

# The Effects of Music Therapy on a Group of Institutionalised Mentally Retarded Boys

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## SUMMARY

A sample group of 9 profoundly or severely mentally retarded boys was chosen. Their intelligence quotients were estimated at an average of 26, their mean chronological age at the beginning of the experiment was 11 years 10 months, and mean estimated mental age 2 years 4 months. The mean time they had spent in the institution was 4 years 10 months. The behaviour of the boys was such that they could be present in a group of 4 or 5 without disrupting the group.

Music therapy in listening to music, participation by unpacking, playing and packing musical instruments away, and by walking to music, was given to small groups for half-an-hour per group, or to individuals for 7 to 10 minutes bi-weekly for 11½ weeks.

Tests were conducted before and after the treatment, at an interval of exactly 3 calendar months apart. Significant improvements in social quotients, where social age was measured on the Vineland Social Maturity Scale, and in fine motor control, were observed.

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As the function of an institution for mentally retarded patients is no longer considered to be purely custodial, therapies are being introduced.

A therapy may be defined as a treatment which ameliorates the condition of, contributes to the healing of, or cures a patient. In other words, it cures, alleviates or remedies a physiologically or psychologically abnormal condition directly or paramedically. A music therapist can make a specific paramedical contribution in a therapeutic team, since music provides a means of communication between people who cannot speak. It has been called a non-verbal language.

The psychiatric purposes of music therapy are: (i) the establishment or re-establishment of interpersonal relationships; (ii) the bringing about of self-esteem through self-actualisation; (iii) the utilisation of the unique potential of rhythm to energise and bring order.<sup>1</sup>

In enabling the patients (who were, with one exception, mute or unintelligible) to participate actively in making musical sounds, the therapist can bring to the treatment a

human relationship of a personal and even intimate character.<sup>2</sup> In order to self-actualise the patients, both individual therapy and group therapy methods were used. A large element in the success of music therapy is the Hawthorne effect, i.e. the very fact that the patient knows that a personal interest is being taken in him raises his self-esteem and improves his performance in carrying out instructions. The music therapist uses his own knowledge of musical instrumental techniques to ensure that each patient is given an individual instrument which is simple enough for him to be able to play, and which he enjoys playing. Group therapy in which each patient actively contributes a sound to the whole effect is very encouraging to him because he does not feel embarrassingly conspicuous and yet he is not anonymous.

Rhythm was used to bring order to movement in clapping hands or walking to the music of the Toy Symphony by Haydn, which had been recorded on tape by a pianist patient at the institution. This strict tempo music which had no emotional content was used more with the purpose of bringing order about rather than energising the sometimes excessively energetic patients. The regular rhythm provided a feeling of security.

## Two Complementary Dimensions of Mental Retardation

A wide definition is: mental retardation refers to sub-average general intellectual functioning, which originates during the developmental period and is associated with impairment in adaptive behaviour.<sup>3</sup> This concept has two dimensions: measured intelligence and adaptive behaviour. The adaptive behaviour approach stresses quite clearly the fact that the mentally retarded person would benefit from therapy.<sup>4</sup> This has sometimes been debated in the past.

Music therapy may improve adaptive behaviour so that the patient becomes more socially acceptable. He may also become more trainable through a change in attitude towards better co-operation with those who are trying to help him, and may learn to work in a group situation, e.g. industrial therapy, occupational therapy or sheltered employment. Intellectual, affective, motivational, social, sensory, and motor factors all contribute to, and are part of, total adaptation to the environment.<sup>5</sup>

The music therapist will be concerned not only with how the child responds to the music activity, but with how he relates and adapts to the therapist and to others in the group. The therapist's attention will centre on the changes that occur in the retardate's behaviour as he func-

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tions in the musical activity, and on the individual involved rather than on the musical outcome.<sup>6</sup>

### Specific Aims of the Experiment

1. To measure by a suitable test whether the social age and social quotient of the group was increased significantly by music therapy given for a period of 3 months.
2. To calculate statistically whether there was a significant improvement (in the group) in fine motor control by active use of musical instruments by the patients.
3. To observe by categorised naturalistic observations whether the attentiveness of the patients improved during music therapy.

## PATIENTS AND METHODS

### Group of Patients

A group of 9 male patients was chosen, whose intelligence quotients would classify them as severely or profoundly mentally retarded. Two patients had intelligence quotients of 36 in one determination for each. This would have brought them to the lower limit of moderately retarded, but the average of several determinations brought even these to below 36. See Table I for data on patients' files at the beginning of the experiment.

It was decided to test this type of low grade patient since it was debatable whether these patients could benefit from therapy. That they could have, had been shown in a non-statistical way by Juliette Alvin (music therapist) at an institution in Britain.<sup>7</sup>

Another limitation was an age range of not more than 10 years — in this experiment the chronological ages in the group ranged from 6 years 9 months to 15 years 9 months at the beginning of the experiment. The patients in the group were all of one sex, thus eliminating sex differences.

The medication for each patient, if any, was kept the same in quality if not in quantity during the 3-month period of the experiment by co-operation with the prescribing psychiatrist, who would not, however, have hesitated in changing the prescription if it became urgently necessary. Further information concerning the patients is not given as it is not relevant in the present context.

Another factor limiting the choice of patients was that none should have had systematic music or music with movement before the experiment began.

### Methods of Testing and Observation

**Social maturity test:** The social age of each patient was tested on the Vineland Social Maturity Scale by asking a nurse or nursing sister, who knew the patients from daily observation in the wards, to answer the questions, since most of the patients were aphasic. The same members of the nursing staff were asked the same set of questions at the end of the experiment. The items covered communication, socialisation, locomotion, occupation, general self-help, and self-help in eating or dressing expected at certain chronological ages. From his score his social age could be rated, and the mean increase in social age for the group calculated and compared with the mean increase in chronological age, which was, in this case, 3 months.

TABLE I. DATA OF PATIENTS AS STATED IN FILES AT THE BEGINNING OF THE EXPERIMENT

Patient	Age at 16.5.1973	Period in institution before 16.5.1973	Mental age	IQ or SQ	Date assessed
1	12 yrs 2 mo.	2 yrs 7 mo.	(2 yrs 2 mo.)	est. 20	before 17.10.1972
2	10 yrs 1 mo.	1 yr 8 mo.	2 yrs 8 mo. 3 yrs	32 36	27.9.1971
3	12 yrs 3 mo.	6 yrs 3 mo.	(2 yrs 5 mo.)	est. 20	Feb. 1972
4	15 yrs 3 mo.	7 yrs 10 mo.	(3 yrs)	est. 20 - 35	before 9.7.1970
5	15 yrs 9 mo.	7 yrs 10 mo.	(2 yrs 9 mo.)	est. 20 - 35	April 1966 April 1967 April 1969
6	13 yrs 5 mo.	5 yrs 6 mo.	2 yrs 4 mo.	OSIS 22	2.3.1970
7	6 yrs 9 mo.	2 yrs 1 mo.	2 yrs	Merrill Palmer 27 OSIS 32 36	3.6.1970 April 1971 April 1972
8	12 yrs 1 mo.	8 yrs 9 mo.	2 yrs	22	14.4.1970
9	8 yrs 8 mo.	8 mo.	2 yrs 2 yrs 2 yrs	33 25	before Aug. 1972 4.10.1972
				Merrill Palmer 24	4.10.1972
Mean	11 yrs 10 mo.	4 yrs 10 mo.	2 yrs 4 mo.	26	

Patients 2 and 9 have more than one mental age because these mental ages were obtained on different tests. The Merrill Palmer is a performance test and the OSIS (old South African Individual Scale) is a predominantly verbal test.  
est. = clinically estimated IQ.

The social quotient of each patient was calculated at the beginning and at the end of the three months' music therapy.

$$\text{Social quotient} = \frac{\text{social age}}{\text{chronological age}} \times 100$$

The changes in social age and social quotient were analysed by the Wilcoxon Matched Pairs Signed Ranks Test.

**Test for motor control — the apple box test:** A very simple test had to be devised since profoundly or severely retarded patients, having had no schooling or sense training, could not understand instructions which involved colours or sorting according to size, and yet the test had to be designed to measure motor control to give results which could be analysed statistically.

A rectangular plastic tray 30 × 50 cm, with hollows suitable for packing apples, was inked so that the upper parts were dark and the hollows remained white. There were 36 hollows 5.5 cm in diameter. An equal number of white cardboard discs 5.7 cm in diameter were stacked next to the apple box tray. The instructor took 3 discs one by one and placed them over 3 hollows at one end of the tray. As she was placing the discs in position the instructor said, 'Look, I am putting it in the hole — you must do the same.'

A stop-watch was then started by one of the observers and the patient put discs over hollows for 3 minutes. To avoid too much extra sympathetic help given to any one patient, only two encouraging remarks were allowed to the instructor during the 3-minute period. The other observer watched complications that arose even in this simple test, such as some patients trying to put the discs in *exactly* the right place and being slower but more accurate. However, the patient probably behaved the same in the final test.

For statistical purposes the number of discs reasonably over hollows was counted — less the 3 instructional ones. The test was repeated 3 months later. Chi square was calculated for the group.

**Naturalistic observations of behaviour:** In 7 preliminary sessions of music therapy observations of behaviour were made in order to draw up a list of categories into which naturalistic observations could be grouped. The frequency with which behaviour of each type occurred was recorded at each subsequent session, and graphs of positive constructive or co-operative behaviour and negative destructive or unco-operative behaviour were drawn. These cannot be considered as accurate mathematical representations, because there were too many variables, but merely as ratings. The graphs cover a period of approximately 7 weeks of 2 sessions per week. Sessions in which there were too many 'not applicable' categories were omitted from the graphs.

## Therapeutic Procedure

The music was designed for three applications:

1. Listening to live music played by the music therapist.
2. Participation of patients by unpacking, playing and repacking instruments taken out of boxes, covers or cases.

3. Movement by patients to tape-recorded piano music. Group sessions lasted 30 minutes per group of not more than 5 patients. Individual sessions lasted 7 - 10 minutes.

## Musical Instruments and Type of Music Used by Therapist

The violin was used because it was suitable for melody and for traditional rhythm. Words could be sung while playing the violin. The children could also touch the instrument and feel the vibrations which made them intimately connected to the music therapist. The music therapist was a qualified teacher of violin and played with a beautiful tone. The violin has been used in important music therapy projects overseas,<sup>8</sup> as well as the violincello<sup>7-9</sup> and the viola.<sup>10</sup> Another advantage is that a violin is portable and one is not dependent on the sometimes appalling pianos in institutions. The violin can also be imitated by children on ukeleles, psalters, Susuki small size violins or even contraptions with a single string but played with a bow.<sup>11</sup> Melodies played were chosen on Carl Orff principles.<sup>12</sup>

The lyre<sup>13</sup> was played for special music in the Dorian mode, which, according to the ancient Greeks (and modern Camphill Schools), is related to modesty and purity,<sup>14</sup> which are tranquil virtues. The lyre has a soft tone and has to be listened to attentively to be heard. The patients were calm while listening to it.

## Musical Instruments Suited to Patients

Instruments chosen for participation in music-making by the patients after short demonstrations by the therapist are listed in Table II.

TABLE II. INSTRUMENTS FOR MUSIC-MAKING

Instrument	Motor control exercise
Recorder	Put two parts together and blow at the correct end.
Toy trumpet	Put to mouth and blow at the correct end.
Drum	Beat with hands.
Mouth organ	Put to mouth and blow or suck.
Xylophone	Put wooden notes in position (small hole over small peg) — strike with beater
Stylophone	Switch on and off, play holding stylus, pack in double cardboard wrapping, insert in box.
Pianica	Put tube together and correct end in socket. Blow and play at the same time. Dismantle.
Ukelele	Pull zip, take out of shaped cover, strum, replace in cover.
Psalter	Extract from cover, play with bow, replace.
Violin	Play with therapist's assistance, replace in case.
Chime bar	Take out of box, strike with beater, replace in small rectangular box.

## RESULTS

The patients' social ages in months on the Vineland Social Maturity Scale at the beginning (S<sub>i</sub>) and the end

(S<sub>2</sub>) of the period of 3 months during which music therapy was applied, are shown in Table III.

TABLE III. CHANGE IN SOCIAL AGE AFTER THREE MONTHS' THERAPY

Patient	S <sub>1</sub> (mo.)	S <sub>2</sub> (mo.)	S <sub>2</sub> - S <sub>1</sub> (mo.)
1	20	20	0
2	29	33	4
3	20	30	10
4	36	48	12
5	16	19	3
6	48	48	0
7	12	16	4
8	42	42	0
9	18	29	11
Mean	27	32	5

The mean change is an increase of 5 months in social age, whereas chronological age only increased by 3 months.

The changes in social quotients calculated at the beginning (SQ<sub>1</sub>) and the end (SQ<sub>2</sub>) of 3 months' music therapy are shown in Table IV. The significance of the changes for the group as a whole has been calculated by the Wilcoxon Matched Pairs Signed Ranks Test. There was a significant improvement in social quotient.

TABLE IV. CHANGES IN SOCIAL QUOTIENTS AFTER THREE MONTHS' MUSIC THERAPY

Patient	SQ <sub>1</sub>	SQ <sub>2</sub>	SQ <sub>2</sub> - SQ <sub>1</sub>	Ranks	
				+ve	-ve
1	13,7	13,4	-0,3		1
2	23,9	26,6	+2,7	4	
3	13,6	20,0	+6,4	8	
4	19,7	25,8	+6,1	6,5	
5	8,5	14,6	+6,1	6,5	
6	29,8	29,3	-0,5		2
7	14,8	19,1	+4,3	5	
8	29,0	28,4	-0,6		3
9	17,3	27,1	+9,8	9	
				Σ = 39	Σ = 6

T = 6 0,01 < P < 0,05.

To test whether fine motor control had improved significantly the chi-square test was applied to the numbers of discs sorted into the apple box tray before (f<sub>1</sub>) and after (f<sub>2</sub>) 3 months' music therapy. The results are shown in Table V. Patient 8 was omitted since he was confined to bed with chickenpox when the final test was conducted. There was a very significant improvement in fine motor control.

**Graphical Representation of Behaviour**

Frequencies of behaviour were recorded in categories. The graphs should be interpreted as ratings, and not as

TABLE V. APPLE BOX TEST FOR FINE MOTOR CONTROL

Patient	f <sub>1</sub>	f <sub>2</sub>
1	0	1
2	7	5
3	3	4
4	17	27
5	13	20
6	21	27
7	0	1
9	0	7
	61	92

Chi-square = 5,882 0,01 < P < 0,025.

exact mathematical statements. In all the figures, the sums of frequencies during individual sessions were represented as lines parallel to the frequency axis, and frequencies during group sessions, by joined x's.

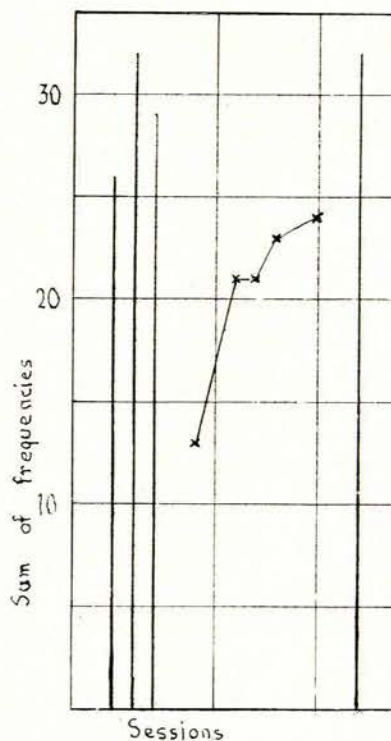


Fig. 1. Frequency of positive behaviour during music therapy: individual sessions, x: group sessions.

Fig. 1 represents the total number of occurrences of behaviour in the following positive categories during each session:

- Positive or constructive behaviour requiring attention of patients:** (a) 'Speaking' to music therapist, to observers, or to other patients (communication); (b) co-operation with music therapist and helpful behaviour; (c) attending to the music heard; (d) playing on an instrument so as to

produce sound; and (e) enjoying or absorbed in playing an instrument. Category (f), unpacking or packing instruments, was omitted as it was not applicable in some sessions and it had been learnt during the preliminary sessions.

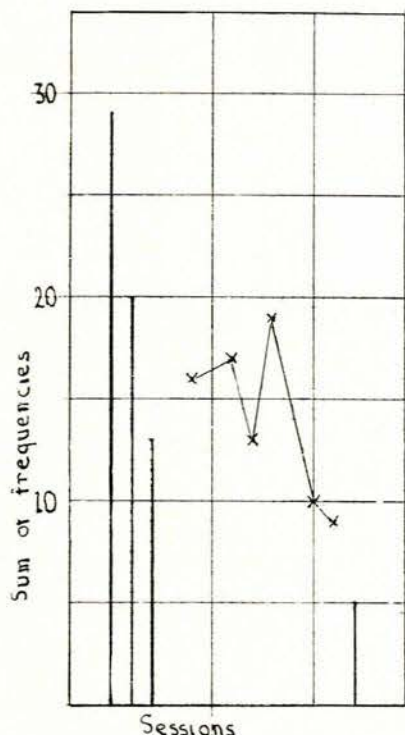


Fig. 2. Frequency of negative behaviour during music therapy.

Fig. 2 represents the total number of occurrences of behaviour in the following negative categories during each session: negative or destructive behaviour, distractibility and inattention of patients, which included (g) laughing or

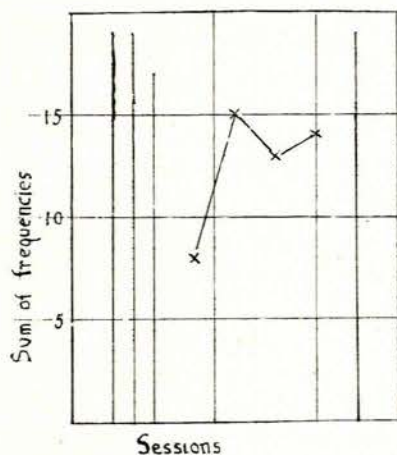


Fig. 3. Frequency of behaviour showing attention to music.

smiling at others, hugging or kissing one another; (h) anti-social behaviour, (i) getting up out of the chair while music was playing; (j) examining the instrument instead of playing it; (k) grabbing or breaking the instrument; and (l) licking or sucking instruments.

Fig. 3 represents the sum of the frequencies in categories (c) (d) (e), which were: attention to the music, listening or participation.

## CONCLUSIONS

The mean increase in social age was 5 months when music therapy was applied, as compared with the increase of 3 months in chronological age.

The increase in social quotient of the group was statistically significant, as was the improvement in fine motor control of the group as a whole.

The positive behaviour of the group improved in individual and in group sessions.

The negative behaviour or distractibility of the group decreased as the experiment continued.

Attention to music was high and remained constant in individual sessions. It was lower in group sessions, but increased nevertheless.

The adaptive behaviour of profoundly and severely mentally retarded boys was improved significantly by music therapy.

## DISCUSSION

Music therapy helped to socialise the patients, since they joined hands at later sessions of the experiment to form a walking chain to the sound of strict tempo recorded music.

That bilateral motor co-ordination and imitation of posture improved significantly in 4 months' participating music therapy with children with psychoneurological dysfunction had been shown in South Africa in 1972.<sup>15</sup>

In the experiment described here music-making was the motivation for unpacking, playing and packing the instrument away for future enjoyment. The test for fine motor control was quite different from the method used for improving that control.

The interpersonal relationships between the music therapist and the patients continued to be friendly long after the formal end of the experiment, and no aggressive acts between patients in the group were noted afterwards.

Another function of music therapy is that the patient becomes communicative, and much helpful information can be supplied to psychiatrists or psychologists to enable them to reassess the patient. For example, patient 8's intelligence quotient was found to have risen from 22 to 41. His calipers were removed as his movement had improved, and he entered the institution's school.

Patient 9 was found to be deaf, but contact with a vibrating instrument gave him much pleasure through tactile sensation or through increased loudness because of proximity to the source of sound.

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