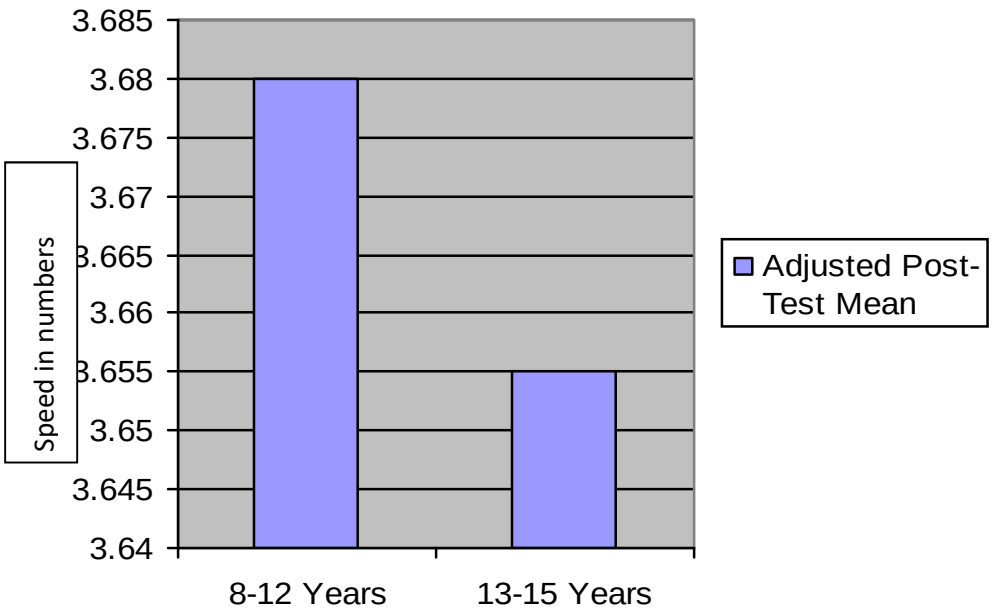

TABLE -VII
COMPUTATION OF ANALYSIS OF COVARIANCE OF NUMERICAL ABILITY ADDITION OF8-12YEARS AGE GROUP AND 13 TO 15 YEARS AGE GROUP

Age group	8 to 12 years	13 to 15 years	Sources of variance	Sum of squares	df	Mean squares	F Ratio
Pre test mean	6.8438	5.3263	Between Groups	9.211	1	9.211	2.389
			Within Groups		14	3.855	
Post test mean	6.8088	5.28	Between Groups		1	9.348	2.449
			Within Groups		14	3.818	
Adjusted Post mean	6.054(a)	6.035(a)	Between Groups		1	0.001	3.483
			Within Groups		13	0	

Required table value at 0.05 level of significant with df 1 and 14 is 4.60 and df 1 and 13 is 4.36. From the table VII the obtained "F" ratio of pretest mean 2.389is less than the table value 4.60 at 0.05 level of significance. The result of the study indicates that there is significant difference between 8 to 12 years age group and13 to 15 years age group. The obtained "F" ratio of post test mean 2.449 is less than the table value 4.60 at 0.05 level of significance. The result of the study indicates that there is significant difference between 8 to 12 years age group and13 to 15 years age group. The obtained "F" ratio for3.483 for adjusted post mean is less than the table value hence there is no significant difference between 8 to 12 years age group and13 to 15 years age group.

FIGURE - 5

ADJUSTED MEAN VALUE OF NUMERICAL ABILITY ADDITION OF 8 - 12YEARS AGE GROUP AND13 TO 15 YEARS AGE GROUP

TABLE -VIII
COMPUTATION OF ANALYSIS OF COVARIANCE OF VERBAL ABILITY ASSOCIATED TEST OF 8-12YEARS AGE GROUP AND 13 TO 15 YEARS AGE GROUP

Age group	8 to 12 years	13 to 15 years	Sources of variance	Sum of squares	df	Mean squares	F Ratio
Pre test mean	1.2088	1.0013	Between Groups	0.128	1	0.128	1.372
			Within Groups	1.304	14	0.093	
Post test mean	1.165	0.9863	Between Groups	0.172	1	0.172	2.863
			Within Groups	0.842	14	0.06	
Adjusted Post mean	1.143(a)	1.067(a)	Between Groups	0.021	1	0.021	2.099
			Within Groups	0.127	13	0.01	

Required table value at 0.05 level of significant with df 1 and 14 is 4.60 and df 1 and 13 is 4.36. From the table VIII the obtained "F" ratio of pretest mean 1.372is less than the table value 4.60 at 0.05 level of significance. The result of the study indicates that there is significant difference between from 8 to 12 years age group and13 to 15 years age group. The obtained "F" ratio of post test mean 2.836 is less than the table value 4.60 at 0.05 level of significance. The result of the study indicates that there is significant difference between 8 to 12 years age group and13 to 15 years age group. The obtained "F" ratio 2.099 adjusted post mean is less than the table value hence there is no significant difference between 8 to 12 years age group and13 to 15 years age group.

FIGURE - 6

ADJUSTED MEAN VALUE OF VERBAL ABILITY ASSOCIATED TEST OF 8-12YEARS AGE GROUP AND 13 TO 15 YEARS AGE GROUP

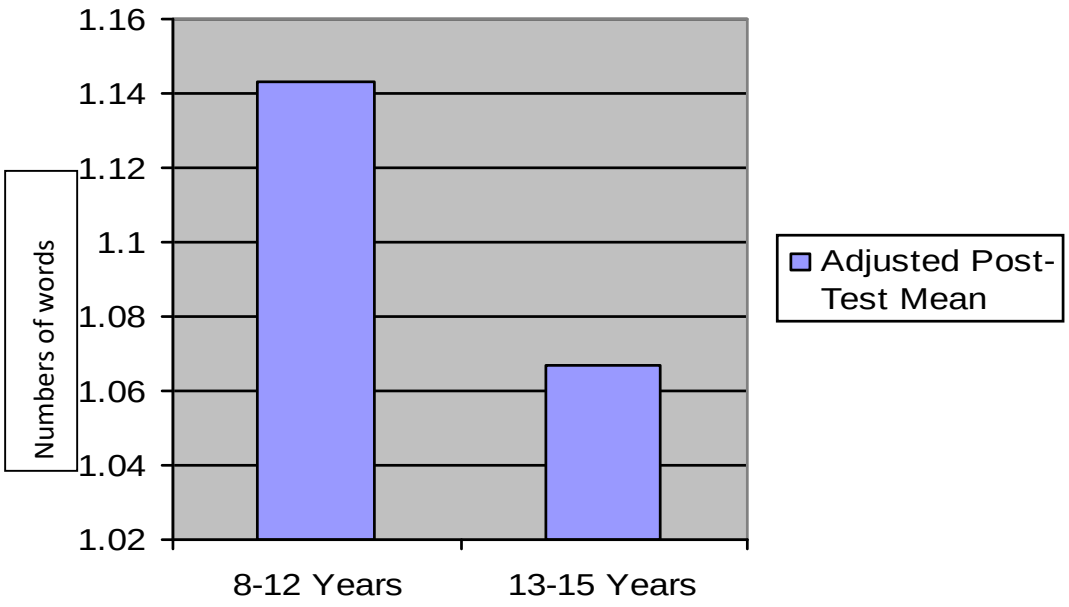

TABLE -IX
COMPUTATION OF ANALYSIS OF COVARIANCE OF REACTION TIME OF 8-12 YEARS AGE GROUP AND 13 TO 15 YEARS AGE GROUP

Age group	8 to 12 years	13 to 15 years	Sources of variance	Sum of squares	df	Mean squares	F Ratio
Pre test mean	0.3416	0.3224	Between Groups	0.001	1	0.001	0.072
			Within Groups	0.29	14	0.021	
Post test mean	0.3404	0.3203	Between Groups	0.002	1	0.002	0.077
			Within Groups	0.295	14	0.021	
Adjusted Post mean	.331(a)	.330(a)	Between Groups	1.99E-06	1	1.99E-06	0.182
			Within Groups	0	13	1.09E-05	

Required table value at 0.05 level of significant with df 1 and 14 is 4.60 and df 1 and 13 is 4.36. From the table IX the obtained “F” ratio of pretest mean 0.072 is less than the table value 4.60 at 0.05 level of significance. The result of the study indicates that there is significant difference between 8 to 12 years age group and13 to 15 years age group. The obtained “F” ratio of post test mean 0.077 is less than the table value 4.60 at 0.05 level of significance. The result of the study indicates that there is significant difference between 8 to 12 years age group and13 to 15 years age group. The obtained “F” ratio 0.182 for adjusted post mean is less than the table value hence there is no significant difference between 8 to 12 years age group and13 to 15 years age group

FIGURE - 7

ADJUSTED MEAN VALUE OF REACTION TIME OF 8-12 YEARS AGE GROUPAND 13 TO 15 YEARS AGE GROUP

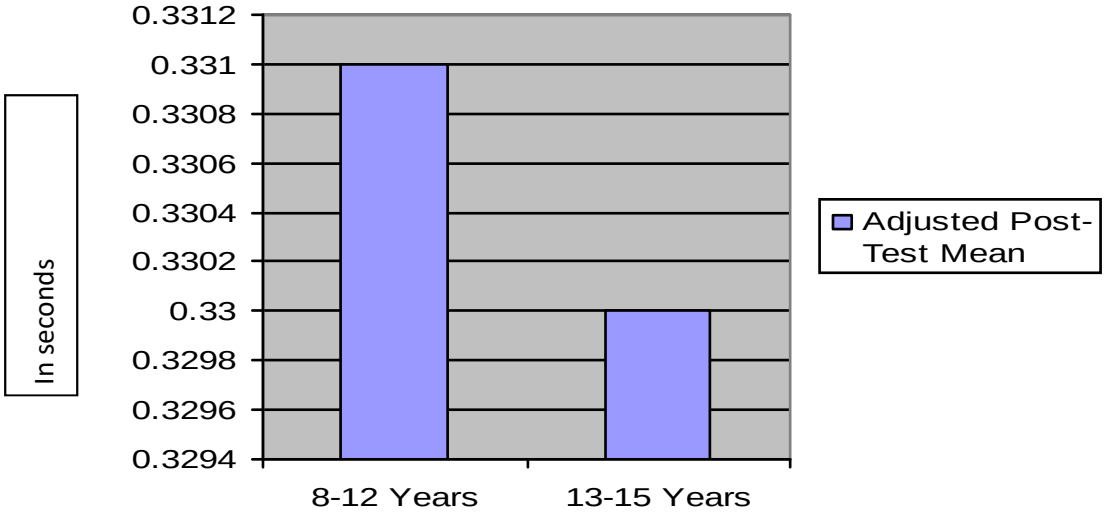

TABLE-X
COMPUTATION OF ANALYSIS OF COVARIANCE OF FINGER EYECO – ORDINATION OF 8-12 YEARS AGE GROUP AND 13 TO 15 YEARS AGE GROUP

Age group	8 to 12 years	13 to 15 years	Sources of variance	Sum of squares	df	Mean squares	F Ratio
Pre test mean	8.3625	7.1813	Between Groups	5.581	1	5.581	0.687
			Within Groups	113.749	14	8.125	
Post test mean	8.3638	7.1713	Between Groups	5.688	1	5.688	0.69
			Within Groups	115.422	14	8.244	
Adjusted Post mean	7.769(a)	7.766(a)	Between Groups	2.58E-05	1	2.58E-05	0.169
			Within Groups	0.002	13	0	

Required table value at 0.05 level of significant with df 1 and 14 is 4.60 and df 1 and 13 is 4.36. From the table X the obtained “F” ratio of pretest mean 0.687 is less than the table value 4.60 at 0.05 level of significance. The result of the study indicates that there is significant difference between 8 to 12 years age

group and13 to 15 years age group.

The obtained "F" ratio of post test mean 0.69 is less than the table value 4.60 at 0.05 level of significance. The result of the study indicates that there is no significant difference between 8 to 12 years age group and13 to 15 years age group. The obtained "F" ratio 0.169 for adjusted post mean is less than the table value hence there is no significant difference between 8 to 12 years age group and13 to 15 years age group

FIGURE -8

ADJUSTED MEAN VALUE OF FINGER EYE CO – ORDINATION OF 8-12 YEARS AGE GROUP AND 13 TO 15 YEARS AGE GROUP

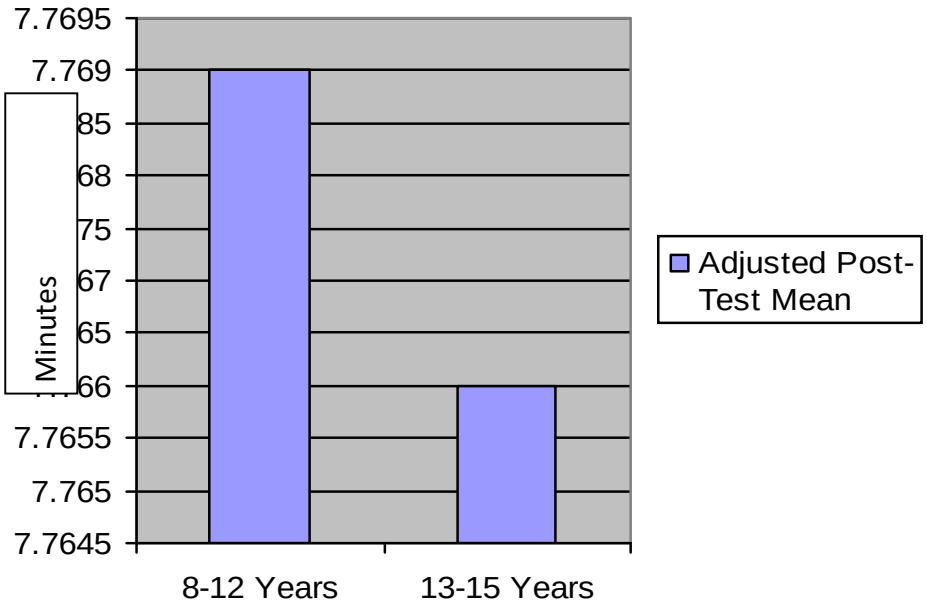

TABLE- XI
COMPUTATION OF ANALYSIS OF COVARIANCE OF HAND EYE CO – ORDINATION OF 8-12 YEARS AGE GROUP AND 13 TO 15 YEARS AGE GROUP

Age group	8 to 12 years	13 to 15 years	Sources of variance	Sum of squares	df	Mean squares	F Ratio
Pre test mean	16.5025	15.4963	Between Groups	4.05	1	4.05	0.089
			Within Groups	640.341	14	45.739	
Post test mean	16.4963	15.49	Between Groups	4.05	1	4.05	0.088
			Within Groups	642.197	14	45.871	
Adjusted Post mean	15.992(a)	15.994(a)	Between Groups	8.37E-06	1	8.37E-06	0.014
			Within Groups	0.008	13	0.001	

Required table value at 0.05 level of significant with df 1 and 14 is 4.60 and df 1 and 13 is 4.36. From the table XI the obtained “F” ratio of pretest mean 0.089 is less than the table value 4.60 at 0.05 level of significance. The result of the study indicates that there is significant difference between from 8 to 12 years age group and13 to 15 years age group. The obtained “F” ratio of post test mean 0.088 is less than the table value 4.60 at 0.05 level of significance. The result of the study indicates that there is significant difference between 8 to 12 years age group and13 to 15 years age group. The obtained “F” ratio 0.014 for adjusted post mean is less than the table value hence there is no significant difference between 8 to 12 years age group and13 to 15 years age group

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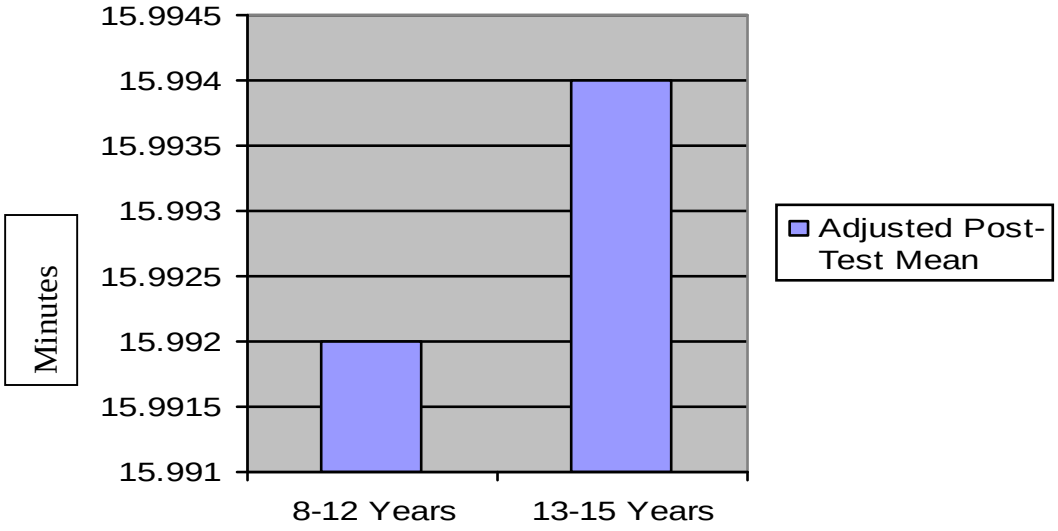
FIGURE - 9

ADJUSTED MEAN VALUE OF HAND EYE CO –ORDINATION OF 8-12 YEARS AGE GROUP AND 13 TO 15 YEARS AGE GROUP



DISCUSSION ON FINDINGS

The results showed that there was significant improvement in the 8-12 years age group due to the music therapy programme on verbal ability number of words, speed of words and pronounciation in numerical ability speed in numbers and addition. There was no significant improvement in verbal ability-associated test, reaction time, hand eye co-ordination and finger eye co-ordination. The result showed that there was significant improvement in the 13-15 years age group due to the music therapy programme in verbal ability number of words, pronounciation and in numerical ability, speed in numbers and addition. There was no significant improvement in verbal ability speed of words, associated test, reaction time, hand eye co-ordination and finger eye co-ordination. The result showed that 8-12 years of age group significant improvement than the 13-15 years of age group in pronounciation. There was no significant difference in verbal ability- number of words and speed of words, numerical ability-speed in numbers and addition, associated test. Reaction time, hand eye co-ordination and finger eye co-ordination between the 8-12 years and 13-15 years age group.It was concluded that music therapy programme significantly improved learning variables: verbal ability – number of words, speed of words, pronounciation and numerical ability – speed in numbers and addition among 8-

12 years age group. The music therapy programme significantly improved the learning variables: verbal ability – number of words, pronounciation, numerical ability – speed in numbers and addition among the 13-15 years age group. The 8-12 years age group had better improvement than the 13-15 years age group in verbal ability pronounciation.The 8-12 years age group had a trend in its favour than 13-15 years age group in, speed of words, pronounciation and hand eye co-ordination. It was concluded that 13-15 years age group had a trend in its favour than 8-12 years age group in number of words, speed in numbers, addition, association reaction time and finger eye co-ordination. This study proved that there was significant improvement in learning variable among the intellectually challenged children. Hence it was recommended that physical educationists and special education teachers to include music therapy to improve learning levels of intellectually challenged children.

CONCLUSION

It is concluded that there was significant improvement in learning variable among the intellectually challenged children

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