

Learning unit No. 1 : Awareness of sound in the environment

Schematic description of the first stage

ACTIVITY	MUSIC AIM	THERAPEUTIC AIM
(1) Listen to the sounds - inside the room - outside the classroom (a) with eyes opened (b) with eyes closed The sounds are then described, represented graphically on the blackboard, and used for vocal and rhythmic improvisation	Learning about qualities of sound. Elements of music: timbre, intensity. Graphic representation of sound. Ways of reproducing sounds.	Auditory discrimination. Concept formation. Graphic and vocal representation of an auditory experience.
(2) a) Check the sounds of the different objects in the room (the children move around). b) Choose one object, produce a rhythm on it, and remain next to it in silence. When the group is silent we proceed to listen to each child separately.	Timbre qualities. Intensities. Rhythmic patterns.	Exploration and discovery (motor-tactile, visual, auditory experience). Comparing, choosing. Awareness of the group.
(3) The sounds are then compared and classified. A group improvisation based on "ostinato" is made with the sounds.	"Ostinato": a pattern that is repeated without interruption (stubbornly).	Non-verbal communication, Creating together.

5.6.1.2. Analysis of the process of the first stage (see schematic description above)

The first step in the process was a multi-sensory experience: the child walked around (motor), touched the different objects (tactile), played on them to produce different types of sounds (motor coordination), observed the source of sound (visual) and listened to the result (auditory).

The second step was to "label" the sounds (verbalization) in order to consolidate the formation of concepts acquired through active auditory discrimination.

The third step was again non-verbal: the sounds "discovered" were used for creative purposes: group improvisation based on "ostinato", using the group's imagination.

Second stage

The children were encouraged to repeat the exploration of sounds at home and bring "an interesting sound" to the class. A "guessing game" was then played: The different objects brought were placed on the floor and the group sat around with closed eyes. One child was called on to produce a rhythm on one of the available objects. He then chose another child from the group to come and reproduce the same rhythm on the same object that he had used.

Third stage:

Once the children could differentiate easily with closed eyes the timbre of the different materials (plastic, wood, cardboard, metal, etc.), they were asked to prepare at home a percussion instrument using whatever material they could find outside, in the yard, the garage or elsewhere in their neighbourhood.

Parents were involved in this venture whenever possible. There was no strict limit of time to bring the instruments. Each child brought his own when it was ready. They had to wrap it in such a way that nobody could guess what it was.

A new "guessing game" was then played: the child was called on to play on his instrument behind a screen, so that the group could listen to the instrument without seeing it. The group had to "guess" from what material/s the instrument was made. Each child was given his turn when he brought his instrument.

Fourth stage:

After every child had introduced his instrument, we discussed together their sound qualities, created different types of rhythmic improvisations with them, and used them as "sound effects" for rhymes or story-telling. They were incorporated into the rest of the instrumentarium for our music-making sessions. At the end of the course, the children took their instruments home.

Analysis of process of Learning unit No. 1

With this fourth stage the process was completed: The child evolved from becoming aware of sounds around him to the creation of a percussion instrument. He was motivated during the whole process by a sense of discovery and was given the instructions that enabled him to solve problems by himself: he was given a framework within which he was free to create.

Auditory discrimination was dealt with in this process involving the child's whole personality. He was the active searcher and the one that produced and analyzed the sounds.

The social interaction involved in this process taught the child "to give and take", to learn from the others and to communicate his own ideas to the group. Basically, we dealt with the ability to listen to others and be heard in return.

5.6.2. Learning Unit No. 2 : Pitch discrimination

From high-low pitch discrimination using the sliding flute to the graphic representation of sound.

5.6.2.1. Main objectives

- (a) auditory discrimination of sounds;
- (b) Integration of auditory-visual and motor responses in the graphic representation of sound patterns;
- (c) graphic representation of sound patterns as a preparation for cognitive tasks (reading, writing);
- (d) understanding graphic symbols connected to an auditory experience.

5.6.2.2. The Procedure

(1) Large pitch differences

Activity: The therapist played a long "glissando" on the sliding flute. The children followed the ascending and descending sounds with the right hand.

"Elevator game": the children stood and followed the sliding sounds with their bodies, imitating the elevator going from floor to floor, in all the possible combinations of high or low, repeated sounds and different "tempi" (slow-quick, etc.)

Analysis of process: The elevator game is an activity for auditory discrimination through multi-sensory stimulation: while listening to the sliding sounds, the child was looking at the flute: following the ascending movement of the hand of the therapist while she played. In addition, he experienced the kinaesthetic sensation of going up on his toes (very high) and down to "the ground floor", even throwing himself to the floor (very low pitch).

Space awareness was involved as well. The audio-visual-motor stimulation was experienced simultaneously, while the child followed the non-verbal instructions of changing sound patterns. Immediate response and precision were encouraged. When the flute reached its highest pitch and the children stretched their bodies "to touch the ceiling", they were asked: "Where are we?" "Very HIGH." When they fell to the ground led by the suddenly descending sound, we said we were "Very LOW." Concept formation was thus included as a result of the multi-sensory experience. The following step was to consolidate the learning experience by focusing on specific areas.

2) Focusing on auditory-motor responses

Activity: The children were asked to follow the sliding sound with their right hands (sitting position), this time with closed eyes. Starting with large pitch differences, the therapist also played repeated sounds and "undulating" ones to test the children's discrimination.

Analysis of process: The children sat while performing this activity in order to reassure them while their eyes were closed. For some of them it was difficult to keep balance with closed eyes while standing, and failure had to be avoided.

The therapist could observe the auditory-motor response of each child and learn to what degree the learning process was consolidated.

The right hand request (left for the left-handed in the group) was a preparation for the next step: the graphic representation of the auditory stimulus.

3) Graphic representation of the auditory stimulus

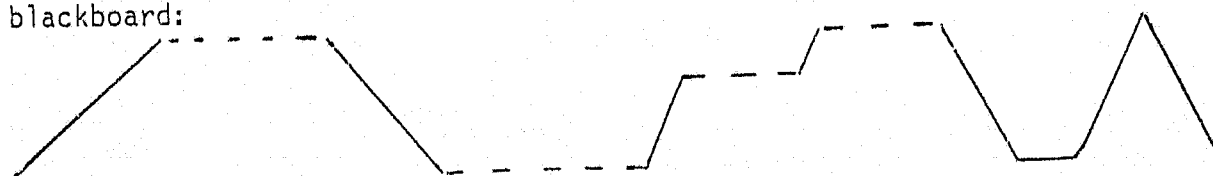
Activity: While sitting, the children were requested to draw an imaginary sheet of paper in front of them (a big square), start at the bottom corner and "draw" the ascending-descending sound of the sliding flute while they listened. When the sheet was "finished" (they arrived at the end of the imaginary sheet), they were asked to start again from the bottom corner.

Analysis of process: Fine motor coordination was encouraged (imaginary drawing with the 2nd finger) and space awareness experienced while producing an auditory-motor response. Eye-hand coordination was developed in a non-compromising activity: the child was drawing in an imaginary way. He could exercise his ability and teach himself the suitable movements, without really drawing. Only when all the children could organize themselves sufficiently to perform this activity with precision, were they exposed to the next step: drawing: drawing the sliding sounds on the blackboard.

4) Eye-hand coordination with auditory stimulus

Activity: The teacher drew the ascending and descending sounds on the

blackboard:



The children were requested to follow the sound pattern represented by reproducing it vocally while the teacher pointed at it. At the same time they followed from their places by pointing with the 2nd finger, as if they were drawing it again.

Each child was then called up to draw on the blackboard to the sound of the sliding flute while the rest of the group followed by doing the movements in space and later on a sheet of paper, using crayons.

Analysis of process: The child learned to represent graphically an auditory stimulus (preparation for writing) and to translate this representation into sound again (preparation for reading). Immediate response and precision were involved, as part of the game. It was not the precision required to reproduce a word, still the process was similar, offering the child the chance to practise it while playing and enjoying.

In order to achieve greater precision and to work on right-left discrimination, the next activity was proposed:

5) Right-left discrimination

Activity: Our elevator now has a flashing light: when the sliding flute stops, the finger cymbal plays a long sound. Two children were invited to play the instruments while the group was divided: one half of the group followed the elevator (flute) and the other half opened and closed both hands, following the finger cymbals. By changing tasks, the whole group performed the different tasks.

A further step was to ask the children to follow both instruments with their hands: right hand for the flute and left hand for the "flashing light".

Analysis of process: Auditory-visual-motor integration was achieved while producing an immediate response using right-left hand discrimination. In order to consolidate the acquisition of these abilities, music was added as an integrative element.

5.6.2.3. Integrative activity

Listening to music through movement and graphic representation

Main objective: To achieve flexibility in the graphic representation of music by exposing the child to an aesthetic experience that appeals to his creativity and self-expression in a group situation.

Activity: Relating to the music listened to.

Presentation of the piece: The therapist played the cou-cou call on her special instrument. The children recognized the call and sang the interval, using their right hands to show the difference between the high and low sounds in the cou-cou interval.

The "Cou-cou in the Wood" from "The Carnival of the Animals" by Saint-Saëns was then played. The children were asked to raise their right hands when they heard the cou-cou.

Later they were asked to hide both hands behind their backs and "flash" them quickly when they heard the cou-cou, hiding them back immediately after.

A short conversation was then developed, asking the children in what kind of wood the cou-cou was and what was happening there. Children expressed their own free associations to the music. We listened to the piece again, this time moving to it, representing the "story" they suggested. One group for instance thought that the long musical sentences represented a wolf crawling in the wood looking for something to eat. Each time he heard the cou-cou, he jumped to catch it. Several combinations for moving were possible while listening to the music again, e.g. some children played the "wolf", while others moved to the cou-cou, appearing suddenly when they heard it in the music.

Analysis of process: A sense of discovery was encouraged from the first time the music was introduced. The first response requested was a motor one to an auditory stimulus and the expression of feelings through moving while associating the music to an invented story.

The child performed his own part relating himself to the group by non-verbal means and the whole group was controlled and organised by the structure of the music (awareness of self, others and music in an expressive and creative activity).

By this stage, the children had heard the composition several times and were well acquainted with it. The next step could then be attempted.

Activity: Graphic representation of the music.

The children were each given a sheet of paper and a crayon. They were asked to draw an "X" in the corner of the page where they would start their "walk" in the wood. When the music started, they drew the path of the wolf. When they heard the cou-cou they were to raise the crayon and draw a sign to represent the cou-cou. Before starting the drawing, we tried the movement, together in space, to make it clear that the crayon was to be lifted to represent the contrast between the path and the sudden appearance of the cou-cou.

Once the drawing was finished, the children were requested to change the colour of their crayon and to follow again the music with their own "score": each time they found the mark for the cou-cou (V), they were to encircle it with the crayon (Ⓟ). Then we counted how many cou-cou calls we had in the "score". If there were different opinions and the children insisted on knowing the exact number, we listened once more and counted for an accurate checking.

Analysis of process: The graphic representation took place only after the kinaesthetic experience. Gross motor coordination came before fine motor activities.

By dealing with the different aspects of the process separately and gradually, each child had the opportunity to succeed in performing the task. Those who were field oriented were assisted by the kinaesthetic exploration. The visually oriented could see the movement performed, and those with an auditory orientation had the clear stimulation of the music structure.

The principle of "variation" as defined by Kephard had been observed: the children listened several times to the same composition, focusing each time on a different area. The repetition was not a drill but an enriching experience that consolidated the learning process.

5.6.3. Learning Unit No. 3 : Rhythmic training From "echo game" to the "gum boot dance".

5.6.3.1. Main objectives

The aim of this learning unit was to develop gradually the rhythmic ability of the child, dealing with his body awareness, gross and fine motor coordination, right-left discrimination, crossing the middle line, perception of a rhythmic pattern, sequencing, rhythmic improvisation and rhythmic recall.

5.6.3.2. The procedure

1) Body and space awareness

The first activities dealt with the exploration of space, barefoot, listening to the sound produced by the feet on the floor. Each child moved according to his own rhythm. Body percussion was then introduced. By producing different timbres and qualities of sound with different parts of the body, the children experienced and named different concepts concerning qualities of sound (e.g. bright-dull), dynamics (e.g. soft-loud), and parts of the body.

No external rhythm was used for this first exploration.

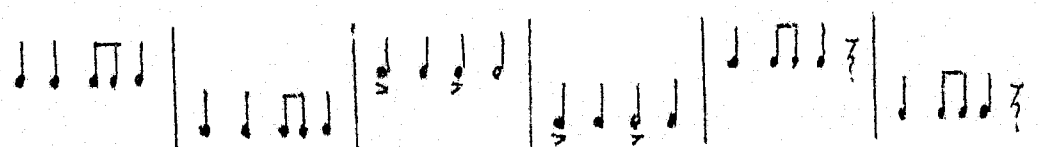
Musical activities were added to provide a united rhythmic structure for the experience: (a) rhythmic clapping to well-known songs, using different parts of the body (clap on your knees, legs, shoulders, etc.); (b) moving to taped music: "When music stops, point at one part of your body, e.g. knees. Then move to the music using only your knees." The activity was repeated, pointing each time at a different part of the body and following the music only with that part, e.g. elbows, both hands, right hand only, hips, etc.

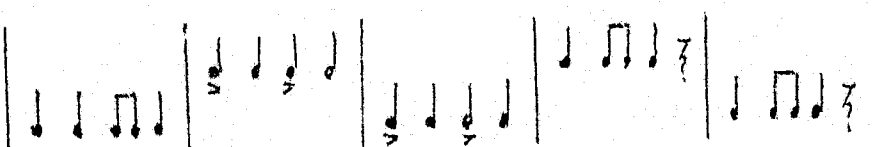
Analysis of process: The main objective of the activity was to make the child aware of his body, to feel its different parts and to move them, produce sounds out of them, exploring their kinaesthetic and musical possibilities. But at the same time there was a verbalization of the "discoveries" leading to concept formation. Moving as a group, the children also developed awareness of the others: not to step in the other's way, listening to the sounds produced by the group to combine them with their own. Auditory discrimination was exercised to classify the sounds produced. The children had to pay attention to verbal instructions in order to carry out the tasks. The group was exposed to the influence of music as an organizing factor.

2) Motor coordination - Perception of a pattern - Rhythmic recall

Activity: Echo-game

The therapist clapped a short pattern, the children repeated after her in unison.

Therapist: 

Children: 

Several rhythmic patterns of the same length were played by the therapist and the children repeated after her, maintaining a regular pulse. The therapist did not repeat her pattern when it was the children's turn. The repetition "by memory" exercised their rhythmic recall. Each child was asked to produce one pattern (and the group repeated). This enabled the child to be the "leader" for some seconds and produce his own pattern (motor coordination). The therapist could learn to what extent the patterns were internalized. The children were encouraged to repeat each pattern exactly (with the same hand and imitating the friend's posture).

Once the group could master the creation and recall of short patterns by clapping, a second part of the body was added: slapping on the upper part of the legs. Later the stamping of the feet and snapping of the fingers were incorporated into the improvised patterns for the echo game.

Analysis of process: Up to this stage, the children acquired the ability to use different parts of the body for producing rhythmic patterns. The following step was to use music to provide an external rhythmic structure

that would facilitate a larger flexibility of movement.

Activity: The group was required to move freely to the music. Each student was again encouraged to use different parts of the body and different directions in space to follow the music.

The therapist says: "Go on moving in your own way, but start looking at the movements of the others as well." Then the technique of "entering the others' kinaesthetic world" was applied: The whole group would move like one of the children, then go back to each one's original movement. The group was given the chance to "try" the ideas of each one of its members.

Analysis of process:

Analysis of process:
Each one has his own kinaesthetic world, his personal "body language". Trying to move following someone else's idea is a form of entering the other's world, and may enable the child to learn a vast repertoire of movements he has never tried before. Having to come back to his own movement may also develop in the child the awareness of self and "others".

Building up of sequencing as a group activity

Once the previous stages have gradually been experienced, we worked on "question-and-answer".

Activity: The therapist clapped a rhythm. One child answered with a different one that "makes sense", e.g.

Therapist:

Child:

Child: Eye contact was involved in this technique: the therapist "looked" towards the child from whom she wanted an answer. Each child was then asked to clap a question and "look" at the child in the group from whom he wanted the answer.

Analysis of process: By this technique the dynamic of the group is activated through eye contact and non-verbal communication. Some children may have difficulties in choosing from whom to get the "answer", others would make signals asking to be "the chosen". The therapist as a facilitator was in a position to learn about the group and its reactions, interfering only when attention was not sustained.

Activity: To the "question-and-answer" the expression of moods was added. Without previous explanations, the therapist clapped her answer very angrily, using mimicry and body language. The child chosen responded. He may have done it angrily as well, or just clapped an indifferent answer, or any personal response he felt. The therapist verbalized this response, explaining to the group that now we should also show a specific mood.

Games of "Same or Opposite mood" were played while using the different parts of the body, insisting on expression using the face, eyes, and body language.

Rhythmic improvisation: Later on the group was requested to split into pairs to work out a "conversation", using all the elements experienced before. The conversation may develop into a real "sketch" by which the children express different moods in their relationship, using non-verbal means of communication (body percussion, mimicry, levels in space, movement).

Children's reaction: The 3 sub-groups reacted differently to this last technique: The youngest group enjoyed preparing the sketch and performing it to the rest of the class. The second group liked acting. A particular girl in that group was specially gifted for acting, and the group followed her. Once the different couples had performed, they wanted to verbalize their impressions, and split again into small groups to work on those ideas non-verbally again.

The older group performed the activity without great interest, therefore it was not developed further at that stage.

Analysis of process: By the time the children could perform these activities freely, we were already very far from the starting point when they were unable to recall a simple pattern. At this stage they could coordinate their movements expressively, improvise rhythmic patterns using different parts of the body and recall longer patterns.

5.6.3.3. Integrative activity

The idea of creating together a "gum boot dance" was then suggested to them. They were asked to prepare at home, in front of the mirror, at least two different patterns they would like and learn them well, so that they could perform them to the class and we could then combine the individual patterns for the "gum boot dance".

The next week they came with their suggestions. Each one could remember his own "creation" and demonstrated it to the rest.

The different rhythmic patterns were repeated by the group as an echo game. Together we chose two different rhythms and "worked" on them until an A-B-A form was created. This provided the opportunity to teach the children how to combine different sequences and the meaning of A-B-A form. A graphic score was drawn on the blackboard. The final "gum boot dance" invented with the children can be seen in Appendix 8, p.100. It was rehearsed and learned by heart by the group standing in two rows, as in the original dance, and performed for the rest of the school and the parents at the end of the term.

Analysis of process: The group was led gradually from a short rhythmic pat-

tern of one bar to the public performance of a rhythmic composition of twelve bars which they learned by heart, including body percussion on three parts of the body in different combinations and right-left hand and feet discrimination. The discipline and team-work required for the rehearsals were a new experience for the children. The therapeutic implications of a public performance were fully attained.

5.6.4. Learning Unit No. 4: Creative use of percussion instruments*

From timbre discrimination to improvisation in small groups.

5.6.4.1. Main objectives

- (a) Auditory discrimination: comparing and differentiating the timbre and pitch of the different instruments, relating their sound to the materials from which they are made.
- (b) Fine and gross motor coordination: Exploring the different ways of producing sounds. Moving according to the different qualities of sound produced.
- (c) Creative and expressive activities: Exploring the possibilities of each instrument to create sound effects and express different moods.
- (d) Social skills: Learning to listen to the others' ideas, suggesting ours, communicating through playing together, planning rhythmic improvisations in small groups.
- (e) Sequencing, rhythmic and melodic recall: Improvising according to different musical forms: A-B-A, rondo, ostinati, batucada (Brazilian form of group percussion playing).

5.6.4.2. The procedure

Activity: Introduction of the instruments

Rhythm sticks: The first instrument introduced to the children were the rhythm sticks.

- (1) A pair of rhythm sticks was given to each child in a "Politeness Game": The sticks were placed in the middle of the room. The children moved around them while the therapist played rhythmically on the guitar. When the music stopped, each child could pick up a pair of sticks, but only if there was no one else trying to pick up the same pair. The music was then resumed and the same game was repeated until everybody had his sticks.
- (2) The group played together following the conductor's (therapist's) movements: forte, piano, crescendo, stop suddenly, etc.
- (3) Each child was given the chance to be the conductor while the group followed.

* A list of the percussion instruments used and their characteristics is detailed on p. 45.

Analysis of process:

- (1) Playing the "Politeness Game", children experienced the awareness of others while complying with the non-verbal commands of the music, indicating to them when to stop and when to move.
- (2) Following the hand movements and the expression of the "conductor", immediate response based on visual-motor coordination was exercised.
- (3) The opportunity to be the leader and conduct the group for a few seconds required precision of movement, eye contact with the group, and auditory alertness to control whether everybody followed correctly.

Activity:

- (1) Using the sticks to "turn into someone else", e.g. as ears to look like a rabbit, as oars to be like a boatman, etc. Each child created his own personification.
- (2) The group was asked to observe and copy their friends' ideas one by one.

Analysis of process:

- (1) The group was free to experience and create different personifications.
- (2) A certain empathy was required to reproduce the mood and the quality of movement of other children, while exercising motor organisation based on visual perception.

5.6.4.3. Integrative activity

- (1) Creating a shape in the middle of the room by laying the sticks on the floor, one child after the other. Only one rule had to be observed: not to move the others' sticks, but to relate to them.
- (2) The shape created by the group was analyzed: was it an open or closed shape? How many triangles could you see?, etc.
- (3) Each child was invited to move around the shape, either walking around, jumping, skipping, etc.
- (4) The group had to observe the movement of the child around the shape and clap, stamp or produce vocal sounds accordingly.

Analysis of process: A high degree of concentration was required to perform this series of activities, which integrated the social, motor, visual, auditory and creative skills developed in previous activities.

General approach used for the introduction of other percussion instruments: Each instrument was introduced separately in order to experience the different ways of playing it, its expressive possibilities and the differences in pitch that may occur between instruments of the same type.

Procedure: Two instruments of the same type were shown to the children, e.g. finger cymbals, and a question-and-answer game was proposed: one

child on each side of the semi-circle was given a pair of finger cymbals. He played a short rhythm on them and the child on the other side of the semi-circle answered back. After this, both children handed their instrument to the child sitting next to them, and the question-and-answer game continued until all the children had played. This same procedure was used to introduce all the instruments.

Children's reaction: Percussion instruments have a strong appeal to children's imagination. Children of the 3 sub-groups were no exception. Once the instruments had been introduced, and different activities proposed by the therapist, the three sub-groups concentrated on different aspects of music-making with the instruments according to their own choice: The younger group created sound effects to nursery rhymes and nonsense rhymes which they already knew or had learned during the project, while the other two groups showed great interest in improvising in small groups.

Music-making in small groups: During several consecutive sessions, the children were split into small groups of two, three or four. They chose the instruments they wanted to play, and went outside the music room in search of a quiet corner in the playground where they could play together. They were given 10 minutes to prepare an improvisation. When they were ready, they came back to the room to play their "invention" to the rest of the group. The children learned how to analyze the form of their improvisations, expressed in musical concepts what they and the others played, and suggested ideas on how to improve their improvisations. As a conclusion, a group improvisation was conducted by the therapist each session, applying the ideas suggested by the children.

From session to session, the form and quality of sound of the small groups' improvisations improved, and the children were eager to start the sessions and unwilling to end them.

They learned to work as a team and be efficient because time was short. If conflicts arose while working on their own in small groups, no extra time was allowed: they had to play whatever they could and the problems were discussed and solved within the whole group.

CHAPTER 6

THE RESULTS

6.1. Comparisons between Experimental and Control groups

The means obtained for the Experimental (E) and Control (C) groups on the five measures of the study before and after intervention, as well as the change scores, are presented in Table 2.

Table 2 Means* of Pre-test, Post-test and Changes following intervention

Means for Experimental group N = 20				Means for Control group N = 20		
Variable	Pre-test	Post-test	Changes	Pre-test	Post-test	Changes
MP	20.2	27.6	7.3	20.2	21.2	1.5
SCPM (IP)	0.9	1.8	0.9	0.5	0.5	0.0
SCPM (BMC)	0.6	1.1	0.5	0.5	0.5	-0.4
SCPM (CML)	0.2	0.6	0.4	0.4	0.5	0.1
SCPM (RLD)	0.2	0.7	0.5	0.2	0.4	0.2
SCPM (SBO)	-0.1	0.3	0.4	-0.1	0.2	0.3
SCPM (SBC)	0.0	0.2	0.2	0.4	0.3	0.0
WAD	5.3	3.3	-2.0	4.1	3.4	-0.6
PRS	63.6	72.8	9.2	67.9	76.6	8.6
DOR	87.4	94.3	6.9	90.0	93.9	3.8

Abbreviations used in Tables:

- MP: Music Perception Test
 SCPM: Southern California Perceptual-Motor Tests:
 (IP) Imitation of Postures
 (BMC) Bilateral Motor Coordination
 (CML) Crossing Mid-Line of Body
 (RLD) Right-Left Discrimination
 (SBO) Standing Balance - Eyes Open
 (SBC) Standing Balance - Eyes Closed
 WAD: Wepman Auditory Discrimination Test
 PRS: Pupil Rating Scale
 DOR: Durell Oral Reading Test

* The respective Sd and Se values for these means are included in App. No. 9, p. 101.

A statistical analysis using the Mann-Whitney U test (Z values) showed that there was no significant difference between the E and C groups in any of the variables tested at the beginning of the project. It could thus be inferred that the two groups were similar, in spite of belonging to two different schools.

Regarding the changes taking place after intervention, it can be observed from Table 2 that the improvement was consistently greater on each of the means for the E group. This is depicted graphically in Figure 1. p. 72*

The Mann-Whitney U test was applied to the change scores in order to determine the significance of the improvement of the E group as compared to the C group. The values, including the mean, Sd and Se for both groups are presented in Table 3.

Table 3 Comparison between Experimental and Control groups on the Mean of the Change scores

Experimental group				Control group				
Variable	Mean	Sd	Se	Mean	Sd	Se	z	p
MP	7.3	2.9	0.6	1.5	2.9	0.6	3.17	0.01
SCPM (IP)	0.9	0.6	0.1	0.0	0.5	0.1	3.80	0.001
SCPM (BMC)	0.5	0.4	0.1	-0.4	0.3	0.0	3.56	0.001
SCPM (CML)	0.4	0.4	0.1	0.1	0.4	0.1	2.46	0.05
SCPM (RLD)	0.5	1.1	0.2	0.2	1.1	0.2	1.23	n.s.
SCPM (SBO)	0.4	0.7	0.1	0.3	0.8	0.1	0.29	n.s.
SCPM (SBC)	0.2	0.6	0.1	0.0	0.9	0.2	1.77	n.s.
WAD	-2.0	2.6	0.5	-0.6	1.6	0.3	1.37	n.s.
PRS	9.2	6.7	1.5	8.6	7.6	1.7	0.46	n.s.
DOR	6.9	3.2	0.7	3.8	5.6	2.3	3.55	0.001

* The lower score of the Wepman Test (-2.0) for the E group indicates a lower number of errors. Therefore to depict the trend accurately on the Figure, the signs were reversed.

Table 3 indicates highly significant differences in favour of the E group in the tests of SCPM (IP) and (BMC) and Durrell Oral Reading. Significant differences were also obtained by the E group in the tests of Music perception and SCPM (CML). Although the mean was higher for the E group in the remaining tests, this improvement yielded no significant difference.

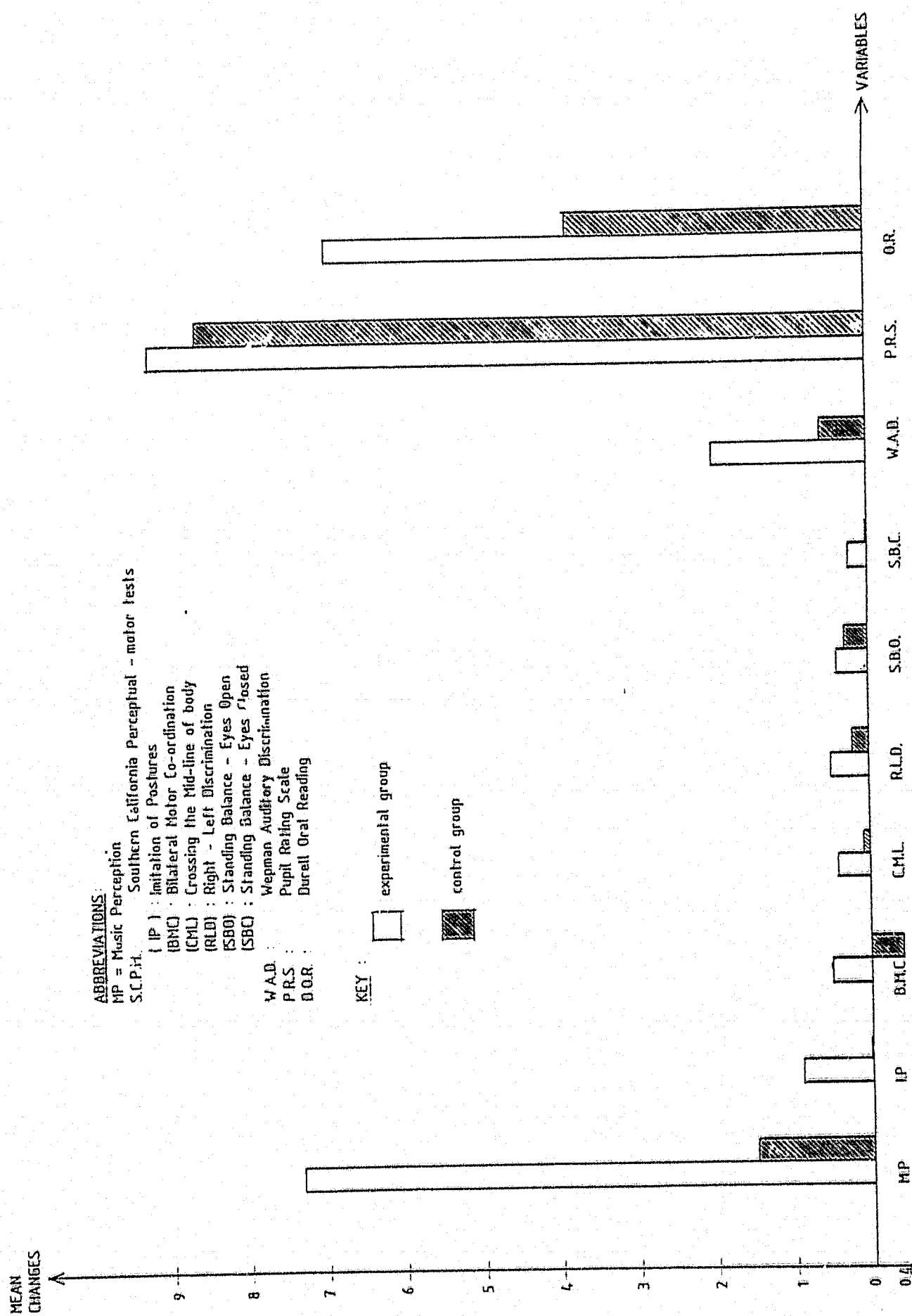
The raw data on all the variables assessed is provided in App. 10 (p. 104-107).

6.2. Correlations

The significant difference shown by the E group in the tests related to music perception, motor coordination and oral reading were the departure point for the assessment of inter-correlations among the variables.

Positive correlations were found between (a) oral reading and rhythm ($r = 0.496$, $p = 0.04$) on the pretest values of the C group; (b) Wepman and Tonal memory on the pretest values of the E group; (c) correlation between these two variables were also found in the change scores of the E group.

FIGURE 1:- IMPROVEMENT IN CHANGE SCORES OF
EXPERIMENTAL AND CONTROL GROUPS
AFTER INTERVENTION



6.3. Questionnaire for the teachers

The answers of the four teachers to the questionnaire given to them at the end of the project are summarized in the form below.

Key to the answers:

- 0 Teacher of sub-group No. 1
- 1 Teacher of sub-group No. 2
- 0 Teacher of sub-group No. 3
- 0 Poetry teacher of sub-group No. 3

QUESTIONNAIRE FOR THE TEACHERS

MUSIC THERAPY PROJECT

"Providing music therapy skills to teachers working with learning disabled children".

Personal data

Name of teacher _____

Age _____

Qualifications _____

Experience in remedial Ed. _____

Musical trainingBackground:

1. Have you ever, in your previous experience as a remedial teacher, used music in your remedial program?

2. Have you ever worked in collaboration with a music teacher/therapist? Detail previous experiences.

Code for answers: 1 - not at all
2 - slightly
3 - moderately
4 - very much

Specific areas:

Answers

1. Perception

a. Could you relate the perception of a rhythmic pattern to a written one?

1 (2) (3) (4)

b. Did the perception of a rhythmic pattern (eco game) assist the children in the understanding of sentences and the reading process?

1 (2) 3 4

c. Could you relate the children's experience of using space in M. th. sessions (feeling high-low pitch with the whole body, awareness of the others while moving in a free space) to their use of space on their sheet of paper?

(1) (2) (3) 4

2. Directionality - laterality

- Do you see any relation between graphic representation of sound (following the melodic line with a pencil while listening, lifting the pencil at the end of a musical phrase) and directionality in writing?
- To what extent did you continue in class the "by the way" recall on right-left awareness as we did in the sessions?
- Did the awareness gained changing direction through music and movement ("jump and change direction when the music stops") help the children in their directionality problems while writing?

1 (2) (3) (4)

(1) 2 (3) (4)

1 (2) 3 4

3. Auditory discrimination

- Have you used the technique "close your eyes and listen" to improve their writing?
- Did the activities in pitch, timbre, loudness, non-sense rhymes, sound effects to rhymes and poems improve the children's spelling and reading?

(1) 2 (3) 4

1 (2) (3) 4

4. Motivation

In the M.th. sessions children were motivated to learn and increase their curiosity and sense of discovery by creative and expressive activities (encouraging "exotic" instruments, improvising with them, assisting to the concert). Did you use this approach in teaching other subjects in class?

(1) 2 (3) (4)

5. Self-image

Did the M.th. sessions improve the child self-image?

1 (2) 3 (4)

6. Awareness-socialization

Did you notice any improvement in class concerning:

- self-awareness,
- awareness of sound in the environment
- awareness of the group,

after the M.th. sessions?

1 (2) (3) 4
1 (2) (3) 4
1 (2) (3) 4

7. Group dynamics

- Do you use non-verbal communication techniques (eco game, questions and answers, games with closed eyes) to improve verbal communication in class?

(1) (2) 3 4

- Children were asked to split into small groups to fulfill creative tasks in M.th. sessions. Has this technique influenced their interaction in the class?

1 (2) (3) (4)

The answers of the four teachers to the following questions are given according to the same key used before.

8. General observations

What remarks would you like to make about the class as a group in the Music Therapy sessions:

- • • "The group participated with enthusiasm and enjoyed the sessions."
- "Hyperactivity was controlled by active participation in musical tasks."
- • "The children began to work together as a group as time went on."
- "Children were given the opportunity for self-expression."
- "They learned to listen and follow verbal instructions."

9. Application of techniques

(a) Which of the skills you observed in the sessions or learned in the Music Therapy workshops could you incorporate in your programme in class?

- • • Echo game.
- Auditory discrimination games.
- • Associations through sound with percussion instruments for creative writing.

(b) In which areas do you think Music Therapy skills could assist your remedial work?

- • • • "Learning to listen and discriminate between sounds could improve the children's performance in poetry and language work, also in arithmetic and reading."

- o o o "Rhythmic training and sequencing could facilitate spelling and reading. Rhythmic and melodic recall could improve the memory span."

10. Suggestions

Which criticisms or suggestions would you like to make on the subject?

oooo All four teachers complained that they had few opportunities to relate the Music Therapy techniques to their teaching strategies. The children had individual programmes to fill in the class and were called out for individual therapies during the week, thus reducing the time in which the teacher could work with them as a group.

- o Suggested that Music Therapy sessions could be seen as an outlet for frustrations because each one was given the opportunity to succeed according to his own ability, which was not so easy to achieve in the class situation.

CHAPTER 7

DISCUSSION

7.1. Introduction

This study provides practical evidence to support the assumption that Music Therapy (MT) techniques can be an effective resource in a multidisciplinary approach to learning disabled (LD) children.

Fig. No. 1 on p.72, indicates graphically the trend in the improvement of the Experimental (E) group, as compared with the Control (C) group after five months of intervention. The E group improved more than the C in all the areas assessed. This improvement yielded a highly significant difference ($p = 0.001$) in favour of the E group in two of the Southern California Perceptual-motor tests (SCPM): Imitation of postures (IP) and Bilateral Motor Coordination (BMC), and in Oral Reading. A significant difference was found in the Music Perception test ($p = 0.01$) and in Crossing the Mid-line of body ($p = 0.05$) of the SCPM tests. For the rest of the test, although the highest mean was found in the E group, a non-significant difference was obtained in comparison with the C group.

These findings are interpreted below, in the context of the different facets of the intervention programme, the aims of the study and the previous reports in the literature.

7.2. Interpretation of findings

Rhythmic training

The E group was led gradually from the repetition of one bar rhythmic patterns to the memorisation of a rhythmic sequence of 12 bars, created out of their own improvisations, requiring motor planning and co-ordination between different parts of the body. The "gum boot dance" was an original feature of the programme combining the echo game practised in the Orff method with a mine dance which is part of the South African tradition.

The highly significant difference found in favour of the E group in the tests related to rhythmic training and perceptual-motor co-ordination (Rhythmic recall Imitation of Postures, Bilateral Motor Coordination and Crossing the Mid-line of body) was thus expected. An interesting fact that was observed in the C group is that their post test scores in these same tests were either the same or lower than the pre-test scores. In the Imitation of Postures post-test, the same wrong postures were repeated in various items by 14 out of 20 children

of the C group, indicating that the same non-habitual motor acts were still unusual for the C group after 5 months of remedial teaching. Rhythmic training, according to Lea (1980), is highly correlated to language ability and facility in reading. The consistent improvement shown by the E group in these tests may emphasize the importance of rhythmic training in LD children.

Perceptual-motor training in the six areas assessed by means of the Ayres Perceptual-motor tests was provided by the Occupational therapists (OT) at both schools. In the three areas that rhythmic training was provided in addition (Imitation of postures, Bilateral motor co-ordination and Crossing the mid-line), a significant difference was found in favour of the E group. The remaining three tests (Right-left discrimination, Standing balance eyes open, and Standing balance eyes closed) were administered in order to compare the influence of the OT treatment in both groups in areas in which the E group did not receive additional Music Therapy training. Concerning Right-left discrimination, it can be observed in the questionnaire to the teachers (p.84) that the "by the way" differentiation between right and left hand practised in the Music Therapy sessions was not followed up in the class by two out of the 4 teachers. Nevertheless children in the E group improved slightly in this test (mean of the change score: 0.5 compared with 0.2 at the pre-test) while the C group did not show any improvement (mean: 0.2 both for the change score and the pre-test). Standing balance was not dealt with in the Music Therapy sessions. The difference between the means of the C and E groups in these tests is the smallest found in all the tests. This may indicate that the Occupational therapy treatment was not substantially different at both schools, and that the improvement noted in the remaining areas could be attributed to the additional rhythmic training provided for the E group.

Auditory discrimination

Concerning auditory discrimination, the improvement of the E group in tonal memory and pitch discrimination was significant, as expected, considering those aspects were practised during the five months of intervention. Here again, 7 out of the 20 children of the C group repeated in July the same errors noted in January, indicating that their discrimination of sounds remained at the same level as before, in spite of their participation in singing lessons. It can be inferred from this fact that singing as a mere repetition of what is heard may not influence auditory discrimination. The difference in the techniques is evidenced here as well: the singing lessons and the Music Therapy sessions both used music as a medium, but while in the singing lessons songs were repeated as a drill, the therapeutic aims were the main concern of the Music Therapy

sessions, mobilising and exercising a wider range of abilities.

Although a non-significant difference was found between the E and C groups in the Wepman test, the E group showed the highest mean in the pretest and in the change scores; children in the E group had a greater number of errors (107) at the beginning of the project as compared with the C (82). The change scores showed a greater improvement for the E group (41 corrections, as compared with 13 of the C group).

The improvement in the Wepman score was expected for the E group, considering a great deal of exercise was done in auditory discrimination of speech sounds in the onomatopaeic rhymes. The fact that this improvement was not significant in comparison with the C group scores may be explained on the grounds that the Mann-Whitney test, being non-parametrical, requires wide differences between the groups in order to show significance.

Social Aspects

The programme provided wide opportunities for interaction among the children and with the therapist. The class teachers considered this interaction as beneficial because the children had few opportunities to work as a group: the individual programmes and special therapies planned for each child reduced the opportunities to learn how to work as a team, as they did in the Music Therapy sessions. The extent to which the beneficial effects observed had an influence in the total social behaviour of the children was rated by the class teachers. Although the mean obtained by the E group in the Myklebust Pupil Rating Scale was higher than that of the C group, a non-significant difference was found between the two groups.

Teachers' participation

The response of the teachers of the E group to the programme varied widely according to each one's personality and background. The various aspects of the programme appealed differently to each teacher. Some techniques were followed up in the class and others not, according to the remedial techniques favoured by the teachers beforehand. This is shown in their answers to the questionnaire. Although they all considered the Music Therapy sessions as a valuable intervention, the degree of integration of the non-verbal techniques to their own remedial approach was limited by the lack of time to work with the children as a group and by their individual preferences.

Correlations

One of the aims of this study was to investigate whether the improvement in auditory discrimination, rhythmic ability and perceptual-motor and social performance of the E group would yield an improvement in oral reading. Although the improvement in oral reading was highly significant for the E group, as compared with the C group, no statistical correlations were found between oral reading and the remaining variables. These findings are consistent with the studies reported by Hurwitz, Wolff, Bortnick & Kokas (1975), Kokas (1969) and Roskam (1979). In these studies the improvement in reading was observed in children receiving specific music instruction, although the correlation between the variables was not demonstrated statistically.

The positive correlation found between oral reading and rhythm in the pretest scores of the C group indicates that low scores in reading were correlated with low scores in rhythmic ability, and vice versa. This correlation may support the findings of several authors who reported a relationship between poor rhythmic ability and retardation in reading (e.g. Stambach, 1960; Tansley, 1967; Travis, 1971; and Zigmond, 1966).

The positive correlation found between Wepman and Tonal Memory in the pretest and again in the change scores of the E group is consistent with the findings of Baxley (1979). This author reports a positive, although small correlation between pitch discrimination and speech sound discrimination. These correlations may indicate that an improvement in speech sound discrimination may result as sound discrimination improves.

The lack of correlations between the change scores of oral reading and rhythm in the E group can be explained on the grounds that the pretest rhythm values were already high, allowing very little scope for improvement, while the oral reading test scores allowed scope for substantial improvement. This same reason can be given for Bilateral Motor Coordination and the Wepman test.

The lack of correlation between these same variables in the C group may be attributed to the fact that their improvement in the various measures was of not sufficient magnitude. A necessary condition for the demonstration of significant correlations would be the existence of a wide range of responses or a large sample size. Kavale (1981), employing data of 18,000 S from 106 studies, found a highly significant correlation ($p = 0.001$) between auditory perception skill and aspects of reading achievement. The absolute magnitude of correlation reported amounted to $r = 0.36$ ($r^2 = 0.13$), while a correlation

of $r = 0.40$ ($r^2 = 0.16$) is required to demonstrate significance in a sample of 20 subjects. Michel, Parker, Giokas, Werner (1982), and Roskam (1979) mention the problem presented in the search for positive correlations by the small number of S usually available for this kind of study, "where most classes are small and the focus is on the individual child" (p. 227).

However, even had positive correlation been found, the improvement in reading could not be attributed solely to the Music Inerapy intervention. The difference in the quality of the remedial teaching at the two schools may have influenced the improvement in reading as well.

7.3. Shortcomings of the study

Shortcomings exist in this study in relation to (a) the sample, (b) the teachers' participation, and (c) the measures.

(a) The sample

The E and C groups had to be formed in two different schools because of the small number of children available at one school. This introduced a variable which could not be controlled. Although the remedial policies and the professional staff were similar at both schools, the effectiveness of their remedial techniques could not be measured. Significant improvement in reading at Pretoria Remedial School could be attributed to a better matching between the remedial techniques and the children's needs at that school.

(b) Teachers' participation

The combination of the non-verbal techniques with the verbal ones by the class teachers presented two main problems: (a) Individualised teaching and the various therapies the children attended during the week reduced considerably the periods in which the class teacher could work with the children as a group and implement the new techniques experienced at the Music Therapy sessions. (2) The formal training of the teachers did not include the experiencing of non-verbal techniques as a therapeutic resource. Musicality in a broad sense and the artistic capabilities of the teachers themselves should be specially developed within the framework of the teachers' training. These would enhance the feasibility of the collaboration between the music therapist (or any other creative and expressive therapist, e.g. dance, drama or art) and the class teacher.

(c) Measures

Although the procedure for the administration of the music perception test, its length and its general conception proved to be satisfactory, some of the measures were too easy for some of the children in the sample. A pilot study was carried out before elaborating the Music Perception test. Nevertheless, in the rhythm test for instance, five out of the 20 S of the E group obtained the maximum score in the pre-test. For this same test, only one S in the C group obtained the maximum score, which may indicate that the test was more suitable for the C group. These results could not be foreseen until all the children were assessed.

Concerning the Myklebust Pupil Rating Scale (MPRS), the personality of the teachers could have influenced the results of the tests: teachers of the C group tended to rate their pupils higher than those of the E group from the beginning in the MPRS. Teachers at both schools noted improvement in the verbal and non-verbal behaviour of their children. However, the fact that a non-significant difference was noted in the improvement of the MPRS, may be related to different personal standards regarding the rating of the children at both schools.

7.4. Implications of this study

Several implications can be drawn from this study. These concern the programme, the teachers' participation, the role of the staff, and of Music Therapy in a multidisciplinary approach.

The programme: Intervention through Music Therapy

The departure point for the development of an intervention programme using music was the assumption that "almost every child can be reached and taught innumerable skills through the arts" (Smith, 1979, p. 135). The programme implemented with the E group provided practical evidence to support this assumption.

The "learning units" followed by "integrative activities" were a flexible frame of reference within which the creativity of the children developed. The role of the therapist was that of a "facilitator", suggesting the activities to match the children's abilities and encouraging the development of new ideas from the children. The elementary music techniques used with the E group proved to be suitable because they matched the children's abilities, giving

them a strong motivation to attend the Music Therapy sessions. New and more complicated tasks were gradually incorporated, giving the children a feeling of progress. By giving them creative tasks and offering them the chance to show their "discoveries" to the group, the uniqueness of each individual was enhanced, with the aim of reinforcing the self-esteem. Combining the children's ideas into a meaningful experience for the group, positive social interaction was fostered. Finally, controlling the quality of the expression to achieve a valuable aesthetic experience transformed the musical activities into a source of joy for the children.

Teachers' participation

The enthusiasm shown by the children to attend the sessions indicates that they were a positive event in their weekly programme. This same motivation for learning could be carried over to the class situation through a better understanding and knowledge by the class teacher of the nature of non-verbal techniques. The importance of "the right brain" in education as suggested by Blakeslee (1980) for instance should be dealt with in the Teachers' Colleges, and more training should be provided for the teachers in the arts and their therapeutic possibilities.

Teachers' Training

A revision of the Remedial teachers' courses should be considered with a view to including in their syllabus the experiencing of creative and expressive therapies (music, dance, drama and art therapy) and their influence on the personality of the child. This would lead to the elaboration of remedial programmes integrating systematically verbal and non-verbal techniques. The collaboration between the class teacher and the creative and expressive therapist should be established on the basis of such a programme.

Role of the staff

A better understanding of the different techniques is essential in a multi-disciplinary team as well: when several therapists work with a group of LD children (speech therapist, occupational therapist, music therapist, psychologist, remedial teacher and class teacher), the co-ordination among the therapeutic efforts into an integrated programme would be fundamental to avoid the overlapping of remedial techniques. For instance, if a group of children is receiving music therapy and group psychotherapy, both specialists should either work together or discuss their aims to obtain better results. The dangers of "specialisation" should be avoided in a multidisciplinary team.

Music therapy in a multidisciplinary approach

The benefits of a Music Therapy programme in a school of LD children are evidenced in this study. The stress on individualized remedial programmes for LD children gives few opportunities for positive interaction between the children. Music Therapy activities provide wide opportunities to share and to learn from one another, promote awareness of self and the group and induce meaningful learning through a joyful group experience. The inclusion of music into a multidisciplinary approach to the LD child is widely justified on these considerations.

7.5. Suggestions for further research

Scope for further research is provided both by the limitations of this study and by its positive findings.

Design of further projects

The study indicates that in order to show statistically the correlation between music abilities and academic achievement, it would be necessary to control the influence of the remaining remedial techniques of a specific school. Should a large population of LD children be available at one school, both the E and C groups should be formed at the same school. The same staff would provide remedial treatment to both groups, and only the E group would receive Music Therapy in addition. The feelings of jealousy that may arise by excluding the C group from music lessons could be avoided by providing them for the C group in the second part of the year, once the research is over.

Further research in this field should contemplate the elaboration of suitable tests to measure music perception, standardised for a population of LD children, which would facilitate the findings of possible correlations with standardised tests measuring academic achievement.

The relationship between rhythmic ability, auditory discrimination and facility in reading should be explored further under controlled conditions. Neurological findings on the functioning of the brain should provide the theoretical basis for this research, investigating the relationship between specific aspects of music perception and reading ability. Remedial programmes thus devised would combine verbal and non-verbal techniques, providing wider opportunities for successful learning for the LD child.

Follow-up studies over an extended number of years could measure the accumulative gains of the multidisciplinary approach suggested below, as compared with a C group receiving remedial teaching only.

7.6. Conclusions

The controversy existing in the literature regarding the definition of LD is also found concerning the intervention techniques. While some authors stress the need for perceptual-motor training as a preparation for cognitive tasks (e.g. Frostig & Horne, 1964; Kephart, 1971; Hallahan & Cruickshank, 1973), others (e.g. Vellutino, Steger, Moyer, Harding, Niles, 1977) strongly advocate that there is no foundation for the assumption that deficient perceptual-motor skills should be remediated as a prerequisite to higher order learning.

What is generally accepted is that an effective remedial approach should be "child centred", taking into account "the remarkable differences that may be observed from one child to the other concerning their verbal and non-verbal ability, their auditory attention, thinking strategies, types of memory. Sometimes the differences concerning mental and cognitive functions are extreme" (Rahmani, 1983, p. 204). These individual differences should be properly assessed before planning remediation, and the role of the teacher is of primary importance. "Each teacher must be a detective of sorts to determine how each child learns best, what modalities or channels of learning are a child's strongest ones, what interests can be built on, what specific disabilities are there to remediate" (Smith, 1979, p. 33).

However, once the strengths and weaknesses of a child are known to the teacher, the child should be motivated to learn. In the view of Adelman and Taylor (1983), motivation is a key concept in LD. "For those to continue to have a lot of trouble staying tuned into a task and who learn slowly, helping means providing more support and guidance and trying to improve the teaching-learning match. This includes exploring different methods to find a combination of learning activities and techniques that a particular individual can do and wants to do" (p. 313). These authors suggest that one of the important strategies is to capitalize on areas people enjoy, where they can succeed. The programme proposed in this study may be considered as one of these joyful alternatives in a multidisciplinary approach. Auditory and rhythmic experiences are conceptualised, enabling the child "to construct meaning from experience" (Reid & Hresko, 1981, p. 9). A dialectic relation between holistic and analytical thinking is thus promoted by musical experiences. Blakeslee (1980) stresses the importance of learning which relates "both sides of the brain". "If the child can be encouraged to make a discovery non-verbally and then verbalize his findings, he will actually be practising the creative process ... In addition to this, the child will learn the concept in both a verbal and

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a non-verbal sense" (p. 61). This integrative quality in learning can be achieved through musical activities of the kind described in this study. "Music Therapy can be beneficial to individuals by providing a means of non-verbal expression, by encouraging verbal expression, by promoting the aim of cognitive skills through different learning channels and methods, and by fostering greater insight and understanding of self" (Levick, Dulicai, Briggs, Billock, 1979, p. 363).

In the context of the previous considerations, Music Therapy techniques can be seen as the bridge that links perceptual training with cognitive tasks, holistic and analytical thinking, harmonising the child's personality through a joyful experience. Enjoyment has not been measured in this study, but has been observed by the staff and expressed by the children. If enjoyment can be considered a mobilising factor in successful remediation, this specific contribution of musical activities to the LD child may validate its effectiveness as a therapeutic resource.

APPENDIX NO. 1 QUALITATIVE ANALYSIS OF EXPECTED DIFFICULTIES
DURING THE EVALUATION OF LEARNING DISABLED CHILDREN

VISUAL FACTORS AND THEIR RELATION TO SCHOOL SUCCESS

<u>Visual function</u>	<u>Expected difficulty</u>
<u>Fixation</u> Ability to fix one's vision at the place most likely to give a total view.	Looks at the end of a word and guesses by minimal clue, or combines end and beginning. Has difficulty finding key words.
<u>Pursuit</u> Ability to follow a moving object smoothly with the eye.	Moves head along a line instead of holding head still and moving the eyes. This can cause blurring and make him lose his place.
<u>Saccadic movement</u> Ability to move accurately and smoothly from one object to another.	Loses place, uses finger to point, skips or rereads lines. Needs a marker below line to keep place.
<u>Accommodation</u> Ability to control focus for all distances and for changing distances.	Holds book too close or too far away. Tends to move book closer for difficult words. When copying from the board, his eyes water and the print blurs.
<u>Fusion</u> Ability to hold a focus and to use both eyes for binocular vision.	Closes one eye, tilts head, holds book too close, rubs eyes, eyes water, print blurs. Gets inconsistent stimuli.
<u>Visual perception</u>	<u>Expected difficulty</u>
<u>Form constancy</u> Ability to recognize and identify like and unlike forms.	Confuses similar words. Has difficulty with all symbols.
<u>Figure-ground discrimination</u> Ability to focus eyes on relevant aspects and to "tune out" irrelevant background.	Has problems with complex words and small or different type, and with noting details in reading. Writing form is poor, especially cursive writing.

Spatial relations

Ability to recognize symbol size and position in relation to others.

Confuses such letters as b and d, or m and w. Changes sequence of letters within a word. Poor printing.

Visual memory (imagery)

Ability to remember and visualize a previously viewed form or symbol.

Cannot recall newly learned words. Poor spelling. Poor writing. (The dyslexic child).

AUDITORY FACTORS AND THEIR RELATION TO SCHOOL SUCCESS

<u>Auditory function</u>	<u>Expected difficulty</u>
<u>Acuity</u> Ability to receive sound clearly at a wide range of intensity.	Has weak or overloud voice. Breathes through the mouth. Frequently needs oral directions repeated. Cocks head. Watches speaker's lips.
<u>Localization</u> Ability to locate source of sound without visual clues. Usually indicates lack of binaural functioning.	Does poorly when teacher (or stimulus) is out of his view. Poor auditory perception.
<u>Discrimination</u> Ability to distinguish similarity and difference of all speech sounds equally well at various pitches. (Can be in intermittent deficit).	Has poor speech, spelling, and phonics skills. Inaccurate repetition of auditory stimuli, especially names and isolated data. Fluctuating performance.
<u>Auditory perception</u>	<u>Expected difficulty</u>
<u>Closure</u> Ability to organize and abstract meaning from isolated auditory stimuli.	Has difficulty with phonics approach. Inaccurate response to oral directions, although there is evidence of recall. Poor sequencing memory. Frustration.
<u>Figure-ground</u> Ability to focus on relevant aspect and to "tune out" irrelevant background.	May appear inattentive and distractible. Does not like a lot of noise. Asks for repetition of information and questions.
<u>Word deafness</u> Lowered sensitivity to auditory stimulation in the form of language. Lack of association (visualization) with a meaningful visual image.	Daydreams, is inattentive, anxious. Inaccurate response to oral directions, lectures, and conversations. Poor listening comprehension.
<u>Memory (short- and long-range)</u> Ability to retain stimuli presented auditorily.	Forgets oral directions. Has difficulty finding words when speaking in front of class or recalling isolated data. Confuses labels: calls a fork a "spoon", a lock a "key".
<u>Aphasia (receptive)</u> Inability to associate words with meaning.	Inability to function in school if severe.

VOCAL FACTORS AND THEIR RELATION TO SCHOOL SUCCESS

<u>Vocal factor</u>	<u>Expected difficulty</u>
<u>Voice defects</u>	
Malfunctioning of sound production mechanisms that affect voice quality.	Has tremorous, nasal, breathy, husky, strained, or falsetto voice.
<u>Articulation</u>	
Ability to place tongue properly or to move it sufficiently for clear enunciation and correct pronunciation.	Has discrimination, spelling, and phonics problems. Makes speech substitutions or omissions. Lisps. Is shy and immature.
<u>Rhythm</u>	
Stuttering or stammering; repetition of sounds or words. Speech block; cannot say a word. Cluttered speech; broken or irregular rhythm.	Self-conscious; avoids participation. Nervous, tense, restless. Facial tics; grimaces.
<u>Delayed speech</u>	
Language and speech are slow in developing; but not defective or deficient.	Uses vocabulary and speech sounds appropriate for a younger child. Has general difficulty with grade-level work.
<u>Language development</u>	
Ability to understand and use words in listening, speaking, reading, and writing.	Has inaccurate or confused speaking vocabulary. Poor reading comprehension. Difficulty following directions and class presentations. Difficulty reading for study. Inattentive, withdrawn, or frustrated.
<u>Sequential speech or language</u>	
Inability to hold the sequence of sounds, words, or thoughts.	Says shakemilk for milkshake, enemy for enemy. Gets the facts, but cannot organize to build concepts. Has difficulty blending in spelling and phonics.
<u>Aphasia (expressive)</u>	
Inability to think in terms of symbols - to give names to objects, actions, etc.	Inability to function in school if severe.

Body awarenessExpected difficultyLocation

Ability to locate body parts without visual clues.

Has difficulty visualizing. Low kinesthetic and tactile awareness.

Identification

Ability to identify body parts by name.

Has poor language recall.

Spatial awareness

Ability to locate the body in relation to other objects. Sense of size and space.

Exhibits clumsiness, spills things, walks into furniture, is hyperactive. Has difficulty with directionality.

Gross control and coordinationExpected difficultyLaterality

Internal awareness of left-right and other directional concepts. Location of things in relation to self.

Activities requiring balance and directional sense are affected: confuses b and d. Writing integration and closure, stopping and starting are affected.

Directionality

External awareness of left-right and other directional concepts. Location of objects in relation to each other in external space.

Has problems in visual-to-motor match when copying. This contributes to spatial problems, reversals, and mastering such material as place values in math, spelling, sequence, map sense, etc..

Rhythm

Ability to coordinate in sequence and in a repetitive pattern the movements of the body or body parts.

Has difficulty with certain types of sports, with writing, and with reading fluency. Exhibits clumsiness in walking. Unable to jump rope or skip.

Eye-hand coordinationExpected difficultyMotor control

Ability to make a kinesthetic response to a visual clue. Includes factors of muscle tone, rhythm, and visual skills.

Grips pencil awkwardly. Tremor shows in writing. Has difficulty controlling size and integration of lines.

Motor speed

Ability to respond automatically, which is a function of kinesthetic memory, muscular control; and rhythm.

Motor movement is slow and labored. Has difficulty sustaining a movement. Poor rhythm in writing. Affects timed activities.

APPENDIX NO. 2
OBSERVATION SHEET

Activity	Musical Aim	Therapeutic Aim	Observations

WEPMAN AUDITORY DISCRIMINATION TEST (i)

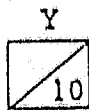
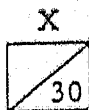
AUDITORY DISCRIMINATION TEST

FORM I

			X	Y
1.	tub	- tug		
2.	lack	- lack		
3.	web	- wed		
4.	leg	- led		
5.	chap	- chap		
6.	gum	- dumb		
7.	bale	- gale		
8.	sought	- fought		
9.	vow	- thou		
10.	shake	- shape		
11.	zest	- zest		
12.	wretch	- wretch		
13.	thread	- shred		
14.	jam	- jam		
15.	bass	- bath		
16.	tin	- pin		
17.	pat	- pack		
18.	dim	- din		
19.	coast	- toast		
20.	thimble	- symbol		

			X	Y
21.	cat	- cap		
22.	din	- bin		
23.	lath	- lash		
24.	bum	- bomb		
25.	clōthe	- clōve		
26.	moon	- noon		
27.	shack	- sack		
28.	sheaf	- sheath		
29.	king	- king		
30.	badg	- badge		
31.	pork	- cork		
32.	fie	- thigh		
33.	shoal	- shawl		
34.	tall	- tall		
35.	par	- par		
36.	pat	- pat		
37.	muff	- muss		
38.	pose	- pose		
39.	lease	- leash		
40.	pen	- pin		

Error Score



WEPMAN AUDITORY DISCRIMINATION TEST (11)

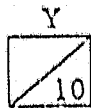
X Y

X Y

1. gear - beer		
2. cad - cab		
3. led - lad		
4. thief - sheaf		
5. nake - shake		
6. jail - fall		
7. ball - ball		
8. lake - lake		
9. bead - deed		
10. rub - rug		
11. wing - wing		
12. gall - goal		
13. pet - pit		
14. lit - lick		
15. bug - bud		
16. lass - lath		
17. caps - caks		
18. pool - tool		
19. zone - zone		
20. frot - throat		

21. bar - bar		
22. burn - bun		
23. lāvo - lātho		
24. hot - shop		
25. wedge - wedge		
26. suck - sock		
27. vio - 'thy		
28. rich - rich		
29. pit - kit		
30. gulo - dial		
31. rash - wrath		
32. chow - chow		
33. fag - sag		
34. phase - phaus		
35. sick - thick		
36. wroath - reef		
37. map - nap		
38. muss - mush		
39. cart - tart		
40. cuff - cunn		

Error Score



WEPMAN AUDITORY DISCRIMINATION TEST (ii)

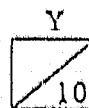
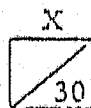
X Y

1. gear - beer		
2. cad - cab		
3. led - lad		
4. thief - sheaf		
5. nake - shake		
6. jail - jail		
7. ball - ball		
8. lake - lake		
9. head - deed		
10. rub - rug		
11. wing - wing		
12. gall - goal		
13. pet - pit		
14. lit - lick		
15. bug - bud		
16. lass - lath		
17. capo - coko		
18. pool - tool		
19. zone - zone		
20. fret - throat		

X Y

21. bar - bar		
22. bum - bun		
23. lave - lath		
24. shot - shop		
25. wedgo - wedge		
26. suck - sock		
27. vio - 'thy		
28. rich - rich		
29. pit - kit		
30. guile - dial		
31. rash - wrath		
32. chow - chow		
33. fag - sag		
34. phaso - phase		
35. sick - thick		
36. wreath - reef		
37. map - nap		
38. muss - mush		
39. cart - tart		
40. cuff - cuff		

Error Score



APPENDIX NO. 4
MUSIC PERCEPTION TEST

Date : Test

Re-test

Name :

Age:

Class:

Music training	Items		No. of correct answers	
	TEST	RE-TEST	TEST	RE-TEST
1. Pitch	1 2 3 4 5 6			
		1 2 3 4 5 6		
2. Rhythmic recall	1 2 3 4 5 6			
		1 2 3 4 5 6		
3. Time	1 2 3 4 5 6			
		1 2 3 4 5 6		
4. Timbre	1 2 3 4 5 6			
		1 2 3 4 5 6		
5. Tonal memory	1 2 3 4 5 6			
		1 2 3 4 5 6		
Total score :				
Singing:				



Pretoria Preparatory School

(Incorporated Association not for gain)

SPECIALIZING IN REMEDIAL EDUCATION

262 Murray Street
Brooklyn
0181
Phone 43 4286

P.O. Box 11180
Brooklyn
0011

WORKSHOP

ON THE

THERAPEUTIC USES OF MUSIC

"Providing music therapy skills for teachers
working in special education"

PROGRAMME OF THE COURSE:

1. Awareness of sound in the environment: from auditory discrimination to music making on self-built percussion instruments.
2. The creative process in the use of percussion instruments.
3. Movement, verbal and graphic expression through the musical experience.
4. The use of therapeutic music skills in the classroom.

RECOMMENDED BIBLIOGRAPHY:

1. Alvin, Juliette: Music Therapy. Hutchinson, London. 1975.
2. Bitcon, Carol: Alike and Different, the therapeutic application of the Orff Schulwerk. Rovha Press, California. 1979.
3. Montessori, Maria: The Discovery of the Child. Ballantine Ed. 1968.
4. Orff, Carl: Music for Children, Teacher's Manual. Dorin Hall. Schoot. 1960.
5. Shafer, Murray: The New Soundscape. Universal Edition. 1969.

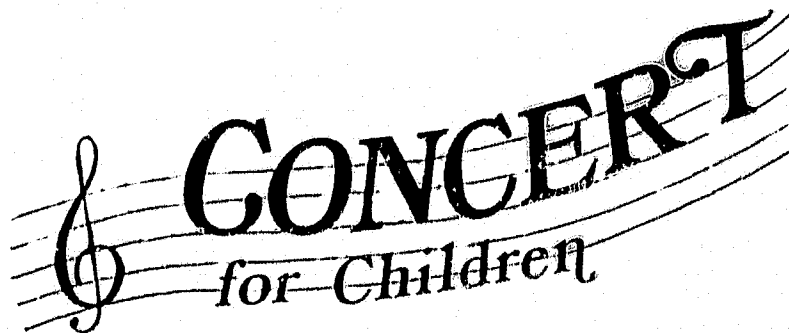
Programme

1. Introduction of the Instruments and the players:
 - Violin: Lidia Gildenhuys
 - Trombone and Euphonium: Steve Hurlin
 - Piano: Piet Woolman
 - Guitar and Commentary: Graciela Sandbank
2. Childrens' Songs
3. How the Instruments express different moods:
 - Extracts from Beethoven
 - Bartok
 - Rimsky-Korsakov
 - Guilmant
4. Dances:
 - Waltz
 - March
 - Wedding March
 - Rumanian Dances
 - Dances for the Court
 - (with the participation of members of Pretoria Theatre for Children).
5. Cannon by the players, actors and audience.
 - Refreshments will be sold after the concert.

ENTIRE PROCEEDS IN AID OF THE
 PRETORIA PREPARATORY SCHOOL.
(Specialists in Remedial Education.)

THERE WILL BE TWO PERFORMANCES:

1. DATE: Sat. 1st May, 1982
 TIME: 11 a.m. - 12 noon
 VENUE: Waterkloof Primary School,
 305 Milner St., Waterkloof
2. DATE: Tues. 4th May, 1982
 TIME: 5 p.m. - 6 p.m.
 VENUE: Waterkloof Primary School,
 305 Milner St., Waterkloof



CONCERT

for Children

**A NEW
MUSICAL
EXPERIENCE..**

for children up to 10 years old.

ADMISSION: Children R1,50
Adults R2,00

**TICKETS OBTAINABLE AT YOUR LOCAL PRIMARY SCHOOL
AND AT THE DOOR ON THE MORNING OF THE CONCERT**

Programme

1. Introduction of the Instruments and the players:

Violin: Lidia Gildenhuys
Trombone and
Euphonium: Steve Hurlin
Piano: Piet Woolman
Guitar and
Commentary: Graciela Sandbank

2. Childrens' Songs

3. How the Instruments express different moods:

Extracts from Beethoven
 Bartok
 Rimsky-Korsakov
 Guilmant

4. Dances:

Waltz
March
Wedding March
Rumanian Dances
Dances for the Court
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APPENDIX NO. 7
ONOMATOPOEIC RHYME BY KARL FOLTZ

1. Kapaftisch!

(Vassell)

100

ifred
ifred

—

Schwarz! Schwarz!

schneef. schneef. schneef.

(A) (Spiel)

		
Ka	paaf	risch,
ka	schnaaf	risch,

ka · zipp, di · zapp, di · zee · nc,
 ♭ 7 7
 ka · zien, di · zapp, di · zipp!

Ka	paaf	tisch,	
ka	schnaaf	tisch,	

ka zipp, di zapp, di zee ne.
(f) zipp!

Ka.
Ka.

ka . zipp, di . zipp, di . zipp!

nib bel lib bel lab bel nob, -nob, -nob:

nib bel lib bel lab bel nob, -nob, -nob:

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© by Karl Dietrich Fischer Verlag, München und Zürich, 1972

Foltz, Karl. Kapaäftisch. Rhythmicals für Kinder zum Sprechen und Tanzen
in Formbildnotation. Zürich: Möseler Verlag, 1975.

APPENDIX NO. 8 GUM BOOT DANCE

(a)	Clapping	
	Slapping	
	Right foot	
	Left foot	
(b)	Clapping	
	Right foot	
(a)	Clapping	
	Slapping	
	Right foot	
	Left foot	
	Voice	

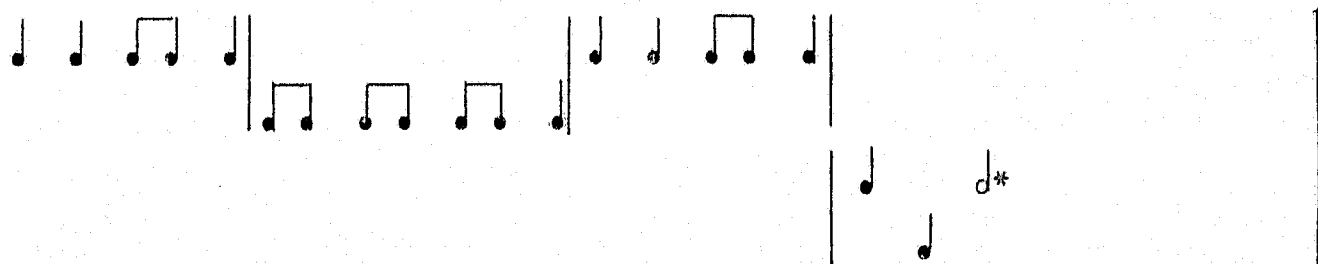
cresc. rising hands

Hei!

* right foot and right hand forwards

APPENDIX NO. 8 GUM BOOT DANCE

(a) Clapping
Slapping
Right foot
Left foot



(b) Clapping
Right foot



(a) Clapping
Slapping
Right foot
Left foot
Voice

}
}
} Repeat of (a)
}
}

Hei!

* right foot and right hand forwards

APPENDIX NO. 9

Computer Print-Out of Means, Standard deviation (Sd) and Ranges of the various variables

Legend for variables

<u>Variables</u>	<u>Test</u>
1 - 3	Wepman
4 - 6	Music Perception
7 - 9	Imitation of Postures
10 - 12	Crossing Mid-line of Body
13 - 15	Bilateral Motor Coordination
16 - 19	Right-left Discrimination
19 - 21	Standing Balance, Eyes Open
22 - 24	Standing Balance, Eyes Closed
25 - 27	Myklebust Pupil Rating Scale (MPRS)
28 - 30	Oral Reading
31 - 33	Personal Social Behaviour (MPRS)

Variables Nos. 1, 4, 7, 10, 13, 16, 19, 22, 25, 28, 31 refer to
pre-test values.

2, 5, 8, 11, 14, 17, 20, 23, 26, 29, 32 refer to
post-test values.

3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33 refer to
change values.

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Computer Print-Out of Means, Standard deviation (Sd) and Ranges of the various variables

Legend for variables

<u>Variables</u>	<u>Test</u>
1 - 3	Wepman
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28 - 30	Oral Reading
31 - 33	Personal Social Behaviour (MPRS)

Variables Nos. 1, 4, 7, 10, 13, 16, 19, 22, 25, 28, 31 refer to pre-test values.

2, 5, 8, 11, 14, 17, 20, 23, 26, 29, 32 refer to post-test values.

3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33 refer to change values.

APPENDIX NO. 9(i) MEANS AND STANDARD ERRORS (Se)

102

Control Group

VARIABLE 1	MEAN= 4.1	Se= .3832	N= 20	RANGE= 2 TO 8
VARIABLE 2	MEAN= 3.45	Se= .34393	N= 20	RANGE= 1 TO 7
VARIABLE 3	MEAN=-.65	Se= .36473	N= 20	RANGE=-3 TO 3
VARIABLE 4	MEAN= 20.2	Se= .76296	N= 20	RANGE= 11 TO 25
VARIABLE 5	MEAN= 21.25	Se= .86107	N= 20	RANGE= 13 TO 27
VARIABLE 6	MEAN= 1.05	Se= .67072	N= 20	RANGE=-4 TO 6
VARIABLE 7	MEAN= .58	Se= .15159	N= 20	RANGE=-1.2 TO 1.4
VARIABLE 8	MEAN= .595	Se= .20907	N= 20	RANGE=-1.7 TO 1.9
VARIABLE 9	MEAN= .015	Se= .13284	N= 20	RANGE=-.9 TO 1.1
VARIABLE 10	MEAN= .435	Se= .12758	N= 20	RANGE=-.5 TO 1.9
VARIABLE 11	MEAN= .56	Se= .11526	N= 20	RANGE=-.2 TO 2.4
VARIABLE 12	MEAN= .125	Se= .10023	N= 20	RANGE=-.4 TO 1.1
VARIABLE 13	MEAN= .545	Se= .10039	N= 20	RANGE=-.3 TO 1.4
VARIABLE 14	MEAN= .505	Se= .11709	N= 20	RANGE=-.8 TO 1.1
VARIABLE 15	MEAN=-.04	Se= .087178	N= 20	RANGE=-1 TO .8
VARIABLE 16	MEAN= .26	Se= .24338	N= 20	RANGE=-3 TO 1.5
VARIABLE 17	MEAN= .47	Se= .17846	N= 20	RANGE=-1.8 TO 1.1
VARIABLE 18	MEAN= .21	Se= .2537	N= 20	RANGE=-2.5 TO 3.5
VARIABLE 19	MEAN=-.125	Se= .18437	N= 20	RANGE=-1 TO 1.6
VARIABLE 20	MEAN= .21	Se= .20799	N= 20	RANGE=-1.1 TO 1.9
VARIABLE 21	MEAN= .335	Se= .18443	N= 20	RANGE=-1.3 TO 2.6
VARIABLE 22	MEAN= .445	Se= .1856	N= 20	RANGE=-1.9 TO 1.6
VARIABLE 23	MEAN= .38	Se= .22695	N= 20	RANGE=-1.1 TO 2.1
VARIABLE 24	MEAN=-.065	Se= .20702	N= 20	RANGE=-1.4 TO 2.5
VARIABLE 25	MEAN= 67.95	Se= 2.6896	N= 20	RANGE= 54 TO 93
VARIABLE 26	MEAN= 76.6	Se= 3.1767	N= 20	RANGE= 55 TO 103
VARIABLE 27	MEAN= 8.65	Se= 1.7203	N= 20	RANGE=-1 TO 29
VARIABLE 28	MEAN= 90.056	Se= 2.688	N= 18	RANGE= 72 TO 104
VARIABLE 29	MEAN= 93.944	Se= 1.9712	N= 18	RANGE= 80 TO 108
VARIABLE 30	MEAN= 3.8889	Se= 1.3281	N= 18	RANGE=-1 TO 17
VARIABLE 31	MEAN= 23.95	Se= 1.4644	N= 20	RANGE= 13 TO 36
VARIABLE 32	MEAN= 26.05	Se= 1.3347	N= 20	RANGE= 19 TO 36
VARIABLE 33	MEAN= 2.1	Se= .64441	N= 20	RANGE=-2 TO 8

Experimental Group

VARIABLE 1	MEAN= 5.35	Se= .83752	N= 20	RANGE= 0 TO 13
VARIABLE 2	MEAN= 3.3	Se= .48177	N= 20	RANGE= 0 TO 10
VARIABLE 3	MEAN=-2.05	Se= .5915	N= 20	RANGE=-10 TO 1
VARIABLE 4	MEAN= 20.25	Se= .80745	N= 20	RANGE= 12 TO 26
VARIABLE 5	MEAN= 27.6	Se= .41295	N= 20	RANGE= 23 TO 30
VARIABLE 6	MEAN= 7.35	Se= .666	N= 20	RANGE= 2 TO 11
VARIABLE 7	MEAN= .915	Se= .17172	N= 20	RANGE=-.5 TO 2.2
VARIABLE 8	MEAN= 1.84	Se= .10296	N= 20	RANGE= .8 TO 2.4
VARIABLE 9	MEAN= .925	Se= .13743	N= 20	RANGE= .2 TO 2
VARIABLE 10	MEAN= .235	Se= .1489	N= 20	RANGE=-1.1 TO 2.3
VARIABLE 11	MEAN= .665	Se= .10215	N= 20	RANGE= .1 TO 2.4
VARIABLE 12	MEAN= .43	Se= .1044	N= 20	RANGE=-.2 TO 1.9
VARIABLE 13	MEAN= .665	Se= .12382	N= 20	RANGE=-.1 TO 1.8
VARIABLE 14	MEAN= 1.195	Se= .046155	N= 20	RANGE= .8 TO 1.6
VARIABLE 15	MEAN= .53	Se= .10981	N= 20	RANGE=-.2 TO 1.3
VARIABLE 16	MEAN= .205	Se= .25521	N= 20	RANGE=-2. TO 1.3
VARIABLE 17	MEAN= .755	Se= .11014	N= 20	RANGE=-1 TO 1.1
VARIABLE 18	MEAN= .55	Se= .24618	N= 20	RANGE=-.5 TO 3.3
VARIABLE 19	MEAN=-.14	Se= .19117	N= 20	RANGE=-1.4 TO 1.4
VARIABLE 20	MEAN= .3	Se= .22396	N= 20	RANGE=-1 TO 2.4
VARIABLE 21	MEAN= .44	Se= .17658	N= 20	RANGE=-.2 TO 3.3
VARIABLE 22	MEAN= .045	Se= .17221	N= 20	RANGE=-.8 TO 1.5
VARIABLE 23	MEAN= .29	Se= .18337	N= 20	RANGE=-.8 TO 1.5
VARIABLE 24	MEAN= .245	Se= .15534	N= 20	RANGE=-1.6 TO 1.3
VARIABLE 25	MEAN= 63.6	Se= 2.7515	N= 20	RANGE= 46 TO 84
VARIABLE 26	MEAN= 72.8	Se= 3.4141	N= 20	RANGE= 46 TO 113
VARIABLE 27	MEAN= 9.2	Se= 1.5176	N= 20	RANGE=-1 TO 29
VARIABLE 28	MEAN= 87.4	Se= 2.3956	N= 20	RANGE= 72 TO 102
VARIABLE 29	MEAN= 94.35	Se= 2.2376	N= 20	RANGE= 74 TO 105
VARIABLE 30	MEAN= 6.95	Se= .73081	N= 20	RANGE= 2 TO 15
VARIABLE 31	MEAN= 20.1	Se= 1.1072	N= 20	RANGE= 12 TO 30
VARIABLE 32	MEAN= 23.5	Se= 1.1528	N= 20	RANGE= 12 TO 31
VARIABLE 33	MEAN= 3.4	Se= .60437	N= 20	RANGE=-2 TO 9

APPENDIX NO. 9(ii) MEANS AND STANDARD DEVIATIONS (Sd)

103

Control Group

VARIABLE 1	MEAN= 4.1	Sd= 1.7137	N= 20	RANGE= 2 TO 8
VARIABLE 2	MEAN= 3.45	Sd= 1.5381	N= 20	RANGE= 1 TO 7
VARIABLE 3	MEAN= -.65	Sd= 1.6311	N= 20	RANGE= -3 TO 3
VARIABLE 4	MEAN= 20.2	Sd= 3.4121	N= 20	RANGE= 11 TO 25
VARIABLE 5	MEAN= 21.25	Sd= 3.8508	N= 20	RANGE= 13 TO 27
VARIABLE 6	MEAN= 1.05	Sd= 2.9996	N= 20	RANGE= -4 TO 6
VARIABLE 7	MEAN= .58	Sd= .67792	N= 20	RANGE= -1.2 TO 1.4
VARIABLE 8	MEAN= .595	Sd= .93498	N= 20	RANGE= -1.7 TO 1.9
VARIABLE 9	MEAN= .015	Sd= .59407	N= 20	RANGE= -.9 TO 1.1
VARIABLE 10	MEAN= .435	Sd= .57057	N= 20	RANGE= -.5 TO 1.9
VARIABLE 11	MEAN= .56	Sd= .51545	N= 20	RANGE= -.2 TO 2.4
VARIABLE 12	MEAN= .125	Sd= .44824	N= 20	RANGE= -.4 TO 1.1
VARIABLE 13	MEAN= .545	Sd= .44895	N= 20	RANGE= -.3 TO 1.4
VARIABLE 14	MEAN= .505	Sd= .52363	N= 20	RANGE= -.8 TO 1.1
VARIABLE 15	MEAN= -.04	Sd= .38987	N= 20	RANGE= -1 TO .8
VARIABLE 16	MEAN= .26	Sd= 1.0884	N= 20	RANGE= -3 TO 1.5
VARIABLE 17	MEAN= .47	Sd= .79809	N= 20	RANGE= -1.8 TO 1.1
VARIABLE 18	MEAN= .21	Sd= 1.1346	N= 20	RANGE= -2.5 TO 3.5
VARIABLE 19	MEAN= -.125	Sd= .82454	N= 20	RANGE= -1 TO 1.6
VARIABLE 20	MEAN= .21	Sd= .93014	N= 20	RANGE= -1.1 TO 1.9
VARIABLE 21	MEAN= .335	Sd= .8248	N= 20	RANGE= -1.3 TO 2.6
VARIABLE 22	MEAN= .445	Sd= .83001	N= 20	RANGE= -1.9 TO 1.6
VARIABLE 23	MEAN= .38	Sd= 1.0149	N= 20	RANGE= -1.1 TO 2.1
VARIABLE 24	MEAN= -.065	Sd= .92581	N= 20	RANGE= -1.4 TO 2.5
VARIABLE 25	MEAN= 67.95	Sd= 12.028	N= 20	RANGE= 54 TO 93
VARIABLE 26	MEAN= 76.6	Sd= 14.207	N= 20	RANGE= 55 TO 103
VARIABLE 27	MEAN= 8.65	Sd= 7.6933	N= 20	RANGE= -1 TO 29
VARIABLE 28	MEAN= 90.056	Sd= 11.404	N= 18	RANGE= 72 TO 104
VARIABLE 29	MEAN= 93.944	Sd= 8.3629	N= 18	RANGE= 80 TO 108
VARIABLE 30	MEAN= 3.8889	Sd= 5.6349	N= 18	RANGE= -1 TO 17
VARIABLE 31	MEAN= 23.95	Sd= 6.5492	N= 20	RANGE= 13 TO 36
VARIABLE 32	MEAN= 26.05	Sd= 5.969	N= 20	RANGE= 19 TO 36
VARIABLE 33	MEAN= 2.1	Sd= 2.8819	N= 20	RANGE= -2 TO 8

Experimental Group

VARIABLE 1	MEAN= 5.35	Sd= 3.7455	N= 20	RANGE= 0 TO 13
VARIABLE 2	MEAN= 3.3	Sd= 2.1546	N= 20	RANGE= 0 TO 10
VARIABLE 3	MEAN= -2.05	Sd= 2.6453	N= 20	RANGE= -10 TO 1
VARIABLE 4	MEAN= 20.25	Sd= 3.611	N= 20	RANGE= 12 TO 26
VARIABLE 5	MEAN= 27.6	Sd= 1.8468	N= 20	RANGE= 23 TO 30
VARIABLE 6	MEAN= 7.35	Sd= 2.9784	N= 20	RANGE= 2 TO 11
VARIABLE 7	MEAN= .915	Sd= .76796	N= 20	RANGE= -.5 TO 2.2
VARIABLE 8	MEAN= 1.84	Sd= .46043	N= 20	RANGE= .8 TO 2.4
VARIABLE 9	MEAN= .925	Sd= .61462	N= 20	RANGE= .2 TO 2
VARIABLE 10	MEAN= .235	Sd= .66592	N= 20	RANGE= -1.1 TO 2.3
VARIABLE 11	MEAN= .665	Sd= .45685	N= 20	RANGE= .1 TO 2.4
VARIABLE 12	MEAN= .43	Sd= .4669	N= 20	RANGE= -.2 TO 1.9
VARIABLE 13	MEAN= .665	Sd= .55372	N= 20	RANGE= -.1 TO 1.8
VARIABLE 14	MEAN= 1.195	Sd= .20641	N= 20	RANGE= .8 TO 1.6
VARIABLE 15	MEAN= .53	Sd= .49108	N= 20	RANGE= -.2 TO 1.3
VARIABLE 16	MEAN= .205	Sd= 1.1413	N= 20	RANGE= -2.3 TO 1.3
VARIABLE 17	MEAN= .755	Sd= .49255	N= 20	RANGE= -1 TO 1.1
VARIABLE 18	MEAN= .55	Sd= 1.101	N= 20	RANGE= -.5 TO 3.3
VARIABLE 19	MEAN= -.14	Sd= .85495	N= 20	RANGE= -1.4 TO 1.4
VARIABLE 20	MEAN= .3	Sd= 1.0016	N= 20	RANGE= -1 TO 2.4
VARIABLE 21	MEAN= .44	Sd= .78967	N= 20	RANGE= -.2 TO 3.3
VARIABLE 22	MEAN= .045	Sd= .77015	N= 20	RANGE= -.8 TO 1.5
VARIABLE 23	MEAN= .29	Sd= .82008	N= 20	RANGE= -.8 TO 1.6
VARIABLE 24	MEAN= .245	Sd= .6947	N= 20	RANGE= -1.6 TO 1.6
VARIABLE 25	MEAN= 63.6	Sd= 12.305	N= 20	RANGE= 46 TO 84
VARIABLE 26	MEAN= 72.8	Sd= 15.268	N= 20	RANGE= 46 TO 113
VARIABLE 27	MEAN= 9.2	Sd= 6.787	N= 20	RANGE= -1 TO 29
VARIABLE 28	MEAN= 87.4	Sd= 10.713	N= 20	RANGE= 72 TO 102
VARIABLE 29	MEAN= 94.35	Sd= 10.007	N= 20	RANGE= 74 TO 105
VARIABLE 30	MEAN= 6.95	Sd= 3.2683	N= 20	RANGE= 2 TO 15
VARIABLE 31	MEAN= 20.1	Sd= 4.9513	N= 20	RANGE= 12 TO 30
VARIABLE 32	MEAN= 23.5	Sd= 5.1555	N= 20	RANGE= 12 TO 31
VARIABLE 33	MEAN= 2.4	Sd= 2.7028	N= 20	RANGE= -2 TO 9

RAW DATA - EXPERIMENTAL GROUP

HEPMAN TEST				MUSIC PERCEPTION		
CHILD	PRE-TEST	POST-TEST	CHANGE	PRE-TEST	POST-TEST	CHANGE
1	5.0	4.0	-1.0	22.0	28.0	6.0
2	3.0	2.0	-1.0	21.0	28.0	7.0
3	5.0	3.0	-2.0	16.0	27.0	11.0
4	12.0	10.0	-2.0	17.0	29.0	11.0
5	3.0	3.0	0.0	20.0	29.0	9.0
6	13.0	6.0	-7.0	17.0	28.0	11.0
7	0.0	0.0	0.0	25.0	28.0	3.0
8	6.0	2.0	-4.0	12.0	23.0	11.0
9	3.0	1.0	-2.0	24.0	27.0	3.0
10	5.0	4.0	-1.0	25.0	30.0	5.0
11	2.0	2.0	0.0	19.0	26.0	7.0
12	4.0	3.0	-1.0	19.0	25.0	6.0
13	10.0	6.0	-4.0	20.0	28.0	8.0
14	2.0	2.0	0.0	16.0	27.0	11.0
15	3.0	2.0	-1.0	20.0	30.0	10.0
16	4.0	3.0	-1.0	24.0	30.0	6.0
17	3.0	4.0	1.0	19.0	28.0	9.0
18	5.0	4.0	-1.0	26.0	30.0	4.0
19	6.0	2.0	-4.0	20.0	27.0	7.0
20	13.0	3.0	-10.0	23.0	25.0	2.0

IMITATION POSTURES				CROSSING MID-LINE OF BODY		
CHILD	PRE-TEST	POST-TEST	CHANGE	PRE-TEST	POST-TEST	CHANGE
1	1.1	1.8	.7	.5	.8	.3
2	1.8	2.0	.2	.7	.8	.1
3	1.5	2.1	.6	-1.1	.8	1.9
4	-.5	1.5	2.0	-.4	.4	.8
5	1.3	2.3	1.0	.7	.8	.1
6	.5	2.1	1.6	-.4	.7	1.1
7	.8	1.3	.5	.2	.7	.5
8	-.1	.8	.9	.3	.6	.3
9	1.3	1.9	.6	.1	.6	.5
10	-.1	1.6	1.7	.3	.1	-.2
11	.8	1.1	.3	-.5	.1	.6
12	2.2	2.4	.2	-.2	.6	.8
13	-.3	1.6	1.9	.6	.6	0.0
14	1.1	1.3	.2	2.0	2.4	.4
15	1.1	2.4	1.3	.3	.6	.3
16	.5	2.2	1.7	.2	.6	.4
17	.5	1.9	1.4	.1	.9	.2
18	1.3	2.2	.9	.1	.6	.5
19	2.2	2.4	.2	.3	.6	.3
20	1.3	1.9	.6	.6	.6	0.0

BILATERAL MOTOR COORDINATION				RIGHT-LEFT DISCRIMINATION		
CHILD	PRE-TEST	POST-TEST	CHANGE	PRE-TEST	POST-TEST	CHANGE
1	1.4	1.6	.2	.6	.4	-.2
2	1.8	1.6	-.2	.9	1.1	.2
3	.4	1.4	1.0	.4	.3	-.1
4	0.0	1.3	1.3	1.3	1.1	-.2
5	1.4	1.6	.2	.6	1.1	.5
6	-.1	1.2	1.3	-2.3	.7	3.0
7	1.2	1.2	0.0	.9	.9	0.0
8	.5	1.1	.6	-2.3	1.0	3.3
9	1.1	1.1	0.0	1.0	.7	-.3
10	.5	1.1	.6	-.5	-1.0	-.5
11	0.0	1.1	1.1	.9	1.0	.1
12	.8	1.1	.3	0.0	1.0	1.0
13	.3	1.1	.8	.5	.5	0.0
14	1.2	1.1	-.1	-2.1	.3	2.4
15	.5	1.1	.6	1.0	1.0	0.0
16	.7	1.1	.4	-.1	1.0	1.1
17	0.0	.1	1.1	.3	1.0	.7
18	.8	.8	0.0	1.0	1.0	0.0
19	0.0	1.1	1.1	1.0	1.0	0.0
20	.8	1.1	.3	1.0	1.0	0.0

APPENDIX NO. 10 (11)
FNU DATA - EXPERIMENTAL GROUP

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CHILD	STANDING BALANCE EYES OPEN			STANDING BALANCE EYES CLOSED		
	PRE-TEST	POST-TEST	CHANGE	PRE-TEST	POST-TEST	CHANGE
1	-0.8	-1.1	.7	-1.7	-1.5	.2
2	-1.1	-1.3	-.2	-1.7	-1.8	-.1
3	-1.8	-1.8	0.0	-1.7	-1.8	-.1
4	-1.0	.8	0.0	-1.5	-1.2	.3
5	-1.9	.2	3.3	-1.7	.8	1.5
6	-1.1	.2	.2	-1.7	-1.3	.4
7	.6	.6	0.0	.7	.7	0.0
8	-1.9	-1.9	0.0	-1.3	-1.3	0.0
9	-1.7	-1.8	-.1	-1.1	.6	.7
10	.2	.7	.5	-1.3	-1.3	0.0
11	1.3	1.1	-.2	1.5	-.1	-1.6
12	0.0	0.0	0.0	1.1	.7	-.4
13	-1.2	.7	.9	0.0	-.1	-.1
14	1.4	1.5	.1	-.4	-.5	-.1
15	.7	1.0	.3	.3	.3	0.0
16	-1.4	-.4	1.0	-.8	.2	1.0
17	.8	1.6	.8	.9	1.6	.7
18	-1.9	.1	1.0	0.0	1.6	1.6
19	-1.2	-.1	.1	.9	1.6	.7
20	1.0	1.6	.6	1.4	1.6	.2

CHILD	PUPIL RATING SCORE (TOTAL)			ORAL READING		
	PRE-TEST	POST-TEST	CHANGE	PRE-TEST	POST-TEST	CHANGE
1	50.0	61.0	11.0	72.0	74.0	2.0
2	59.0	69.0	10.0	72.0	79.0	7.0
3	78.0	88.0	10.0	80.0	87.0	7.0
4	65.0	69.0	4.0	72.0	84.0	12.0
5	81.0	85.0	4.0	72.0	87.0	15.0
6	56.0	65.0	9.0	77.0	82.0	5.0
7	55.0	67.0	12.0	96.0	105.0	9.0
8	75.0	80.0	5.0	84.0	89.0	5.0
9	84.0	113.0	29.0	98.0	104.0	6.0
10	79.0	90.0	11.0	96.0	105.0	9.0
11	54.0	53.0	-1.0	101.0	105.0	4.0
12	60.0	71.0	11.0	96.0	104.0	8.0
13	57.0	65.0	8.0	89.0	97.0	8.0
14	50.0	72.0	22.0	96.0	101.0	5.0
15	52.0	73.0	21.0	98.0	101.0	3.0
16	69.0	78.0	9.0	85.0	94.0	9.0
17	46.0	46.0	0.0	102.0	105.0	3.0
18	82.0	91.0	9.0	80.0	86.0	6.0
19	66.0	71.0	5.0	96.0	101.0	5.0
20	54.0	59.0	5.0	86.0	97.0	11.0

CHILD	PERSONAL SOCIAL BEHAVIOUR		
	PRE-TEST	POST-TEST	CHANGE
1	16.0	20.0	4.0
2	15.0	21.0	6.0
3	26.0	30.0	4.0
4	20.0	20.0	0.0
5	24.0	27.0	3.0
6	21.0	27.0	6.0
7	12.0	18.0	6.0
8	28.0	28.0	0.0
9	18.0	24.0	6.0
10	25.0	29.0	4.0
11	15.0	13.0	-2.0
12	21.0	23.0	2.0
13	22.0	25.0	3.0
14	18.0	24.0	6.0
15	18.0	27.0	9.0
16	20.0	24.0	4.0
17	12.0	12.0	0.0
18	30.0	31.0	1.0
19	23.0	26.0	3.0
20	18.0	21.0	3.0

APPENDIX NO. 10 (iii)

RAW DATA - CONTROL GROUP

WEPMAN TEST				MUSIC PERCEPTION		
CHILD	PRE-TEST	POST-TEST	CHANGE	PRE-TEST	POST-TEST	CHANGE
1	3.0	1.0	-2.0	20.0	19.0	-1.0
2	8.0	5.0	-3.0	17.0	15.0	-2.0
3	5.0	5.0	0.0	11.0	16.0	5.0
4	4.0	3.0	-1.0	20.0	21.0	1.0
5	7.0	5.0	-2.0	17.0	20.0	3.0
6	2.0	5.0	3.0	19.0	19.0	0.0
7	3.0	4.0	1.0	17.0	23.0	6.0
8	2.0	4.0	2.0	21.0	19.0	-2.0
9	3.0	1.0	-2.0	17.0	13.0	-4.0
10	3.0	4.0	1.0	22.0	27.0	5.0
11	4.0	3.0	-1.0	25.0	22.0	-3.0
12	4.0	3.0	-1.0	20.0	18.0	-2.0
13	3.0	3.0	0.0	24.0	26.0	2.0
14	6.0	3.0	-3.0	23.0	27.0	4.0
15	3.0	1.0	-2.0	23.0	23.0	0.0
16	4.0	3.0	-1.0	25.0	24.0	-1.0
17	5.0	3.0	-2.0	23.0	23.0	0.0
18	3.0	2.0	-1.0	21.0	23.0	2.0
19	3.0	4.0	1.0	21.0	24.0	3.0
20	7.0	7.0	0.0	18.0	23.0	5.0

IMITATION POSTURES				CROSSING MID-LINE OF BODY		
CHILD	PRE-TEST	POST-TEST	CHANGE	PRE-TEST	POST-TEST	CHANGE
1	.1	-.7	-.8	1.0	1.0	0.0
2	1.1	1.3	.2	.8	.4	-.4
3	-.4	-.9	-.5	.6	.5	-.1
4	1.1	.4	-.7	.4	.8	.4
5	.9	1.4	.5	.8	.5	-.3
6	1.4	1.8	.4	.8	.7	-.1
7	0.0	1.1	1.1	.2	.1	-.1
8	0.0	1.1	1.1	.4	.1	-.3
9	.8	.8	0.0	-.5	.6	1.1
10	1.3	.8	-.5	-.5	.6	1.1
11	.5	.8	.3	1.9	2.4	.5
12	.2	-.3	-.5	.3	.1	-.2
13	1.3	1.1	-.2	.6	.6	0.0
14	.2	.5	.3	-.5	.3	.8
15	1.1	1.1	0.0	.5	.6	0.0
16	.2	.2	0.0	.6	.6	0.0
17	1.1	1.9	.8	-.2	-.2	0.0
18	1.1	1.3	.2	.6	.3	-.3
19	.8	-.1	-.9	.2	.6	.4
20	-1.2	-1.7	-.5	.6	.6	0.0

BILATERAL MOTOR COORDINATION				RIGHT-LEFT DISCRIMINATION		
CHILD	PRE-TEST	POST-TEST	CHANGE	PRE-TEST	POST-TEST	CHANGE
1	.5	.4	-.1	-1.3	.6	1.9
2	-.1	-.3	-.2	-1.4	-1.8	-.4
3	.2	-.8	-1.0	0.0	-.7	-.7
4	.9	1.1	.2	1.5	-1.0	-2.5
5	.6	.2	-.4	-.1	-.1	0.0
6	1.4	1.1	-.3	1.0	.7	-.3
7	-.3	.5	.8	.3	.7	.4
8	.5	0.0	-.5	.9	1.0	.1
9	.3	.8	.5	1.0	.7	-.3
10	.5	.5	0.0	1.0	1.0	0.0
11	0.0	0.0	0.0	.5	1.0	.5
12	.8	1.1	.3	1.1	1.1	0.0
13	.9	.8	0.0	.5	.7	.2
14	1.1	1.1	0.0	0.0	0.0	0.0
15	0.0	.3	.3	-.3	1.0	1.3
16	1.1	1.1	0.0	1.0	1.0	0.0
17	.8	.3	-.5	.5	1.0	.5
18	.8	.8	0.0	1.0	1.0	0.0
19	.8	.8	0.0	-2.0	.5	2.5
20	.2	.3	.1	1.0	1.0	0.0

APPENDIX NO. 10 (iv)

RAW DATA - CONTROL GROUP

CHILD	STANDING BALANCE EYES OPEN			STANDING BALANCE EYES CLOSED		
	PRE-TEST	POST-TEST	CHANGE	PRE-TEST	POST-TEST	CHANGE
1	-.9	.3	1.2	.3	-1.1	-1.4
2	-.7	1.9	2.6	-.4	2.1	2.5
3	-.9	-.1	.8	-.2	-.8	-.6
4	1.0	1.1	.1	.8	.5	-.3
5	-.8	-.9	-.1	.2	-.9	-1.1
6	.1	-.3	-.4	-.5	-1.1	-.6
7	-1.0	-1.1	-.1	-1.9	-.7	1.2
8	-.4	-.5	-.1	-.1	-.4	-.3
9	-.1	-.1	0.0	0.0	-.1	-.1
10	-.5	-.2	.3	1.6	1.5	-.1
11	-.5	1.2	1.7	.4	.9	.5
12	.6	-.7	-1.3	1.6	.9	-.7
13	.8	1.0	.2	.9	.9	0.0
14	1.5	1.6	.1	.8	1.6	.8
15	.3	.3	0.0	.5	.5	0.0
16	-.6	-.2	.4	1.4	1.6	.2
17	-.3	.8	1.1	1.1	.8	-.3
18	-.8	-.6	.2	.7	-.1	-.8
19	1.6	1.6	0.0	.6	1.6	1.0
20	-.9	-.9	0.0	1.1	-.1	-1.2

CHILD	PUPIL RATING SCORE (TOTAL)			ORAL READING		
	PRE-TEST	POST-TEST	CHANGE	PRE-TEST	POST-TEST	CHANGE
1	65.0	94.0	29.0	72.0	87.0	15.0
2	74.0	73.0	-1.0	72.0	86.0	14.0
3	54.0	70.0	16.0	90.0	93.0	3.0
4	93.0	97.0	4.0	90.0	93.0	3.0
5	76.0	96.0	20.0	89.0	90.0	1.0
6	85.0	103.0	18.0	74.0	91.0	17.0
7	56.0	57.0	1.0	92.0	97.0	5.0
8	55.0	67.0	12.0	80.0	84.0	4.0
9	56.0	68.0	12.0	88.0	92.0	4.0
10	58.0	69.0	11.0	81.0	81.0	0.0
11	83.0	92.0	9.0	103.0	103.0	0.0
12	62.0	70.0	8.0	99.0	98.0	-1.0
13	55.0	63.0	8.0	80.0	80.0	0.0
14	66.0	66.0	0.0	****	****	****
15	67.0	71.0	4.0	103.0	100.0	-3.0
16	85.0	92.0	7.0	104.0	104.0	0.0
17	69.0	70.0	1.0	103.0	103.0	0.0
18	74.0	70.0	-4.0	98.0	98.0	0.0
19	72.0	81.0	9.0	103.0	103.0	0.0
20	54.0	55.0	1.0	****	****	****

CHILD	PERSONAL SOCIAL BEHAVIOUR		
	PRE-TEST	POST-TEST	CHANGE
1	16.0	24.0	8.0
2	31.0	29.0	-2.0
3	13.0	21.0	8.0
4	36.0	35.0	-1.0
5	26.0	31.0	5.0
6	31.0	35.0	4.0
7	22.0	22.0	0.0
8	19.0	21.0	2.0
9	20.0	23.0	3.0
10	21.0	22.0	1.0
11	35.0	35.0	0.0
12	25.0	31.0	6.0
13	22.0	24.0	2.0
14	21.0	21.0	0.0
15	18.0	19.0	1.0
16	35.0	36.0	1.0
17	20.0	20.0	0.0
18	21.0	21.0	0.0
19	26.0	30.0	4.0
20	21.0	21.0	0.0

LIST OF REFERENCES

- Adamson, C.K. Effects of Prescribed Music Therapy on the Psychological Development of Disadvantaged Preschool Children. Unpublished Masters Thesis, Hannemann Medical College, Philadelphia, 1977.
- Adelman, H.S. The Not-so-Specific Learning Disabled Population. Exceptional Children, 1971, 37, 528 - 533b.
- Adelman, H.S. Diagnostic Classification of Learning Problems: Some Data. American Journal of Orthopsychiatry, 1978, 48, 716 - 726.
- Adelman, H.S.; & Taylor, L. Two Steps Towards Improving Learning for Students with (and without) "Learning Problems". Journal of Learning Disabilities, 1977, 10 (7), 66 - 72.
- Adelman, H.S.; & Taylor, L. Learning Disabilities in Perspective, USA: Scott, Foresman & Co., 1983.
- Aiello, R. Cerebral Dominance for the Perception of Arpeggiated Triads. Journal of Research in Music Education, 1979, 16, 470 - 478.
- Alley, J.M. Music in the I.E.P., Journal of Music Therapy, 1979, 14 (3), 111 - 127.
- Alvin, J. Music for the Handicapped Child. London: Oxford University Press, 1965.
- Alvin, J. Music Therapy. London: Hutchinson, 1975.
- Alvin, J. Music Therapy for the Autistic Child. London: Oxford University Press, 1978.
- Amerikaner, M.; & Summerlin, M.L. Group Counseling with Learning Disabled Children: Effects of Social Skills and Relaxation Training on Self Concept and Classroom Behavior. Journal of Learning Disabilities, 1982, 15 (6), 340 - 343.
- Austen, M.P. The Effects of Music on the Learning of Random Shapes and syllables with institutionalized severely mentally Retarded Adolescents. Contribution to Music Education, 1977, 5, 54 - 69.
- Ayres, A.J. Sensory Integration and Learning Disabilities 2nd ed. USA: 1973.
- Ayres, A.J. Southern California Perceptual-motor Tests Manual. 7th printing. USA: Western Psychological Services, 1979.
- Barrett, H. Reduction in Rate of Multiple Tics by Free Operant Conditioning Methods. Journal of Nervous and Mental Disorders, 1962, 135, 187 - 195.
- Bartholomeus, B. Effects of Task Requirements on Ear Superiority for Sung Speech. Cortex, 1974, 10, 215 - 223.
- Baumgarte, R.; & Franklin, E. Lateralization of Components of Melodic Stimuli: Musicians versus Nonmusicians. Journal of Research in Music Education, 1981, 29, 199 - 208.

- Baxley, B.L. The Effects of Training in Discrimination of Pitches on the Ability to Discriminate Speech Sounds in Primary Age Children Classified as Learning Disabled in Area of Auditory Discrimination: Paper presented at the Annual International Convention, The Council for Exceptional Children (57th, Dallas, Texas, April 22-27, 1979, Session A-1).
- Bennis, J. The Use of Music as a Therapy in the Special Education Classroom. Journal of Music Therapy, 1969, 6, 15 - 18.
- Bentley, A. Bentley Measures of Musical Ability, London: Harrap, 1966.
- Berel, M.; Diller, L.; & Orgel, M. Music as a Facilitator for Visual Motor Sequencing Tasks in Children with Cerebral Palsy. Developmental Medicine and Child Neurology, 1971, 13, 335 - 342.
- Bever, T.G.; & Chiarello, R.J. Cerebral Dominance in musicians and Non-musicians. Science, 1974, 185, 137 - 139.
- Blakeslee, T.R. The Right Brain. Great Britain: The Macmillan Press Ltd, 1980.
- Bleger, J. Psicologia de la Conducta. Buenos Aires, Argentina: Paidós, 1973.
- Breadsley, G.L. The Medical Uses of Music. Medical Monthly, 1882/3, 2, 214 - 216. Quoted by Alvin, J., op. cit., 1975.
- Bruner, E.C. Teaching Disorders. In B. Bateman (Ed.). Learning Disorders, Vol. 4. Seattle: Special Child Publications, 1971.
- Brutten, M.; Richardson, S.O.; & Mangel, C. Something is wrong with my Child. New York: Harcourt Brace Jovanovich, 1973.
- Bryan, T.H.; & Bryan, J.H. The Social-emotional Side of Learning Abilities. Behavior Disorders, 1977, 2, 141 - 145.
- Burris-Meyer, H.; & Cardinell, R.L. The Place of Music in Healing. Journal of the Acoustical Society of America, 1946, 17, 232 - 235.
- Butler, B. Music Group Psychotherapy. Journal of Music Therapy, 1966, 3, 49 - 52.
- Cegelka, W.J. The Competencies needed by Persons Responsible for Classifying Children with Learning Disabilities. Journal of Special Education, 1982, 16 (1), 64 - 71.
- Chadwick, D.R. Speech Disorders and Music. Instrumentalist, 1976, 31 (1), 28 - 30.
- Chalfant, J.C.; & Scheffelin, M. Central Processing Dysfunctions in Children: a Review of Research. U.S. Dept. of Health, Education and Welfare, National Institute of Neurological Diseases and Stroke, 1969.
- Chapman, R.B.; Larsen, S.C.; & Parker, M.P. Interactions of First-grade Teachers with Learning Disordered Children. Journal of Learning Disabilities, 1979, 12 (4), 20 - 25.
- Charlesworth, E.A. Music, Psychology and Psychotherapy. The Arts in Psychotherapy, 1982, 9, 191 - 202.

- Chomet, D.H. The Influence of Music on Health and Life. Translation: Flint. New York: Putnam, 1875. Quoted by Sekeles, J., op. cit., 1979.
- Clarke, L. Can't read, can't write, can't talk too good either. New York: Walker, 1973.
- Cohen, S.A. Dyspedagogia, as a Cause of Reading Retardation: Definition and Treatment. In B. Bateman (Ed.). Learning Disorders, Vol. 4, Seattle: Special Child Publications, 1971.
- Condon, W. Speech Makes Babies Move. In R. Lewis (Ed.). Child Alive. London: Temple Smith, 1975.
- Cook, R.B. Right-left Differences in the Perception of Dichotically Presented Musical Stimuli. Journal of Music Therapy, 1973, 10 (2), 59 - 63.
- Critchley, McD.; & Hanson, R.A. Music and the Brain. Great Britain: Camelot Press, 1977.
- Cruickshank, W.M.; Bentzen, F.A.; Ratzeburg, F.H.; & Tannhauser, M.T. A Teaching Method for Brain-injured and Hyperactive Children. Syracuse: Syracuse University Press, 1961.
- Day, C. Pre-listening: Teaching toward Auditory Competence. Speech presented at the 5th Annual TESOL Conference, New Orleans, Louisiana, March, 1971.
- Deutsch, C. Auditory Discrimination and Learning. Merrill-Palmer Quarterly of Behavior and Development, 1964, 10, 277 - 296.
- Diserens, C.M. The Influence of Music on Behavior. Princeton: Princeton University Press, 1926.
- Dorow, L.G. Conditioning Music and Approval as New Reinforcers for Imitative Behavior with the Severely Retarded. Journal of Music Therapy, 1975, 12, 30 - 39.
- Doro, L.G. Televised Music Lessons as Educational Reinforcement for Correct Mathematical Responses with the Educable Mentally Retarded. Journal of Music Therapy, 1976, 13, 77 - 86.
- Durell, D.D. Durell Analysis of Reading Difficulty, 2nd Ed. New York: H.B. Jovanovich Inc., 1955.
- Dykman, R.A. In step with 94-142, two by two. Music Educators Journal, 1979, 65 (5), 58 - 63.
- Eisenstein, S.R. Effect of Contingent Guitar Lessons on Reading Behavior. Journal of Music Therapy, 1974, 11, 138 - 146.
- Epley, C. In a Soundless World of Musical Enjoyment. Journal of Music Education, 1972, 58 (4), 55.
- Farnsworth, P. The Social Psychology of Music. Ames, Iowa: Iowa State Press, 1969.
- Flower, R.M. The Evaluation of Auditory Abilities in the Appraisal of Children with Reading Problems. In H.K. Smith (Ed.). Perception and Reading, Newark, Del.: International Reading Association, 1968.

- Franklin, E.; & Baumgarte, R. Auditory Laterality Effects for Melodic Stimuli among Musicians and Nonmusicians. Journal of Research in Music Education, 1978, 26, 48 - 56.
- Frostig, M. Education for Children with Learning Disabilities. Progress in Learning Disabilities, Vol. I. R. Myklebust (Ed.), New York, 1972.
- Frostig, M.; & Horne, D. The Frostig Program for the Development of Visual Perception: Teacher's Guide. Chicago: Follett, 1964.
- Frostig, M.; & Maslow, P. Learning Problems in the Classroom. New York: Grune & Stratton, 1973.
- Gainza, V. Ocho estudios de Pedagogia Musical. Buenos Aires, Argentina: Paidos, 1982.
- Galloway, H.F. A Comprehensive Bibliography of Music Referential to Communicative Development, processing, Disorders, and Remediation. Journal of Music Therapy, 1975, 12, 164 - 196.
- Gaston, E.T. (Ed.). Music in Therapy. New York: Macmillan, 1968.
- Gates, A.; & Bradshaw, J.L. The Role of the Cerebral Hemispheres in Music. Brain and Language, 1977, 4, 403 - 431.
- Giacobbe, G.A. Rhythm builds Order in Brain-damaged Children. Journal of Music Education, 1972, 58 (4), 40 - 43.
- Gilman, L.; & Paperte, F. Music as a Psychotherapeutic Agent. In A. Capurso, V.R. Fisichelli, L. Gillman, E.A. Gutheil, F.T. Wright & F. Paperte (Eds.), Music and your Emotions. New York: Liveright, 1952.
- Gordon, E. Musical Aptitude Profile. Boston: Houghton Mifflin, 1965.
- Gordon, H.W.; & Bogen, J.E. Hemispheric Lateralization of Singing after Intercarotid Sodium Amylobarbitone. Journal of Neurology, Neurosurgery, and Psychiatry, 1974, 37, 727 - 738.
- Gordon, H.W. Left Hemisphere Dominance for Rhythmic Elements in Dichotically-presented Melodies. Cortex, 1978, 14, 58 - 70.
- Gregory, A.H.; Harriman, J.C.; & Roberts, L.D. Cerebral Dominance for the Perception of Rhythm. Psychonomic Science, 1972, 28 (2), 75 - 76.
- Hall, J.C. The Effect of Background Music on the Reading Comprehension of 278 Eighth and Ninth Grade Students. Journal of Educational Research, 1952, 45, 451 - 458.
- Hallahan, D.P.; & Cruickshank, W.M. Psychoeducational Foundations of Learning Disabilities. Englewood Cliffs, N.J.: Prentice-Hall, 1973.
- Hallahan, D.P.; & Kauffman, J. Introduction to Learning Disabilities: A Psycho-behavioral Approach. New Jersey: Prentice-Hall, 1976.
- Hallahan, D.P.; & Kauffman, J. Exceptional Children: Introduction to Special Education, 2nd Ed. Englewood Cliffs, N.J.: Prentice-Hall, 1982.
- Halperin, Y.; Nachshon, I.; & Carmon, A. Shift of Ear Superiority in Dichotic Listening to Temporally Patterned Nonverbal Stimuli. Journal of the Acoustical Society of America, 1973, 53, 4, 50.

- Hannett, F. The Haunting Lyric: The Personal and Social Significance of American Popular Songs. Psychoanalytic Quarterly, 1964, 33, 226 - 269.
- Harrison, W.; Locrone, H.; Temerlin, M.K.; & Trousdale, W.W. The Effect of Music and Exercise upon the Self-help Skills of Nonverbal Retardates. American Journal of Mental Deficiency, 1966-67, 71, 279 - 282.
- Head, H. Aphasia and Kindred Disorders of Speech. Vol. I. Cambridge: University Press, 1926. Quoted by Ayres, J., op. cit., 1979.
- Henson, R.A. Neurological Aspects of Musical Experience. Music and the Brain. Great Britain: Camelot Press, 1977.
- Hirschkowitz, M.; Earle, J.; & Paley, B. EEG Alpha Asymetry in Musicians and Nonmusicians: A Study of Hemispheric Specialization. Neuropsychologia, 1978, 16 (1), 125 - 128.
- Hurwitz, I.; Wolff, P.; Bortnick, B.; & Kokas, K. Non-musical Effects of the Kodaly Music Curriculum in Primary Grade Children. Journal of Learning Disabilities, 1975, 8 (3), 45 - 52.
- Jorgenson, B. The Use of Contingent Music Activity to Modify Behaviors which Interfere with Learning. Journal of Music Therapy, 1974, 11, 41 - 46.
- Kavale, K. The Relationship between Auditory Perceptual Skills and Reading Ability: A Meta-Analysis. Journal of Learning Disabilities, 1981, 14 (9), 539 - 546.
- Kephart, N.C. The Slow Learner in the Classroom. 2nd Ed. Columbus, Ohio: Merrill, 1971.
- Kephart, N.C. The Perceptual-motor Match. In W.M. Cruickshank & D.P. Hallahan (Eds.). Perceptual and Learning Disabilities in Children. Vol. I. Psychoeducational Practises. Syracuse: Syracuse University Press, 1975.
- Kimura, D. Left-right Differences in the Perception of Melodies. Quarterly Journal of Experimental Psychology, 1964, 16 (4), 355 - 358.
- Kimura, D. Functional Asymmetry of the Brain in Dichotic Listening. Cortex, 1967, 3, 163 - 178.
- Kinsbourne, M. Cerebral Dominance, Learning and Cognition. Progress in Learning Disabilities, Vol. III, R. Myklebust (Ed.), New York, 1975.
- Kirk, S.A. Educating Exceptional Children. Boston, USA: Houghton Mifflin, 1972.
- Kokas, K. Psychological Tests in Connection with Music Education in Hungary. Journal of Research in Music Education, 1969, 8 (3), 102 - 114.
- Kodaly, Z. Folksong in Pedagogy. Music Education Journal, 1967, 53(7), 59 - 61.
- Langer, S. Philosophy in a New Key. New York: Mentor Brooks, 1951.
- Larson, B.A. Use of the Motorvator in Improving Gross-Motor Coordination, Visual Perception and I.Q. Scores: A Pilot Study. Journal of Music Therapy, 1978, 15 (3), 145 - 149.
- Lashley, K.S. The Problem of Serial Order in Behavior. In Jeffress, L.A. (Ed.). Cerebral Mechanisms in Behavior. New York: John Wiley, 1951.
- Lea, J. The Association between Rhythmic Ability and Language Ability. In Jones, M.F. (Ed.). Language Disability in Children. England: International Medical Publishers, 1980, 217 - 230.
- Leonidas, J. Healing Power of Chants. New York State Journal of Medicine, 1981, 81, 966 - 968.

- Lerner, J.W. Children with Learning Disabilities, 2nd Ed. Boston, USA: Houghton, Mifflin, 1976.
- Levick, M.; Dulicai, D.; Briggs, C.; Billock, L. The Creative Arts Therapies. In Adamson, W.C. & Adamson, K.K. (Ed.). A Handbook for Specific Learning Disabilities. New York: Gardner Press Inc., 1979.
- Levin, H.D.; & Levin, G.M. Instrumental Music: A Great Ally in Promoting Self-Image. Journal of Music Education, 1972, 58 (4), 31 - 34.
- Leviton, H. & Kiraly, J. Intervention Strategies for Promoting Self-concept Development. Academic Therapy, 1979, 5, 535 - 545.
- Locke, S.; & Kellar, L. Categorical Perception in a Non-linguistic Mode. Cortex, 1973, 9, 353 - 367.
- Levy-Agresti, J.; & Sperry, R.W. Differential Perceptual Capacities in Major and Minor Hemispheres. Proceedings of the National Academy of Sciences, 1968, 61, 1151.
- Madsen, C.K.; & Madsen, C.H., Jr. Music as a Behavior Modification Technique with a Juvenile Delinquent. Journal of Music Therapy, 1968, 5, 72 - 76.
- Madsen, C.K.; Madsen, C.H., Jr.; & Michel, D.E. The Use of Music Stimuli in Teaching Language Discrimination. In C.K. Madsen, R.D. Greer & C.H. Madsen, Jr. (Eds.). Research in Music Behavior: Modifying Music Behavior in the Classroom. New York: Teachers College Press, 1975.
- Madsen, C.K.; & Geringer, J.M. Choice of Televised Music Lessons versus Free Play in Relationship to Academic Improvement. Journal of Music Therapy, 1976, 13 (4), 154 - 162.
- Marquardt, T.P.; & Saxman, J.H. Language Comprehension and Auditory Discrimination in Articulation Deficient Children. Journal of Speech and Hearing Research, 1972, 15, 382 - 389.
- Matteson, C.A. Finding the Self in Space: More than one handicap doesn't make less than one child. Journal of Music Education, 1972, 58 (4), 63 - 65.
- Matuszek, P.; & Oakland, T. Factors Influencing Teachers and Psychologists Recommendations Regarding Special Class Placement. Journal of School Psychology, 1979, 17, 116 - 125.
- McCarthy, J.; & McCarthy, J. Learning Disabilities. Boston: Allyn & Bacon, Inc., 1970.
- Metzler, R.K. The Use of Music as a Reinforcer to Increase Imitative Behavior in Severely and Profoundly Retarded Female Residents. Journal of Music Therapy, 1974, 11, 97 - 110.
- Michel, D.E. Music Therapy: An Introduction to Therapy and Special Education through Music. Springfield, Illinois, USA: Charles C. Thomas, 1976.
- Michel, D.E.; Parker, P.; Giokas, D.; Werner, J. Music Therapy and Remedial Reading: Six Studies Testing Specialized Hemispheric Processing. Journal of Music Therapy, 1982, 14 (4), 219 - 229.
- Miller, D.M.; Dorow, L.G.; & Greer, R.D. The Contingent Use of Music and Art in Improving Arithmetic Scores. Journal of Music Therapy, 1974, 11, 57-64.

- Miller, D.M. Effects of Music Listening Contingencies on Arithmetic Performance and Music Preference of EMR Children. American Journal of Mental Deficiency, 1977, 8, 371 - 378.
- Milner, B. Laterality Effects in Audition. Interhemispheric Relations and Cerebral Dominance. Baltimore: Johns Hopkins University Press, 1962.
- Montessori, M. Childhood Education. 2nd Ed. USA: Regnery, 1974.
- Mooney, M.K. Blind Children Need Training not Sympathy. Journal of Music Education, 1972, 58 (4), 56 - 60.
- Morency, A. Auditory Modality and Reading: Research and Practice. In H.K. Smith (Ed.). Perception and Reading. Newark, Del.: International Reading Association, 1968.
- Moreno, J. Musical Psychodrama: A New Direction in Music Therapy. Journal of Music Therapy, 1980, 17 (1), 34 - 42.
- Moyer, B.G. Music for Children with Reading Learning Disabilities. Paper presented at the International Scientific Conference of IFLD (3rd, Montreal, Canada, August 9 - 13, 1976).
- Murray, C.H. The Learning Disabled Child in the Eighties. South African Journal for Learning and Educational Disabilities, 1980, 1 (2), 11 - 32.
- Myklebust, H.R. The Pupil Rating Scale: Screening for Learning Disabilities. New York: Grune & Stratton, 1971.
- Natale, M. Perception of Nonlinguistic Auditory rhythms by the Speech Hemisphere. Brain and Language, 1977, 4, 32 - 44.
- Neisser, U. Cognitive Psychology. New York: Appleton Century Crofts, 1967.
- Nordoff, P.; & Robbins, C. Music Therapy in Special Education. 2nd Ed. New York: The John Day Co., 1975.
- Nordoff, P.; & Robbins, C. Creative Music Therapy. New York: The John Day Co., 1977.
- Orff, C. Music for Children. English adaptation by Margaret Murray. London: Schott, 1960.
- Parnell, P.; & Korzeniowski, R. Auditory Perception and Learning, Part II. Remedial Education, 1972, 4, 20 - 22.
- Paynter, J.; & Aston, P. Sound and Silence. London: Universal ed., 1970.
- Perozzi, J.; & Kinze, L.M. Relationship between Speech and Discrimination Skills and Language Abilities of Kindergarten Children. Journal of Speech and Hearing Disabilities, 1971, 14, 382 - 390.
- Piaget, J. The Psychology of Intelligence, Trans. M. Inerby and D.E. Berlyne. London: Routledge and Kegan Paul, 1950.
- Podvin, M. The Influence of Music on the Performance of a Work Task. Journal of Music Therapy, 1967, 2, 52 - 56.
- Priestley, M. Music Therapy in Action. London: Constable, 1975.

- Rahmani, L. Brain and Learning Processes and Disabilities. 2nd Ed. Tel-Aviv, Israel: Papyrus, 1983.
- Reid, D.H.; Hill, B.K.; Ravers, R.J.; & Montegar, C.A. The Use of Contingent Music in Teaching Social Skills to a Nonverbal, Hyperactive Boy. Journal of Music Therapy, 1975, 12, 2 - 18.
- Reid, D.K.; & Hresko, W.P.A. Cognitive Approach to Learning Disabilities. USA: McGraw-Hill Inc., 1981.
- Reik, R. The Haunting Melody: Psychoanalytic Experience in Life and Music. New York: Farrar, Strauss & Young, 1953.
- Rejto, A. Music as an Aid to the Remediation of Learning Disabilities. Journal of Learning Disabilities, 1973, 6, 286 - 295.
- Rieber, M. The Effect of Music on the Activity Level of Children. Psychonomic Science, 1965, 3, 325 - 326.
- Rink, M. The Therapeutic Value of Music in Remedial Work with Children with Psychoneurological Dysfunction. Ph.D. Thesis, University of the Witwatersrand, Johannesburg, South Africa, 1972.
- Ritschl, C.; Mongrella, J.; & Presbie, R. Group Time out from Rock-and-Roll Music and Out-of-seat Behavior of Handicapped Children while Riding a School Bus. Psychological Reports, 1972, 31, 967 - 973.
- Robinson, G.M.; & Solomon, D. Rhythm is Processed by Speech Hemisphere. Journal of Experimental Psychology, 1974, 102, 508 - 511.
- Rockland, L. What Kind of Fool am I? A Study of Popular Songs in the Analysis of a Male Hysteric. Psychiatry, 1970, 33, 516 - 525.
- Roskam, K. Music Therapy as an Aid for Increasing Auditory Awareness and Improving Reading Skill. Journal of Music Therapy, 1979, 16, 31 - 42.
- Rosner, J. The Development and Validation of an Individualized Perceptual Skills Curriculum. Pittsburg: Learning Research and Development Center, 1972. (Research paper)
- Sabitino, O.; & Miller, T. Dilemma of Diagnosis in Learning Disabilities: Problems and Potential Directions. Psychology in the Schools, 1980, 17, 76 - 86.
- Salmon, S. Music against Dyslexia. Music in Education, 1978, 43, 210 - 211.
- Saperston, B. The Use of Music in Establishing Communication with an Autistic Mentally Retarded Child. Journal of Music Therapy, 1973, 10, 184 - 188.
- Seashore, C.E.; Lewis, D.; & Sactreitt, J. Seashore Measures of Musical Talents. New York: Psychological Corporation, 1956.
- Selz, M.; Reitan, R.M. Rules for Neuropsychological Diagnosis: Classification of Brain Function in Older Children. Journal of Consulting and Clinical Psychology, 1979, 47 (2), 258 - 264.
- Scott, T. The Use of Music to Reduce Hyperactivity in Children. American Journal of Orthopsychiatry, 1970, 40, 128 - 130.
- Schronell, F.J.; & Goodacre, E.J. The Psychology and Teaching of Reading. 5th Ed., London: Oliver & Boyd, 1974.

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