

MUSIC AS A THERAPEUTIC RESOURCE
FOR LEARNING DISABLED CHILDREN

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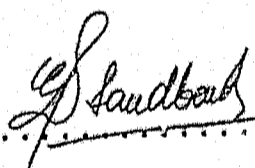
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Supervisor: Professor M.S. Skuy

I hereby declare that this
dissertation is my own work
and has not been submitted
or incorporated in another
dissertation or thesis for
any other degree.


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1st November 1983.

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A B S T R A C T

This dissertation deals with the role of music as a therapeutic resource in the treatment of learning disabilities. The dissertation consists of three parts. The first part, from Chapter 1 to 3, presents a review of the literature. A definition of Music Therapy and its current applications is provided in Chapter 1, summarizing its effectiveness in the treatment of children with special needs. Chapter 2 defines the concept of Learning Disabilities. The main approaches in educational intervention are mentioned, and a chart is provided describing the specific population dealt with in the study embodied here. Chapter 3 reviews the educational, physiological, psychological and social aspects involved in the treatment of Learning Disabilities through Music Therapy techniques, providing the basis for the rationale of the study.

The second part, from Chapter 4 to 6, describes the study itself. Twenty children between the ages of 6.10 to 10.9 years old were selected as an Experimental (E) group from a private remedial school specialising in Learning Disabilities in Pretoria. A Control (C) group with the same characteristics was formed in a similar school in Johannesburg. The aim of the study was to investigate whether twice-weekly Music Therapy sessions, provided as an integral part of the programme of the remedial school for five months, would improve the children's auditory discrimination, perceptual-motor coordination and social behaviour. As a consequence of the improvements in these skills, an enhancement of their scholastic achievement would be expected. Such improvement would be greater than that ordinarily achieved at a remedial school, as demonstrated by comparison with the C group.

A special Music Therapy programme was implemented with this purpose with the E group. The intervention techniques are explained in Chapter 5, which describes the role of the teachers in the project and provides an analysis of the musical activities, their therapeutic aims and the children's reaction to the programme. The results and their statistical analysis are presented in Chapter 6.

A comparison between the E group and the C group by means of the Mann-Whitney U test showed a significant improvement in the E group in the Music Perception test, three aspects of the Ayres perceptual-motor coordination test (Imitation of Postures, Bilateral Motor Coordination, and Crossing the Mid-line of body)

and in Oral reading. Although a higher mean for the Wepman test and the Myklebust Pupil Rating Scale was found in the E group, the results did not reach significance. The correlations found are reported and an analysis of the questionnaire for the teachers is provided.

The third part comprises the discussion in Chapter 7. The findings and their implications are interpreted. Various shortcomings are elaborated upon, suggestions for further research proposed and the conclusions of the study are outlined.

The results suggest the effectiveness of Music Therapy techniques in a school for learning disabled children and indicate directions for further research in this new and promising field.

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CHAPTER 1

MUSIC AS A THERAPEUTIC AGENT

1.1. Introduction

The therapeutic uses of music have been referred to by different cultures all over the world since ancient times. Throughout the history of humankind, the role of music as a therapeutic agent was closely related to the religious and philosophical beliefs of each period (Alvin, 1975; Sekeles, 1979).

During the 19th century, with the development of the scientific approach, interest arose concerning the influence of music in the physiology and the emotions of human beings, and several researches were done in collaboration with medical specialists. Since the early works of Chomet (1875) and Breadsley (1882) about the influence of music in health and life and its medical uses, medical research (mainly psychiatry and neurology) and psychological research, attempted to shed light on the psychological and physiological influence of music.

1.2. Definition and goals of Music Therapy

Music Therapy as a discipline can be defined in various ways according to the field to which it relates. A basic definition by Alvin (1975) states that "Music Therapy is the controlled use of music in the treatment, rehabilitation, education and training of children and adults suffering from physical, mental or emotional disorder" (p. 4).

A more detailed definition by the National Association for Music Therapy (1977) points out that Music Therapy is "... the use of music in the accomplishment of therapeutic aims; the restoration, maintenance, and improvement of mental and physical health. It is the systematic application of music, as directed by the music therapist in a therapeutic environment, to bring about desirable changes in behavior. Such changes enable the individual undergoing therapy to experience a greater understanding of himself and the world about him, thereby achieving a more appropriate adjustment to society. As a member of the therapeutic team the professional music therapist participates in the analysis of individual problems and in the projection of general treatment aims before planning and carrying out specific musical activities. Periodic evaluations are made to determine the effectiveness of the procedures employed."

The field of study of Music Therapy includes the research on the relation between music and man, the effects of music and its different components (rhythm, sound, structure) on man's body and emotions, and the influence of music perception in man's behaviour and abilities.

The goal of the music therapist is to devise the relevant therapeutic approach suitable for the specific patient or group and to attain his remediation or rehabilitation through Music Therapy techniques in collaboration with the medical or educational staff involved in the treatment.

As a paramedical discipline, Music Therapy is concerned with the search for appropriate means for the diagnosis of the different disabilities or handicaps, evaluating strengths and weaknesses through music making and through testing based on the perception of musical elements.

A functional description of Music Therapy as a profession is provided by Michel (1976): "Music therapists make use of music as a form of communication which may enhance the development of a warm, helping relationship with clients. But music, skilfully applied as structure, as a reinforcing activity of great power and as a time-ordered stimulator and facilitator of human activity, does differentiate music therapists from other types of therapists and special teachers" (p. 105).

1.3. Current applications

Music therapy is practised nowadays in the areas of mental health, sensory handicaps and special education as a paramedical discipline, in close collaboration with the medical as well as the educational staff.

According to Michel (1976), "Music Therapy allies itself with and depends upon the findings of other behavior sciences as well as its own scientific research" (p. 4).

Current research in the field of neurophysiology for instance deals with the anatomical localization of musical faculties (Critchley & Hanson, 1977; Baumgarte & Franklin, 1981) and their relation to the processing of cognitive functions in the brain (Kavale, 1981; Lea, 1980; Roskam, 1979).

In the fields of physiology and psychotherapy, music is considered "the Universal adjuvant therapy" (Leonidas, 1981) because of its value as a powerful stimulus acting on the organism. Reviewing the older literature on the

effects of music on our physiological responses, Diserns (1926) reports consensus on the following issues: Music (1) increases bodily metabolism; (2) increases or decreases muscular activity; (3) accelerates respiration and decreases its regularity; (4) produces marked but variable effects on volume, pulse and blood pressure; (5) lowers the threshold of various sensory stimuli; (6) affords the physiological basis for the creation of various emotions.

These observations led to the application of music as a stimulating factor in industry (Diserns, 1926). The Harvard Fatigue Laboratory reached the conclusion that "certain kinds of music of certain people can sustain attention to prolong psychomotor performance above and beyond the effects of drugs" (Burris-Meyer & Cardinell, 1946).

In the early 1940s, after the Second World War, music was introduced in the Mental Hospitals as a therapeutic aid to assist in the recovery of veterans "pathetically out of gear with reality" (Gilman & Paperte, 1952). These two authors review the practical application of music in hospitals and enumerate its beneficial effects as: (a) attracting attention and prolonging its span; (b) producing various moods; (c) planting engrams, stimulating associations and imagery; (d) relieving internal tension; and (e) facilitating self-expression (p. 34).

Several authors report on the value of music as a resource in psychotherapy. Priestley (1968) and Gaston (1968) report on the use of music as a projective technique. Being a non-verbal means of communication, music may evoke and facilitate the expression of emotions which could not be previously verbalized. Farnsworth (1969) claims that for most people the real essence of music lies in the fact that it gives each person an opportunity to project his private experience through his own personal images. Langer (1951) states: "The real power of music lies in the fact that it can be 'true' to the life of feeling in a way that language cannot, for its significant forms have the ambivalence of content which words cannot have" (p. 206). Charlesworth (1982) mentions the observations by Hannett (1964), Reik (1953) and Rockland (1970) on the important role of songs and lyrics in the specific problems of their patients during treatment. Using music in group psychotherapy, Butler (1966) has found that the use of lyrics may facilitate the patient's interpreting, verbalizing and projecting his own feelings into a discussion.

However, because of the intimate relation between music and our emotions, music can also produce very harmful effects. As Alvin (1975) observes, the beneficial effects of music sometimes depend on the place that music has

occupied in the patient's life, of its associations which it may be desirable either to re-awaken or to leave dormant. Charlesworth (1982) and Slonimsky (1971) report the relationship between music and suicidal thoughts in acute depressive patients, concluding that the "power" of music in its relationship to psychology is not simple and awaits more systematic studies. Music as a therapy should be considered in the same way as the best of chemical drugs: its use must be controlled by a professional who should also be aware of the harmful effects it can produce, being so intricately tied up with man and his emotions.

1.4. Effectiveness of Music Therapy with children with special needs

Since the first publications of the National Association for Music Therapy (NAMT) in the USA (1950) and of the British Society of Music Therapy in London (1958), articles and books on the effectiveness of music in the treatment and rehabilitation of persons of all ages have been published all over the world. The majority of the publications are issued in the USA, England, France and Germany. Concerning children with special needs, the scope of the application of music includes all the handicaps and disabilities dealt with in the framework of special education.

Many music therapists and music educators have written about the role of music in the treatment and rehabilitation of handicapped children (Alley, 1979; Alvin, 1965; Bennis, 1969; Gaston, 1968; Giacobbe, 1972; Levin & Levin, 1972; Matteson, 1972; Mooney, 1972; Nordoff & Robbins, 1971, 1977; Weigl, 1959).

In PL 94-142, the Education for All Handicapped Children Act, the USA Congress stated: "The use of the arts as a teaching tool for the handicapped has long been recognized as a viable, effective way not only of teaching special skills, but also of reaching youngsters who had otherwise been unteachable" (Implementation, 1977, p. 42488). Alley (1979) observes that "of all the arts, music has by far the strongest research base to document its effectiveness in facilitating learning processes" (p. 144).

Some of the special education curricular areas in which music therapy has proved to be particularly beneficial are:

(a) Teaching academic skills such as mathematics and reading (Dorow, 1976; Eisenstein, 1974; Hall, 1952; Madsen & Geringer, 1976; Miller, 1977; Miller,

Dorow & Greer, 1974; Roskam, 1979; Farbrough, Charboneau & Wapnick, 1977).

(b) Increasing on-task school behaviour (Jorgenson, 1974; Steele, 1967).

(c) Increasing physical responses such as self-help skills, imitative behaviour, activity level (Dorow, 1975; Harrison, Lecrone, Temerlin & Trousdale, 1966-67; Metzler, 1974; Rieber, 1965).

(d) Teaching language skills (Austen, 1977; Chadwick, 1976; Galloway, 1975; Madsen, Madson & Michel, 1975; Saperston, 1973).

(e) Teaching social skills (Reid, Hill, Rawers & Montegar, 1975; Ritschl, Mongrella & Presbie, 1972).

(f) Improving perceptual-motor skills (Berel, Diller & Orgel, 1971; Rejto, 1973).

Music may help the psychotic child to externalize his personal feelings when the verbal output is inhibited or when the child forms his own reality and loses contact with the external world.

As a non-verbal means of communication, music enables the therapist to establish a relationship with the autistic child (Alvin, 1978). Webner (1966) often uses music juxtaposed with novelty to gain entrance into the shell of isolation used by these autistic children. "Sometimes, in the middle of the song, the therapist will stop playing and, in a very abrupt manner, call out to the child being sung about, "Where's your shirt, Mike?" and, before he stops himself, Mike pulls at his shirt. Up to this time he has shown little interest in actively participating, except for a few tentative beats on the barrel drum. The element of surprise, mixed in amidst well-worn patterns of singing and playing, adds spice to the musical life of the children as well as to their total emotional life. Through this surprise new ideas are introduced which, because of their surrounding cushion of familiar material, do not seem so threatening to the children as other new situations usually do" (p.26).

Music as a positive reinforcer in the behavioural modification approach has been successfully used among others by Barnett (1962) treating a case of multiple tics, Podvin (1967), Steele (1967), Madsen & Madsen (1968) in controlling maladaptive behaviour, and Scott (1970) in reducing hyperactivity in children.

As a therapeutic resource in the psychological adjustment of hospitalized

children music may offer the possibility of creating a non-threatening atmosphere. The music therapist may be seen as a "buddy" performing pleasant activities which help the child to feel secure, not associated with the pain produced by the medical treatment. This time of lessened anxiety, increased self-expression and enjoyment may help the child to build up the psychological strength necessary to cope with the more painful or demanding aspects of a therapeutic setting.

1.5. Summary

This review on music as a therapeutic agent provides information on the role of music as a paramedical discipline, "the universal coadjuvant therapy" (Leonidas, 1981).

The influence of music in the psychology and physiology of man was observed all through the history of humankind. With the development of scientific thinking in the 19th century, the value of music as a powerful stimulus on the organism was investigated. Nowadays the field of study of Music Therapy includes research on the relationship between music and man, the effects of music and its different components (rhythm, sound, structure) on man's body and emotions, and the influence of music perception on man's behaviour and abilities.

Qualified music therapists use music in the accomplishment of therapeutic aims, in close collaboration with the medical or educational staff involved in the treatment or rehabilitation of patients.

The scope of music therapy intervention is very wide. It includes a large range of situations in which the psychological and physiological influences of music may be instrumental in the pursuit of therapeutic aims. It is used as a stimulating factor in industry and as a non-verbal means of communication and self-expression in psychotherapy and psychiatry with patients of all ages. Concerning children with special needs, the scope of the application of music includes all the handicaps and disabilities dealt with in the framework of specialised education. Music Therapy is not only an effective resource for the teaching of special skills, it is also an enjoyable non-verbal means of communication for the establishment of a helpful relationship with the disabled or handicapped child.

CHAPTER 2

LEARNING DISABILITIES

2.1. The meaning of learning

Learning is an essential experience in the growing process of every child. Montessori (1974) declared that the main therapy for the disabled children that she treated as a medical doctor was to give them the feeling of progressing through learning. The pedagogic devices she created to enable the handicapped to grasp and learn the basic abilities normal children acquire without special effort, are even nowadays classical implements in every educational or remedial institution.

Learning is a process during which a stable change in behaviour is produced through the experiences lived by the subject (Bleger, 1973); "this process is consolidated with the acquisition (conscious or unconscious) of a series of capacities or skills in the sensorial, motor, affective and cognitive areas" (Gainza, 1982, p.31).

"Children learn by successive approximations, by coming closer and closer to what is accepted as objective reality, by constantly enriching and elaborating past knowledge ... New abilities and information serve to revise and/or expand what was already known" (Reid & Hresko, 1981, p. 50).

The outcome of this process is the feeling of gradual progress, a continuity towards maturity which harmonizes the personality of the child and enhances his self-esteem. Several factors are involved in this process, mainly neurophysiological, emotional and environmental.

Anomalies in any of these areas may affect the learning process in different degrees. When the impairment can be clearly defined, as in the case of sensorial or sensory-motor handicaps (blind, deaf-mute or cerebral palsy children, mental retardation or maladjustment), children are provided with special programmes to learn to compensate for their specific limitations.

However, children with average or above average intelligence and no apparent sensorial handicaps may suffer from slight anomalies which impair their capacity for learning in a normal school.

The child may feel he cannot cope with the learning situation as his peers do. His motivation for learning may decrease or disappear completely. When the "match" between the individual needs and the learning environment is

not satisfactory, learning problems may arise.

It was in 1963, during a parents' meeting in New York, that Samuel Kirk (1972) first proposed the term "learning disabilities" to describe the child with average intelligence who was having learning problems, for whom the normal school was ineffective, but who could not be referred to a special school.

2.2. Current definitions of Learning Disabilities (LD)

"The field of LD is the newest category in Special Education" (Hallahan-Kauffman, 1982) and one of the most controversial. Since the term was first used by Kirk in 1963, "authors point to the 'turmoil' (Reynolds & Birch, 1977), 'confusion' (Cruickshank, 1980), 'controversy' (Gearheart, 1980), surrounding the term 'learning disabled' " (Murray, 1980, p. 23).

Valett (1967) defines LD as a "specific difficulty in acquiring and using information or skills that are essential to problem solving". In his functional aspect, "the LD child's performance or achievement is far below his capacity or potential", which results in a "discrepancy between classroom achievement and mental age". p. 3.

The most commonly quoted definition of LD is the one included in the Public Law 94-142, U.S.A. Federal Register, December 29, 1977, p. 65083. It reads:

"Specific learning disability means a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which may manifest itself in an imperfect ability to listen, think, speak, read, write, spell or to do mathematical calculations. The term includes such conditions as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, and development aphasia. The term does not include children who have learning problems which are primarily the result of visual, hearing or motor handicaps, of mental retardation, of emotional disturbance, or of environmental, cultural or economic disadvantage."

Further specifications in the Public Law 94-142 stress the severe discrepancy between achievement and intellectual ability. "In LD children, intellectual ability, most often determined by a score on an intelligence test, is average or above average. Children with below average scores and labeled as LD only when the testing profile suggests that, for some reason, test scores are depressed and the child does indeed possess average or better intellectual capacity.

According to the various schools of thought, a wide variety of definitions

emphasize different aspects of the problem (Reid & Hresko, 1981). Some, for example, limit the definition to children with perceptual disorders. Others use hyperactivity and/or emotional liability as a criterion. Still others argue that the problems are due to difficulties in the acquisition and use of language. Some postulate a developmental problem, a lag in the maturation of the Central Nervous System, which affects various aspects of behaviour at different times during the child's growth (first perception, then language, etc.). Other authors equate LD with reading disabilities, while some, like Hallahan & Kauffman (1980) propose a broadening of the definition, including in this category any child who "is not achieving up to potential".

Hallahan & Kauffman (1982) enumerate five main ideas which are included in most definitions:

- (1) There is academic retardation.
- (2) An uneven pattern of development exists.
- (3) The individual may or may not have Central Nervous System dysfunction.
- (4) Learning problems are not due to environmental disadvantage.
- (5) Learning problems are not due to mental retardation or emotional disturbance.

In addition to the points enumerated above, Reid & Hresko (1981) also mention the disruption in basic psychological processes as a very controversial idea present in most definitions. According to this author, there is a consensus of opinion regarding academic retardation and uneven performance, but how to define the remaining criteria is still controversial. Physiological correlates are often not easily demonstrable, and many professionals are against relying on inference from behaviour to presume physiological impairment. With regard to the basic psychological processes, there is little agreement as to what they are, how they should be defined and evaluated, and what their importance is to academic achievement.

Finally, there are those who would argue that it is extremely difficult to distinguish accurately between categories of mild exceptionality. "It is no wonder then that prevalence figures vary from 1 per cent to 15 per cent or more, depending upon the criteria set for inclusion" (Reid & Hresko, 1981, p. 21).

2.2.1. Distinction between specific learning disabilities and learning problems

In attempting to define the field of LD, it is important to stress that there are many kinds of LD.

LD children range from those suffering from Central Nervous System dysfunction, who may be highly hyperactive and unable to function even with a great deal of extra help in a normal classroom, to mild underachievers who get C's and D's when they have the capacity to get A's.

Each child confronted by learning problems may present a unique combination of factors that impair his ability to learn. Hallahan & Kauffman (1976), mentioning psychological and behavioural characteristics of LD children, maintain that the list is endless, and that LD as a category comprises a heterogeneous population of children.

Authors referring to Specific Learning Disabilities mention that the deficiency in a particular aspect of academic achievement may be the result of underlying impairments within the child. Wepman, et al, (1975), for instance, limit the number and type of children identified as LD to those who are underachievers because of perceptual or perceptual-motor handicaps, regardless of etiology or other contributing factors.

Adelman (1971) maintains that the population labelled as children with LD consists of at least three major sub-groups of youngsters with learning problems:

- (a) Youngsters who have major disorders which predispose them to learning difficulties.
- (b) Youngsters who do not have such internal disorders but who simply do not function well in non-personalized instructional programmes.
- (c) Youngsters who have minor disorders but who, under appropriate, motivating circumstances, are able to compensate for such disorders in mastering school learning tasks (p. 530).

Adelman (1971) differentiates children with Specific Learning Disabilities from those whose learning problems arise not from internal deficiencies, but from "a characteristics of the classroom situation to which they are assigned. He states: "As a basis for classifying the range of learning problems, we discuss causes as stemming not only from factors within the person (such as neurological and emotional problems), but from environmental variables (such as school procedures and curricula) and from the interaction of person and environment variables" (Adelman & Taylor, 1983, p. 6).

2.3. Causes of LD

According to Hallahan & Kauffman (1982), in most cases the cause of a child's learning disability remains a mystery. Authors agree that there

are two general classes of causes of LD: organically based and environmentally based.

Reid & Hresko (1981) include in the first category problems related to brain injury (genetic as well as prenatal, perinatal and postnatal) and to biochemical disorder. The symptoms are those of suboptimal neurological functioning.

Environmentally based disorders include poor nutrition, lack of early stimulation and poor teaching (Bruner 1971, Cohen 1971), or as Adelman & Taylor (1983) maintain, the wrong interaction between the child's special needs and the school procedures and curricula. In these cases the learning problems arise from circumstances or experiences which limit or inhibit the acquisition of basic skills.

"In truth, however, whatever the etiology, the behavioural manifestations are frequently similar and it is often impossible to determine whether a particular problem is organically or environmentally based" (Reid & Hresko, 1981, p. 9).

Smith (1979), stressing the uniqueness of each LD child, maintains that there is no one cause for learning problems, and no one answer that would be appropriate for its remediation. She recommends to the teacher "to focus on its prime symptom - immaturity or delayed development - and the disorganization and disorder that accompany it" (p. 33).

In the absence of consensus of opinion amongst the different schools of thought regarding the definition and the causes of LD, Smith's suggestion about focusing on the symptoms in order to plan remediation appears to be an effective approach.

Following this conception, a summary of the psychological and behavioural characteristics of LD children would offer a frame of reference for identification and intervention.

2.4. Psychological and behavioural characteristics of LD children

According to Hallahan and Kauffman (1982), the most frequently found symptoms of LD children are:

- (1) Hyperactivity.
- (2) Perceptual-motor impairments.
- (3) Emotional lability (frequent shifts in emotional moods).

- (4) General coordination deficits.
- (5) Disorders of attention (short attention span, distractability, perseveration).
- (6) Impulsivity.
- (7) Disorders of memory and thinking.
- (8) Specific academic problems (reading, arithmetic, writing, spelling).
- (9) Disorders of speech and hearing.

Many of the psychological and behavioural characteristics mentioned can be summed up by stating that the LD child is a passive learner, lacking in strategies for attacking academic problems. Specifically, research points to the LD child as one who tends not to believe in his own ability (learned helplessness), has an inadequate grasp of what strategies are available for problem-solving (poor metacognitive skills), and is unable to produce appropriate learning strategies spontaneously. "The picture we get is of a child who does not actively involve himself in the learning situation" (Hallahan & Kauffman, 1982, p.116).

2.5. Identification and assessment of LD children

The peculiar characteristics of this impairment is that it is not so easily recognized as other handicaps which are the concern of special education.

Problems that may lead to learning disabilities are not so easily detected during the early childhood in children that have average or above average intelligence. Lack of maturity or delayed development in certain areas is generally attributed to the young age, and parents as well as inexperienced nursery-school teachers hope that the child will outgrow his specific difficulties. It is only when the child reaches the formal frame of a school class, with its demands and competition, that the child feels he is unable to cope. Not having the insight of auto analysis, when the child realizes that he cannot read, follow instructions or count as other children in his class, he develops a negative self-image. Emotional problems may arise because of his feeling of inadequacy.

This situation is aggravated by the pressure the unaware parents may exert on him at home. When interviewing the parents of the LD child, it is common to hear their "anecdotes" about the different strategies employed to get the child to do his homework in the first grade. "Later, Mom," is the most common answer of a child who subconsciously tries to postpone the frustration of an impossible task.

But invariably the "strategies" of both sides (parent-child) added to those

of the teacher demanding from him the same achievements of everybody else in a large class, end in tension and resentment which alter the parent-child relationship. The emotional reactions and problems that may be associated with LD are discussed by Brutten, Richardson & Mangel (1973).

"Identification of specific LD is possible only when there is a difference that can be measured between the child's intellectual potential and his mastery of scholastic techniques" (Steenkamp, 1980, p. 218).

Nevertheless, according to Murray (1980), "there are children below the compulsory school-going age who have difficulties learning the skills which are basic to the mastery of the three R's, and who seem to have difficulty in developing satisfactory cognitive control over their behaviour and to learn the social skills required by modern society" (p. 12).

Murray (1980) stresses the urgent need for the training of pre-primary teachers to identify deficiencies in the acquisition of these basic skills and to cope with them in the nursery school.

"Early identification of specific LD is useful only if it leads directly to correction, not if it is used to label the child" (Steenkamp, 1980, p. 214).

Considering LD children may "exhibit disorder in one or more of the basic psychological processes involved in understanding or using spoken or written language", and that "the disability may be manifested in disorders of listening, thinking, talking, reading, writing, spelling or arithmetic" (Lerner, 1976), a multidisciplinary team is required to assess each of the basic processes separately.

Skuy (1982) suggests a functional approach to scholastic disability. Departing from "labelling", the predominant conception in recent literature is that "special children have specific needs". "The identification of each individual's strengths and weaknesses within a functional analysis would provide a basis for an effective remedial programme" (Skuy, 1975, p. 120).

Concerning the type of assessment required, Cengelka (1982) states: "No child should be classified as having LD until she/he has been evaluated by an evaluation team composed of qualified diagnosticians with the skills to assess medical, psychological, social, educational and vocational factors, as applicable" (p. 64).

The evaluation procedures and instruments used to assess LD caused considerable controversy and debate during the last decade (Adelman, 1978;

Cegelka, 1982; Matuszek & Oakland 1979; Sabitino & Miller 1980).

Cegelka (1982) stresses "the need to achieve adequate individual assessment leading to prescriptive program planning" (p.68) and proposes a list of recommended areas of study and expected competencies on the part of the evaluators.

Research in the field of neuropsychological diagnosis during the last decade has improved the possibility of identifying the type of dysfunction in some cases: Selz & Reitan (1979) report that LD children often suffer from a degree of cerebral dysfunction that is frequently undetected by neurological examination, but that can be reliably measured by neuropsychological tests (e.g. level of performance, right-left differences, patterns of performance and pathognomic signs).

The influence of the school setting to which the child is exposed is an important factor to be taken into consideration when evaluating the LD child. Along the same lines as Adelman & Taylor, Steenkamp (1980) observes: "LD is not a simple endogenous entity but a complex syndrome in which the child learning modalities, the pedagogic situation and the teacher play a role." (p.215).

Once the specific problems of the child have been assessed, Cegelka (1982) suggests: "The team should assume responsibility for proposing and interpreting an individual educational plan for the child in the school setting, with provisions for ongoing evaluation of the child's progress and/or needs", p. 64.

Cegelka (1982) conceives the responsibility of the assessment team as exceeding the limits of the work at school. He suggests: "The team should also develop suggestions for assisting the child and his/her family to maximize growth potentials outside school hours" (p.64).

Reid & Hresko (1981) suggest that until we can demonstrate both better accuracy in identifying the mildly handicapped child and the effectiveness of intervention programmes, the most appropriate procedure would be to provide, for children who are suspected of having problems which would lead to learning disabilities, pre-school programmes specially designed to enrich the child's experience. These may provide activities that include literature, language, play, fine and gross motor experiences and problem-solving. "Such rich environments may prove more effective for mildly impaired pre-schoolers than the more sterile, remediation-orientated programmes typically associated with pre-school classes for the handicapped"

(p. 147).

In Cape Town, South Africa, the Association of Hebrew pre-primary schools runs a remedial pre-primary school (JARINGS) along these lines. Children are referred from the various nursery schools after being screened as developmentally delayed. Child-teacher ratio is 1 : 3. The staff comprises two OT, a speech therapist and a multi-disciplinary team for assessment.

2.6. Intervention Approaches in Education

There are several orientations to planning educational programmes for LD children. Hallahan & Kauffman (1982) suggest five categories to group what the majority of professionals recognize as major approaches:

(1) Process training. (2) Multisensory approaches. (3) Structure and stimulus reduction. (4) Cognitive behaviour modification. (5) Behaviour modification.

(1) Process training: According to this approach, psychological processes are thought to be the foundation upon which higher abilities are based. The focus is in training the child to improve the impaired processes themselves. For example, a child believed to have reading problems because of difficulties in visual perception would be given visual perception training before being given reading instruction.

Frostig's visual training techniques for instance (Frostig & Horne, 1964) have been widely applied and discussed. In the field of perceptual-motor training, Kephart's (1971) activities focus on the "perceptual-motor match", in which the rationale is that motor development precedes visual development: the child is first taught appropriate motor skills, followed by visual training matched to the learned motor experience.

The main criticism of these techniques is that there is no solid research evidence to support the use of process training. "There is little in the literature to support the position that perceptual and psycholinguistic training will enhance academic performance" (Hallahan & Kauffman, 1982, p. 118).

(2) Multisensory approach: Multisensory techniques involve correction of a child's problems by using a combination of the child's sensory system in the training process. In Fernald's VAKT method, for instance, the student's own words and ideas in a story provide the material for the subsequent learning process. VAKT are the initials of the senses involved

in this technique: V stands for visual, A stands for auditory, K stands for kinaesthetic, and T stands for tactual (Fernald, 1943). Advocates point out that using a student's own experience is a particularly good motivation, especially for older children.

(3) Structure and stimulus reduction: Cruickshank, Bentzen, Ratzeburg & Tannhauser (1961) propose a structured programme for LD children who are also inattentive and hyperactive. The three main principles in their approach are: (a) Structure. (b) Reduced environment stimulation. (c) Enhancement of intensity of teaching materials.

The learning procedure is strongly teacher-directed, on the basis that the hyperactive or distractible child cannot make his own decisions until he is carefully educated to do so. The outcome of this approach is that attending skills have been imposed on distractible children, but achievement gains have not been automatic.

Regarding stimulus reduction, there has been considerable controversy about the use of drugs to control hyperactivity and distractibility in children (Hallahan & Kauffman, 1982, chart on p. 110). It is not always an easy matter to determine when the overactivity warrants medication. Side-effects are not uncommon, and determination of the proper dosage requires medical expertise. In any case, drugs cannot substitute for good teaching.

(4) Cognitive behaviour modification (CMB): This approach differs from traditional behaviour modification in that thought processes are the object of change rather than strictly observable behaviour. The approach appears particularly well suited for the remediation of attentional and impulsivity problems because (a) It stresses self-initiative by involving the child as his own trainee, helping him to overcome passivity and learned helplessness. (b) It provides the child with specific learning strategies for solving problems. Two types of CMB techniques that have been successfully applied to LD children are: self-instructional training and self-monitoring (Hallahan & Kauffman, 1982).

(5) Behaviour modification: In this procedure, intervention implies direct involvement with reading skills, arithmetic computation, etc. Goals are specified, behaviour is carefully monitored, and reinforcement is provided for successful learning. Hallahan & Kauffman (1982) found that this approach has been effective with LD children, particularly those who are hyperactive and easily distracted.

Approaching intervention techniques from a wider point of view, Adelman & Taylor (1977) maintain that successful teaching depends on the interaction of the child's characteristics and learning situation, and point out the need for the following: (1) To establish an environment which can "optimize the match" between the learning situation and the learner's current developmental and motivational status. (2) To develop a mutually satisfying learning agreement or contract, in which teachers facilitate learning, engender an atmosphere of mutual respect between school professionals and students, and participate in a process which allows each person to reclaim his power and deal with others as equals.

In practice, expert teachers with a knowledge of the different approaches will often combine two or more of them according to the child's needs and response. "With the possible exception of process training versus behavior modification, it is not uncommon to find a blend of several approaches" (Hallahan & Kauffman, 1982, p. 116).

2.7. Approach to the identification of LD in a particular setting

On the basis of the diffuse and heterogeneous field that is LD, it is necessary to define the population in a particular setting by using a specific approach and analysis.

In order to specify which kind of problem a LD child may face in his performance at school, a qualitative analysis of the different functions and the expected difficulties has been elaborated by the staff of the Pretoria Preparatory School (see Appendix No. 1, p.88).

This chart offers the relation between the perceptual impairment and the resulting defective performance of the child, thus offering a departure point for the elaboration of a remedial programme based on the individual assessments.

The chart is incorporated in this work in order to specify the areas in which the children of the E. group in Pretoria Preparatory School were affected, thus delimitating the concept of LD to the description provided.

CHAPTER 3

MUSIC THERAPY IN THE TREATMENT OF LEARNING DISABILITIES

3.1. Introduction

Analyzing the problems of the LD child, it has been pointed out in the previous chapter that his difficulties arise as a consequence of impairments in the learning process, resulting in a gap between chronological age and academic progress.

The feeling of failure and frustration caused by the underachievement in the learning areas may produce a total lack of motivation in learning. One of the main tasks of the remedial team in a school for LD children is to restore the child's self-confidence and motivate him to try again. It is in this crucial aspect that music has a role to play.

Says Alley (1979, p.114): "In addition to assisting a handicapped child to learn, music is also fun. So much of a person's lifetime is spent learning to overcome a handicap, that a strong rationale exists for providing learning experiences that are also enjoyable. Music is also adaptable. It is pleasurable and worthwhile in even its most simplistic forms which require little intellectual or physical prowess. 'Why music? For happiness' (Madser & Kuhn, 1978, p.10)."

The joyful possibilities of music in childhood education has also been mentioned by Gainza (1982): "To be educated through music is to grow with plenitude and happiness. To develop without happiness is not sufficient. To give happiness without developing is not to educate." (p. 9).

Music is a non-verbal means of communication. Well-planned musical activities may offer the LD child the opportunity to succeed in improving his abilities while enjoying a non-verbal experience that engages his whole personality.

Based on physiological processes, Music Therapy techniques integrate psychological, social and remedial aims into a meaningful learning experience.

During the last 20 years, research in related fields (mainly medical and social sciences) has clarified different aspects of the intervention through music in LD. Current research concentrates on the correlation between musical abilities and cognitive skills.

Several educational, physiological, psychological and social aspects

relevant to the practice of music therapy in LD are reviewed below, including studies of music educators and therapists dealing with LD children.

3.2. Educational aspects

Musical activities, even the simplest ones, can appeal to auditory, visual, motor, kinaesthetic and emotional processes simultaneously. Skilfully applied, they can provide appropriate multisensory stimulation of the kind which is recommended by specialists in LD.

3.2.1. Multisensory stimulation

Kephard (1975), using a neurological model to explain the difficulties of LD children, stresses the importance of multisensory stimulation instead of drill to facilitate the learning process. Multisensory stimulation must be presented simultaneously to the LD child. Kephard recommends that the same information be presented through different channels at the same point in time, as opposed to drill, in which the same information is presented through the same channels at different points in time. A multisensory approach using music was reported by Sheham (1981). Studying different techniques to improve short-term memory of word pairs with LD children, Sheham presented word pairs in musical, verbal, music/visual and verbal/visual formats. The best results were obtained by using music/visual and verbal/visual strategies.

A pilot study using the "motorvator" in training automatic rhythm coordination was reported by Larson (1978). The child was required to tap different parts of the body, depending on the colour of flashing lights shown by the "motorvator". Using this multisensory device, they report significant improvement in gross motor coordination and in I.Q. scores of LD children.

Multisensory techniques are instrumental in perceptual development. The importance of perceptual development in LD children in relation to music therapy is reviewed in the next sub-section.

3.2.2. Perceptual development

The consolidation of perceptual skills as a preparation for cognitive tasks has been stressed by several authors, for example Frostig & Maslow (1973), Hallahan & Cruickshank (1973), Kephard (1971), Rosner (1972), Piaget (1950) the most famous observer of the developmental sequence in children, states that "symbolic action is based on assimilation of prior

sensory-motor intelligence".

According to the developmentalist approach, "each developmental step is in some way dependent upon a certain degree of maturation of previous steps" (Ayres, 1973). Ayres explains this assumption through the functioning of the brain: "The cortex will not function optimally unless the lower centres of the brain are well organized." Referring to language disorders, for instance, Ayres (1973) suggests that the most appropriate initial therapy appears to be "very elementary pre-language non-cognitive activities, which elicit sensations from the body and reflexes", producing "adaptive responses to them" (p. 242).

Although there is consensus regarding the importance of "readiness" before approaching reading and writing, opinions differ on how to proceed. Several authorities developed intervention techniques based on perceptual training which are widely applied and discussed.

Critics of perceptual training claim that it has not been shown to improve the academic achievement of LD children (see sub-section Intervention Approaches in Education, p. 15). Music activities as a therapeutic resource offer the possibility of close interaction between perceptual-motor and cognitive processes, providing a new dimension for perceptual training.

3.2.3. Training in specific areas

3.2.3.1. Auditory perception:

Wiig & Semel (1976) report that auditory perception problems constitute one of the bases for the auditory language processing deficits observed in LD children.

Many other studies (Deutsch, 1964; Flower, 1968; Marquardt & Saxman, 1972; Morency, 1968; Perozzi & Kinze, 1971, Wiig & Semel, 1976) support the view that auditory perception and language are closely related.

Auditory perception has been broken down into different tasks by Chalfant & Scheffelin (1969). These tasks are considered to be:

- (1) attention to auditory stimuli;
- (2) differentiation of sound versus no sound;
- (3) sound localization;
- (4) discrimination of phenomena;
- (5) discrimination of sound sequences;
- (6) auditory figure-ground selection;

(7) association of sound with sound source.

To these can be added the tasks of segmentation: ability to divide perceived words into the smallest grammatical units called morphemes; and synthesis: ability to combine sounds and sound sequences into larger units.

Several authorities (Day, 1971; Frostig, 1972; Stanchfield, 1971, Van Valkenberg, 1968; Wiig & Semel, 1976) have emphasized the necessity for teaching which provides greater auditory competence in these areas. Applying the Orff method in a therapeutic approach, Rink (1972) demonstrated in her research that auditory discrimination and motor coordination of children with psychoneurological dysfunction may be improved by music-making.

Rejto (1973) reported a case study which demonstrates significant gains in auditory and visual perception, language skills, sensory-motor integration, symbolic representation and memory in a 7-year-old boy who received six months of prescriptive piano and theory lessons.

3.2.3.2. Auditory perception and reading:

Kavale (1981) in a meta-analysis of the relationship between auditory perceptual skills and reading ability, statistically integrates the findings of 106 studies. His results show that auditory perceptual skills are important correlates of reading ability. He concludes that developing auditory perceptual skills as a primary instructional modality positively influences success in reading.

3.2.3.3. Auditory perception, reading and music training:

In Hungary, as a consequence of the introduction of the Kodaly system for teaching music in the curriculum, Kokas (1969) has reported an improvement in reading, arithmetic and observable study habits. In a further study, Hurwitz, Wolff, Bostwick & Kokas (1975) acknowledge the application of the Kodaly system as a contributory factor in the acceleration of reading abilities and recommend their use with LD children, especially when problems of sequencing are involved. They stress the importance of early identification and intervention by providing music instruction in kindergarten or during the first two years of elementary school.

To measure the effectiveness of music therapy in the treatment of reading difficulties, Roskam (1979) conducted a study: 36 LD children from 6 to 9 years old were divided into 3 groups and 3 remedial techniques were used: (1) prescriptive music therapy; (2) language development activities;

(3) a combination of both.

Although an analysis of variance showed no statistical differences among the 3 groups, the highest mean difference in pre-post test scores was obtained in the music therapy group. The mean of this group was the highest in reading recognition and spelling. In the area of reading comprehension the best results were obtained by combining language development techniques and music therapy. Roskam concludes that remedial reading programmes which focus exclusively on reading, writing and academic pre-reading activities should be re-examined in the light of this study.

3.2.3. Rhythmic ability and language

3.2.3.4. Rhythm as a basis for language

Lashley (1951) suggests that rhythm is the basis for language since language consists of a pattern of sounds which is organized in time.

The regular appearance of a series of elements in respect of time has been described by Neisser (1967): "One way to think of the effect of rhythm is that it may provide a set of reference points to which digits or words can be attached ... A rhythmic pattern is a structure which serves as a support, an integrator and a series of cues for the words to be remembered" (p.219).

Condon (1975) suggests a new approach to language acquisition and enculturation by empirically observing the influence of rhythm from birth. In his opinion, the neonate moves synchronously with adult speech as early as the first day after birth. If, from the beginning, the infant moves in precise shared rhythm with the organization of the speech structures of his culture, then he participates developmentally in literally millions of repetitions of linguistic forms long before he will use them for speaking and communicating. By the time he begins to speak he may already have laid down within himself the form and structure of the language system of his culture. This would encompass a multiplicity of interlocking aspects: rhythmic and syntactical hierarchies, pitch and stress patterns, paralinguistic nuances, not to mention body motion styles and rhythms.

Condon's views are consistent with the evidence in the literature that normal development of rhythmic abilities in children may well be a necessary precursor to normal language development (Lashley, 1951; Lea, 1980).

According to Lea (1980), "the strong association between rhythm and language may be due to common underlying processes, or to some basic part played by

rhythm in language learning" (p. 224). A review of the research on the physiological bases of this hypothesis is dealt with in sub-section 3.3.

Recent investigations, including a study undertaken by Lea (1980) in a special school for children suffering from severe language disorders, have shown that these children are also deficient in rhythmical skills.

3.2.3.5. Rhythmic ability and reading

A number of studies have found a relationship between poor rhythmic ability and gross retardation in reading (Stamback, 1960; Tansley, 1967; Travis, 1971; Zigmond, 1966).

According to Zigmond (1966), disturbances of pattern perception may affect development of auditory language and also facility in reading.

Similarly, Tansley (1967) found that the majority of backward readers who have a particular difficulty in the phonic aspects of reading, are lacking in rhythmic ability and have poor auditory memory.

Based on these considerations, Lea (1980) performed a study in England. He administered language and rhythmic tests to a group of 39 boys and 9 girls ranging from 9.8 to 16.5 years old, who were suffering from severe disorders of speech and language. Tests on language included: (a) understanding of vocabulary, (b) ability to repeat sentences, (c) the use of grammatical inflections.

The rhythmic tests measured: (a) perception, (b) motor performance, (c) imitation.

Correlation between the 3 rhythmic tests and the three language tests were highly significant. Lea (1980) concludes: "The hypothesis that poor rhythmic ability is a correlate of severe speech and language disorders was supported" (p. 224).

Because of the demonstrated close relationship between rhythmic ability and language ability, the question of remediation through rhythmic training naturally arises. Lea (1980) suggests that remedial programmes designed to help children with speech and language disorders should include remediation in rhythmic skills. He goes even further, suggesting that "perhaps rhythmic training should always accompany language therapy" (p. 228). Lea (1980) is aware of the necessity for further studies to clarify the relationship between rhythmic training, language disorders and reading skills.

In the light of the review on the educational aspects of music therapy in learning disabilities mentioned in this chapter, Lea's recommendation can be seen as a specific suggestion on how to use one of the elements of music (rhythm) in the remedial programmes of children whose language abilities are impaired.

Considerations on the physiological bases of the assumptions stated before will be reviewed in the next section.

3.3. Physiological aspects

Music Therapy techniques provide the child with a highly integrative experience: gross and fine motor-coordination abilities, developed through movement and music making, are gradually transferred to the graphic representation of the perceptual experience. Multi-sensory stimulation is verbalized to attain concept formation. Verbal instructions must be understood in order to go through the different non-verbal tasks.

This continuous shifting from verbal to non-verbal communication may be emphasized as a very special quality of music therapy intervention and one of the main reasons why it can be resourceful in LD.

A review of the research on brain dominance and its relation to verbal and non-verbal tasks is attempted in this sub-section with the aim of providing physiological bases for the use of music as a therapeutic resource in LD.

3.3.1. Considerations on brain dominance in the processing of verbal and non-verbal input

Research on brain dominance during the last 20 years has implied that the right cerebral hemisphere in most individuals is specialized for the perception of music and other non-verbal input, with the left hemisphere being dominant for verbal functions (Cook, 1973; Gordon & Bogen, 1974; Kimura, 1964, 1967; Kinsbourne, 1976; McCarthy, 1969; Milner, 1962; Smith, 1966; and Teuber, 1967).

Other research findings, however, appear to indicate that not all music stimuli are mediated by the right hemisphere. Gordon (1978) explains this apparent conflict between the findings by the notion that it is not the stimulus per se that govern the hemisphere dominance, but rather the cognitive functioning required by the left and right hemispheres to process these stimuli.

3.3.1.1. Listening strategies

Barcholomeus (1974) and Gates and Bradshaw (1977) confirm Gordon's views, reporting that listening for the overall contour of a melody requires a different processing strategy from that needed when listening to the internal structure of that melody.

The varying strategies for listening were studied by Levy, Agresti and Sperry (1968). They maintain that the right hemisphere is specialized for parallel or holistic processing, whereas the left is responsible for serial or analytical processing.

This view is consistent with the reports on the different processing of musical stimuli by musicians and non-musicians: Bever and Chiarello (1974) suggest that the left hemisphere plays a more active role in the melodic perception of trained musicians because they assume a more sequential analytical approach than non-musicians. Non-musicians show more right hemisphere involvement in melodic perception, relying upon a holistic (right hemisphere) strategy for this task.

Evidence that the cerebral processing of music may be influenced by the musical background of the perceiver was also stated by Aiello (1979); Franklin & Baumgarte (1978, 1981); Hishkowitz, Earle and Paley (1978) and Locke & Kellar (1973).

3.3.1.2. Rhythm and the left hemisphere of the brain

In the sub-section dealing with rhythmic ability and language (3.2.3.4., p. 22), it is mentioned that according to Lea (1980), "the strong association between language and rhythm may be due to common underlying processes" (p.224).

Rhythm, for example, may be processed by the left hemisphere (Gordon and Bogen, 1974; Gregory, Harriman and Roberts, 1972; Halperin, Nachshon and Carmon, 1973; Lashley, 1951; Natale, 1977; Neisser, 1967; Robinson and Solomon, 1974).

According to Robinson & Solomon (1974), rhythmic patterns, unlike other non-speech auditory stimuli, are processed better by the same hemisphere that is dominant for speech. Robinson & Solomon support the clarifying discussions of Lashley (1951) and Neisser (1967) and confirm the suggestion by Halperin et al (1973) that because of the sequencing involved, rhythmic patterns are processed by the left hemisphere.

To conclude their findings, Robinson and Solomon (1974) suggest that because rhythm is the only non-speech auditory feature found to be processed by the speech hemisphere, models of speech cognition based on rhythmic organization are to be encouraged: rhythm could provide the organizing pattern for the performance of a verbal task.

3.3.1.3. Summary of the different findings

Summarizing the different findings on brain dominance, Gates and Bradshaw (1977) state that although there is a basic difference in cerebral dominance for the processing of verbal and non-verbal stimuli, both hemispheres are involved in music perception, each one operating according to its own specialization and task requirements.

Ayres (1973), basing her approach to LD on the sensory integration process, stresses the importance of interhemispherical integration to consolidate the learning process.

Concerning speech production, for instance, she states: "It has been suggested that speech production is dependant upon connections between the language centre in the left hemisphere and important parts of the brain, including the right hemisphere, where some aspects of auditory perception such as tone quality and pattern discrimination are most likely to receive some essential processing (Milner, 1967; Bogen, 1969b). If this is the case, then the need for adequate interhemispherical integration at the brain stem level is important for that reason" (p. 245).

3.3.1.4. Conclusions

To conclude this summary on brain dominance, it can be stated that inter-hemispherical integration is important both for music perception and for the processing of the different verbal tasks involved in learning. However, as the learning process is based largely on verbal channels and music perception on non-verbal ones, it can be inferred that when the verbal channel is impaired, thus inhibiting the integration of the stimulus which consolidates the learning process, music and its elements may offer the option of working towards integration through non-verbal channels.

The hypothesis that music therapy techniques may offer an alternative resource in the treatment of LD is rooted in these considerations. Further research and specific studies may clarify and define these promising assumptions.

3.4. Psychological and social aspects

Children with LD often have concurrent emotional and interpersonal difficulties (Chapman, Larser & Parker, 1979; Lerner, 1976; and McCarthy & McCarthy, 1970). Among the most frequently cited characteristics of these children are hyperactivity, distractibility, impulsiveness, emotional lability, low self-esteem and poor social skills (Bryan & Bryan, 1977; Leviton & Kiraly, 1979; McCarthy & McCarthy, 1970).

Amerikaner & Summerlin (1982) suggest that "psychoeducational approaches designed to focus on alternatives to inappropriate behaviours, could enable the LD child to function more effectively in the school setting both socially, and perhaps indirectly, academically" (p.340).

The same authors examine the effects of relaxation and social skills through group participation, on the behaviour and self-perception of LD children. The study shows that children categorized as LD can learn relaxation techniques in a group setting and that this learning has beneficial effects in terms of their behaviour in the classroom. Improving social skills through group counselling proved to have a positive effect on the self-esteem of LD children.

The quality of the teaching is also important to improve the child's self-image. Wink (1982) states that the basis of successful teaching of LD children is the establishment of a supportive, trusting relationship and the continual stimulation of the children's curiosity and motivation, through tasks that evoke their imagination and relate to their experiences. In this way, the teacher can enhance the LD student's sense of self-worth and social and academic skills.

3.4.1. Music Therapy as a psychoeducational approach

These social and psychological therapeutic aims mentioned before may be achieved in a music therapy group situation.

According to Moreno (1980), "music therapy uses the group as a social phenomenon that can provide a range of feedback and a variety of interactive experiences." (p. 34)

The music therapy group provides a "laboratory for human relations", where the LD child learns how to interact and learn about himself and others, while performing non-verbal tasks with the support of the music therapist, who coordinates the activities in her role of facilitator.

Several authors report on music therapy as a form of psychoeducational intervention improving psychological and social functioning.

Tyson (1966) reports positive changes in behaviour in a hyperactive, brain-damaged 8-year-old boy as the result of individual music lessons. Clarke (1973) gives strong evidence of music as a valuable way of releasing frustration for her LD son. Salmon (1978) reports the benefits of daily music lessons for two weeks in a holiday residential school for dyslexic children. Empirical observation showed improvement in auditory, physical, spacial and social awareness, as well as high motivation to collaborate in small groups.

3.5. Summary

Research carried out during the last two decades by neurologists, music educators and music therapists has illustrated the various therapeutic effects of music or its elements in LD children and partially tried to explain their scientific basis and their possible correlation with the learning process.

The review discusses the educational, physiological and social aspects of the use of music therapy and its elements in LD.

The views of the neurologists and the specialists in LD are related to those of music educators and music therapists.

Regarding the educational aspects, it is stated that through music therapy intervention, a constant interaction between perceptual-motor and cognitive processes can be attained, thus providing a new dimension to the much-criticized perceptual training techniques.

Positive correlations were found between auditory perception and language development, and rhythmic ability and reading. As a consequence, the question of remediation through rhythmic and auditory training naturally arises.

Regarding the physiological aspects, it is concluded that although there is a neurological specialization for processing verbal and non-verbal stimuli, interhemispherical integration is essential for the consolidation of both processes. Thus, as the learning process is based on verbal channels, and music or non-verbal ones, it can be inferred that music and its elements may offer the option of working towards integration through non-verbal channels, when the verbal ones are impaired. The psychological and social aspects discuss the importance of highly creative and reassuring activities

to improve the self-image and social skills of LD children, and how these aims are part of the music therapy practice.

As well as being a highly integrative experience, music is also fun. Learning experiences that are also enjoyable may motivate the LD child and restore his self-confidence.

By presenting the educational, physiological and social aspects involved in the practice of music with LD children, a wide background to the rationale of the project is provided. This is described in detail in the next chapter.

CHAPTER 4

THE PROJECT

4.1. Rationale

Music therapy can be considered a useful tool in the treatment of different impairments, and as instrumental in the formation of helping relationships with patients of all ages. Concerning LD, several authors report improvement in specific areas, using music and its elements as a therapeutic resource (Larson, 1978; R jto, 1973; Rink, 1972; Sheham, 1981). Several authors go further, indicating possible correlations between auditory perception and reading (Kavale, 1981; Kokas, 1969); rhythmic ability and reading (Lea, 1980); music therapy and reading (Moyer, 1976; Roskam, 1979). Neurological findings provide a theoretical basis for these assumptions, stressing the need for further research in this new field (Gates & Bradshaw, 1977; Robinson & Solomon, 1974). Regarding intervention, no specific studies have been found which include music therapy techniques in a multidisciplinary approach at a school for LD children.

Based on these considerations, a systematic programme was conceived for the children and their teachers, integrating music therapy skills in the remedial programme of a school specializing in LD. An evaluation of the influence of this programme in the children's progress as compared to a control group would provide additional information on the effectiveness of music as a therapeutic resource in a multidisciplinary approach, offering practical evidence to corroborate the theoretical considerations.

4.1.1. Aims

The primary aim of this study is to provide practical evidence on the effectiveness of music as a therapeutic tool in the treatment of LD children, integrating previous practical and theoretical findings by:

- (i) Implementing a music therapy programme as part of the curriculum in a school for LD children.
- (ii) Enabling the class teachers to incorporate the music therapy skills they experience while attending the children's sessions into their everyday programme.
- (iii) Assessing the effectiveness of the programme in the improvement of auditory perception, sensory-motor and social performance, as well as the reading ability of the children.
- (iv) Establishing the possible correlations between certain areas of musical training and reading ability.

4.2. Method

In order to validate the effectiveness of the intervention techniques, an Experimental (E) and Control (C) group were formed out of the population of two schools specializing in LD. Both groups were tested before and after the intervention and the results of the tests were analyzed statistically.

4.2.1. Sample

The project involved 40 children, equally divided into an E. and C. group.

4.2.1.1. Constitution of the E. and C. groups

On account of the small number of children attending the only English-medium school specializing in LD in Pretoria (50 children from Grade I to Std. V), it was not feasible to form both the E. and C. groups at the same school. In any case it was decided that all the children at the one school should receive music sessions to avoid feelings of jealousy, which could arise in the event of certain groups being excluded. Bellavista Remedial School in Johannesburg was found to have the same remedial policies as Pretoria Preparatory School, therefore the C. group was chosen out of its population.

4.2.1.2. Composition of the sample

The E. and C. groups consisted of 20 children each, from Grade II to Std. III. The E. group was formed at Pretoria Preparatory School, and the C. group at Bellavista Remedial School in Johannesburg.

The variables taken into consideration for the matching of the groups were:

- (a) Age and sex; (b) Socio-economic status; (c) Scholastic performance;
(d) Test results; (e) Remedial policies of the schools.

(a) Age and sex

Table 1 shows the age range and mean for the two groups at the beginning of the project.

Table 1 Age range and mean of the Experimental and Control groups at the beginning of the project

	Experimental	Control
Age range	6.10 to 10.9	6.11 to 9.11
Mean	8.4	8.4

N = 20, 10 girls and 10 boys in each group.

No significant difference was found using the Mann-Whitney U test to compare age differences between the E. and C. groups.

(b) Socio-economic status

Children in both schools belonged to middle-class parents. None of the families were considered culturally disadvantaged or seen as the source of the child's under-achievement.

(c) Scholastic performance

Children were referred to both schools on account of their being under-achievers in the regular school, in spite of having an average or above-average I.Q. Special care was taken not to include in the sample children with sensorial handicaps (sight or hearing losses) or serious psychological problems.

(d) Pre-test results

Non-significant differences were found using the Mann-Whitney U test between the E. and C. groups in the 5 tests performed at the beginning of the study. The results were evaluated as a group and not on an individual basis. Considering the individual differences found in any population of LD children, the one-to-one matching was not feasible.

(e) Remedial policies of the schools

A multidisciplinary approach was provided by the staff of the schools, which included class teachers, remedial teachers, speech therapists, occupational therapists and a psychologist. A full assessment was performed by the staff before accepting the child at the school. A remedial programme was designed for each child according to the impairments evidenced in the full assessment.

Apart from the class teacher, with whom the children learned as a group, each one received either individual or group speech and occupational therapy, as well as the assistance of the remedial teacher. Both schools held weekly staff meetings to discuss each child's progress and to re-assess the therapeutic strategies. The meetings were coordinated by the principal. The staff decided about the extent of the intervention of the speech therapist, occupational therapist or psychologist in the programme of each child. When additional neurological or sensory examinations were needed, the medical doctor was consulted by the staff before addressing the parents.

The E. and C. groups received individual and group speech and occupational therapy at least once a week, according to their needs, as decided by the staff in the case conferences.

4.3. Procedure

4.3.1. Assessment

The E. and C. groups were assessed by means of 5 different tests during the month of January 1982, and reassessed in the month of July, after 5 months of intervention through music therapy with the E. group.

4.3.2. Division of the group

The 20 children in the E. group belonged to 3 different classes according to their ages. The same grouping was kept for the music therapy sessions. They received twice a week a 30-minute session, starting at the beginning of February until the end of June 1982. The elder group came once a week with their class teacher and once with the poetry teacher. Four teachers were thus involved in the study.

4.3.3. Teachers participation

The teachers of the E. group received four workshops of two hours each once a week by the writer during the month of January, before the beginning of the project with the E. group. They were present at every session with their pupils. A special sheet for observation was given to them (see App. No.2 p.93). Break-time and after-school meetings took place when necessary to discuss the integration of the techniques they observed in the music therapy sessions with their own remedial approach. They completed a questionnaire to evaluate the programme at the end of the project (see p.73).

The writer was considered a part of the staff, and therefore attended the weekly case studies and reported on the progress or difficulties of the children.

4.3.4. Intervention techniques

The intervention techniques comprised elements of different approaches in music education and in music therapy integrated by the writer into "learning units" and "integrative activities". The programme followed and a detail of the approach are described in Chapter 5, "Intervention through Music Therapy", p.43).

4.4. Measures

The following tests and ratings were selected as the measuring instruments for the project because they covered the areas in which the children were expected to improve after the five months of intervention. The timetable was arranged to avoid testing the same child more than once a day. Generally an interval of 2 days was observed for each child from test to test.

The five tests administered to the E. and C. groups at the beginning of the study were:

- (a) Wepman Auditory Discrimination Test.
- (b) Ayres Southern California Perceptual-Motor Test.
- (c) Myklebust Pupil Rating Scale-Screening for learning disabilities.
- (d) Oral Reading Tests: Durrell Analysis of Reading Difficulty;
Schonell Graded Word Reading Test.
- (e) Non-standardized test to measure musical perception, devised by the writer.

(a) WEPMAN AUDITORY DISCRIMINATION TEST (Wepman 1958)

The test measures the child's ability to recognize fine differences between pairs of words read by the examiner, and to indicate whether the words heard were the same (a single word repeated) or different (two different words). The task presented to the child is a simple one. It measures only the ability to hear accurately.

Two equated forms of the test permit test-retest evaluation in short periods of time. Each form consists of thirty pairs of words differing in a single phoneme in each pair, and ten word pairs which do not differ, as false choices. Comparisons are made between thirteen initial consonants, thirteen final consonants, four medial vowels and ten false choices. A copy of the two forms can be seen in App. No. 3, p.94).

The Wepman test is widely used in educational clinics as part of the psycho-educational testing battery. Administration of the test to older five-year-old children and younger six-year-olds permits the selection of those who are likely to have difficulty learning to use the phonics necessary for reading. For older children the test has been found useful in the differential diagnosis of reading and speech difficulties. According to Wepman (1958), auditory discrimination has been found to be highly related to the development of speech accuracy and somewhat related to reading ability. For each age group there is an acceptable number of errors. Inadequate performance is reflected

by a number of errors greater than the standard for any given group. Wepman provides construct validity data for his test by reporting several studies where auditory discrimination ability is significantly related to reading abilities. The reported reliability for test-retest administration is of $+0.91$ ($N = 109$).

In the present study the relative number of errors before and after intervention was assessed. The Wepman test was administered and scored by the speech therapists at both schools.

(b) AYRES SOUTHERN CALIFORNIA PERCEPTUAL-MOTOR TESTS (SCPM) (Ayres, 1979)

This test is part of the 17 tests comprised in the Southern California Sensory Integrative Tests battery designed by Ayres (1979) to detect and determine the nature of sensory integrative dysfunction. The SCPM tests consist of six tests designed to evaluate perceptual-motor function in children with learning problems. Although the test is standardized for children ranging in age between 4 and 8.11 years, it is also used in clinical practice to assess older children when LD are suspected. The Normative Data from both initial data and fitted curve are presented in Table 7 of the Manual (Ayres, 1979). Coefficients of test-retest stability vary widely for each of the six tests and for the different age levels (from $r = .78$ to $r = .12$). The lower correlations are given for the elder group. A detail of the coefficients is presented in Table 15 of the Manual. No data on the validity is reported in the Manual. The six tests included in the SCPM tests are:

(1) Imitation of Postures (IP)

This test requires the subject (S) to assume a series of positions or postures demonstrated by the experimenter (E), a process that requires motor planning or programming a skilled or non-habitual motor act.

(2) Crossing Mid-line of Body (CML)

In this test S is asked to imitate E as the latter uses either his right or left hand to point to either his right or left ear. Ayres (1979) reports that this test is based on Head's (1926) findings that certain types of brain injury resulted in a tendency on the part of the patient to avoid crossing the mid-line of his body with his hand.

(3) Bilateral Motor Coordination (BMC)

The S is expected to imitate different rhythmical clapping and tight-slapping patterns performed by E. This test is very similar to the "echo-game" practised

in rhythmic training. Both motor planning and integration of function of the two sides of the body are involved. The test evaluates the ability of the arms to interact in a smoothly integrated pattern.

(4) Right-Left Discrimination (RLD)

In this test the subject responds to verbal commands from the E, according to which he has to indicate or identify right or left hand, ear, sides, or foot on himself and left or right hands of the E.

(5) Standing Balance: Eyes Open (SBO)

The ability of S to balance himself while standing on one foot with his eyes open is measure by this test.

(6) Standing Balance: Eyes Closed (SBC)

This test is similar to SBO but is performed with eyes closed, thus eliminating visual perception and its contribution to balance.

The SCPM tests were administered individually by the writer, and took about 30 minutes to complete. The word "test" was avoided in order to establish a more relaxed and friendly relationship that would enable the child to perform the best they could. The children were told that they were invited to perform the "mirror game" with the writer. Detailed instructions on how to administer and score each test are provided in the Manual (Ayres, 1979, p. 42-49). These were followed closely, taking into account Ayres' recommendations to perform the test spontaneously as well as accurately.

(c) MYKLEBUST PUPIL RATING SCALE (MPRS)(Myklebust, 1971)

The MPRS is described by Myklebust (1971) as a screening technique for the identification of children with deficits in learning. The teacher is required to rate the child in five clearly defined behaviours which are placed along a five point scale. These behaviours are: Auditory comprehension, spoken language, motor-coordination, orientation, and personal behaviour. A total verbal score is yielded by a summation of the auditory comprehension and spoken language ratings, while a non-verbal score is provided by the ratings for motor-coordination, orientation and personal behaviour. A total MPRS is obtained by combining the verbal and the non-verbal scores. Skuy, Shmukler & Clark (1982) report a particularly high degree of reliability, validity and parsimony for the MPRS.

The MPRS was completed by the teachers in the month of March with a view for

providing an additional measure for the behaviours of the children, mainly in the area of social behaviour, which was not assessed by the remaining tests. The teachers re-rated the children in the month of July.

(d) ORAL READING TESTS

The non-readers at the beginning of the project (4 children in the E. group and 3 in the C. group) were assessed by means of the Schonell Graded Word Reading Test. The Durrell Analysis of Reading Difficulty was the measuring instrument used for the rest of the sample.

Schonell Graded Word Reading Test (Schonell, 1976)

The task required from the child is to read aloud a series of graded words. The score is the total number of words correctly read. The reading age corresponding to the score is determined from a normative table (Schonell 1976). The Revised Norms are based on the testing of 10 000 children in Salford and adjusted to the National norm (Schonell and Goodacre, 1974).

Durrell Analysis of Reading Difficulty (Durrell, 1955)

The Analysis consists of a series of tests and situations in which the examiner may observe in detail various aspects of a child's reading (Durrell, 1955). The examiner is provided with checklists for recording observations of difficulties apart from the norms according to which a Profile Chart is drawn. The norm tables are based on no fewer than a thousand children for each test. Durrell (1955) states that in the extensive use of these tests, the norms have been found to check satisfactorily against other measures of reading ability.

The Oral Reading Test contains eight paragraphs with comprehensive questions. The examiner selects at least three paragraphs for the child to read aloud, according to the child's grade and ability. The examiner keeps records of the time required for reading each paragraph, the number of correct answers, the quality and quantity of errors made, and the difficulties or faulty reading habits. High, middle, or low grade levels are calculated according to reading time and number of paragraphs read. The levels are entered in the Profile Chart to obtain the normative age. A complete detail of the procedure to be followed is given in the Manual of Directions (Durrell, 1955, p. 8 - 10).

The Oral Reading Tests were administered by the remedial teachers at both schools.

(e) NON-STANDARDIZED TEST TO MEASURE MUSIC PERCEPTION

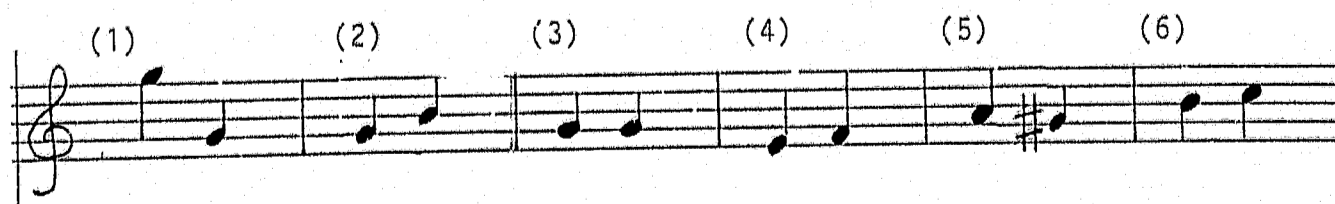
The tests generally applied to measure music perception in normal children (Bentley, 1966; Gordon, 1965; Seashore, 1956; Wing, 1958) require from the subject a high level of performance and a wide attention span which could not be attained by the children in this study. Rink (1972) reports the problems encountered when applying the Seashore tests to children with psychoneurological dysfunction: "In some cases the tests (and retests) were invalidated because some children did not complete the answer sheet, or had already completed it before the end of the test by simply ringing letters at random without listening" (p. 132). In planning a test for the children of the sample, a compromise between a formal test and a friendly interview had thus to be found in order to enhance the chances of a successful assessment and to obtain accurate results.

The test comprised the five measures generally found in music perception tests: pitch, rhythmic recall, time, timbre and tonal memory. Each measure included six items, totalising 30 items to be answered in 30 to 35 minutes. No reading or writing was required. The examiner invited each subject (S) to play "music games" with her. Each measure was explained to the S facing the examiner, clarifying the concept involved and playing the first item as an example. Once the instructions for a given measure were fully understood, the S sat with his back to the therapist and was asked to listen attentively before answering. The first item was played again to the S. No further verbal instructions were given between the items. The tempo was kept at M.M. ♩ = 60 for all the measures. The examiner (E) marked the wrong answers on a scoresheet (see App. No. 4, p.96). The score for each measure was obtained by the summation of the correct answers. A total score was yielded by the summation of the five partial scores. The five measures were elaborated as follows:

(1) Pitch

Two tones were played on a Descant Recorder. The S had to say if the second tone was higher or lower than the first one, or if they were the same. The largest interval was an octave and the smallest a semitone. The following intervals were used:

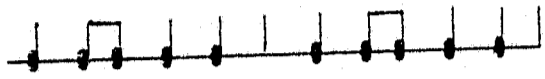
Descant Recorder



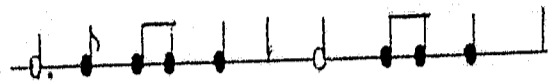
(2) Rhythmic recall

Two rhythmic patterns were played in simple quadruple time. The S had to say if the second pattern was the same as or different from the first. The patterns were played on wooden sticks.

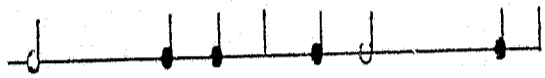
(1)



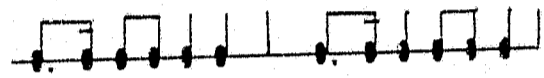
(2)



(3)



(4)



(5)

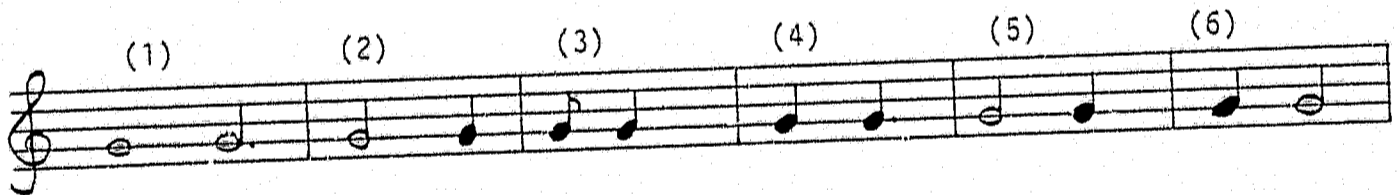


(6)



(3) Time

Two notes were played on the Descant Recorder, keeping the pitch constant. The S had to say if the second sound was longer or shorter than the first.



(4) Timbre








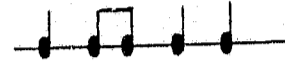


A rhythmic pattern was played twice. The S had to say if they were played on the same or a different instrument.

Drum



Drum

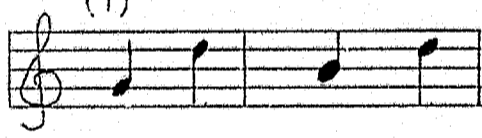



Glockenspiel		Small cymbals	
Metal box containing a stone		Metal box containing a piece of wood	
Bells		Shakers of tambourine	
Hand drum		Plastic jar	
Metal box containing a stone		Metal box containing a stone	

(5) Tonal memory

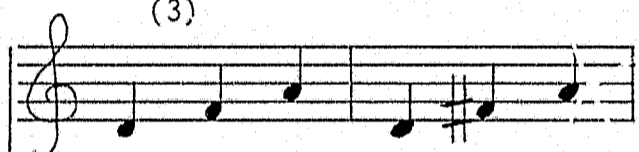
This test was divided into three parts of two items each. In the first part two tones were played consecutively on a Descant Recorder, and repeated immediately, changing one of the tones. The S had to say which tone was changed (first or second). The same procedure was followed using three or four tones.

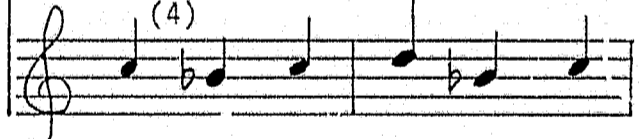
Two tones

(1) 


(2) 

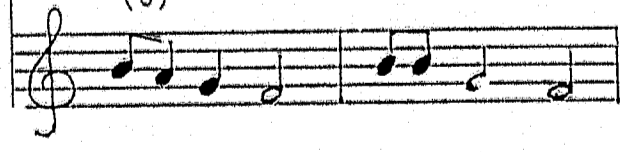
Three tones

(3) 

(4) 

Four tones

(5) 

(6) 

4.5. Experimental design

The scores of the E and C groups in the five tests performed at the beginning of the study were compared statistically to confirm the assumption that there were non-significant differences between the groups.

A pre-post-test design was used to measure the changes of the E and C groups after five months of intervention with the E group. In order to determine the degree of significance of the improvement in the E group, the change scores resulting from the difference between pre- and post-test scores for the E group were compared to the change scores of the C group.

Taking into consideration that a normal distribution of the subjects in the study could not be assumed, the Mann Whitney U test was used to analyze the scores. This "is one of the most powerful of the non-parametric tests, and it is a most useful alternative to the parametric t test when the researcher wished to avoid the t test's assumptions, or when the measurement in the research is weaker than interval scaling" (Siegel, 1956, p. 116).

The value of U is calculated by the following formula:

$$U = n_1 n_2 + \frac{n_1(n_1 - 1)}{2} - R_1$$

In order to determine the significance of U, the value of z is calculated:

$$z = \frac{U - \frac{n_1 n_2}{2}}{\sqrt{\frac{(n_1)(n_2)(n_1 + n_2 + 1)}{12}}}$$

(The value of z thus obtained is entered in a table of probabilities (Siegel, 1956, p. 247) in order to determine its degree of significance.

4.5.1. Correlations

In the literature there are suggestions of a relationship between certain aspects of music perception and cognitive tasks. (Kokas, 1969; Michel, Parker, Giokas, Werner, 1982; Moyer, 1979; Roskam, 1979; Stamback, 1960; Tansley, 1967; Travis, 1971; Zigmond, 1966). This relationship was demonstrated statistically by Kavale (1981), who reports a positive correlation

between auditory discrimination and reading ability, and Lea (1980), who found a positive correlation between rhythmic ability and language.

The only variable related to academic achievement which was correlated to the other tests performed in this study, was the Oral reading test. The determinants of Oral reading (post-test, pre-test) and improvement in Oral reading (post minus pre-test) were investigated by means of multiple linear regression models using two sub-items of the Music Perception test: Rhythm and Tonal memory, Wepman, Bilateral Motor Coordination, and total Music perception scores as predictors. A stepwise backwards elimination procedure was employed to eliminate predictors which did not contribute significantly (at a 5% level) to the prediction of reading ability in each case.

Finally all possible simple correlation coefficients (product-moment and Spearman rank) between the six variables monitored were calculated for pre-test, post-test and improvement scores in both groups.

CHAPTER 5

INTERVENTION THROUGH MUSIC THERAPY

5.1. Teachers participation

As stated in the procedure (Chap. 4.3., p.33), the four class teachers of the E. group were involved in the study. They were not specially selected: they possessed no formal musical training, and their qualifications, age and experience varied widely.

Their main task was to teach the children the syllabus, mainly reading, writing and maths, integrating the different abilities the children developed in their individual sessions with the various therapists on the staff. (See Remedial policy of the schools, Chap. 4.2.1.2., p.32).

The teachers were invited to attend the music therapy sessions because it was thought that by experiencing the different techniques together with their classes, they would be able to incorporate them in their teaching strategies. They could for instance integrate the non-verbal experiences of the music therapy sessions with the verbal ones in the class, relate rhythmic patterns to verbal ones, improve auditory discrimination of words using the techniques we used for sound discrimination, and mainly learn about the dynamics of the group while observing how the children reacted in the sessions. A questionnaire to evaluate their participation can be seen in Chap. 6.3. (p. 73).

5.2. Workshops for the teachers

As stated in the Procedure (Chap. 4.3.3,p.33), four workshops were held for the teachers of the E. group.

Teachers of other schools were also invited in order to enable the teachers of the study to experience the techniques in a larger group. This was considered necessary because a larger group (15 teachers) would offer the opportunity of greater interaction in the creative activities to be experienced. The programme of the workshop is included in Appendix No. 5(p.97).

The workshops comprised the experiencing of musical activities and the analysis of the musical and therapeutical aims attempted in each activity. This approach was devised to enable the teachers to incorporate creatively the skills they experienced in the workshops, facilitating their integration in their own remedial techniques. Both the practical and theoretical aspects of the musical activities had to be experienced and understood: once the activity had been experienced, stressing the process of graduating the difficulty according to the child's growing ability, it was written down on a special sheet divided into four columns (see Observation Sheet in

Appendix No. 2, p.93).

Under the "activity" column of the observation sheet they described briefly what they had done. The music and therapeutic aims were analysed, discussed and written down in the respective columns. Under "observations" they were asked to write down any association they could find between the activity done and their own remedial techniques.

The teachers were asked to use these same observation sheets to keep an analytical record of the sessions the writer held with the children.

5.3. The therapeutic setting

5.3.1. The group

The 20 children of the E. group belonged to three different classes. The same grouping was kept for the music therapy sessions.

1st sub-group: Grade II: 10 children aged 6.9 to 8.10 years old, 4 boys and 6 girls. A boy and a girl belonging to that grade attended the sessions but were not a part of the sample. The boy had hearing problems and the girl suffered from leukemia. They were kept in the group in order to maintain the original class, but were not assessed because they did not fit the requirements of the sample.

2nd sub-group: Standard I: 8 children aged 8 to 9.1, 3 girls and 5 boys. They were all part of the sample.

3rd sub-group: Standard II: 10 children aged 8.8 to 10.9, 5 girls and 5 boys. Only 4 of this group were part of the sample. They were kept in their original class to avoid dividing their own group.

5.3.2. The room

The difficulties of finding a suitable room for music therapy sessions in a special education school are well-known to all those who ever tried to start a music therapy programme. Lack of space seems to be a chronic handicap of the schools. Working with sound and rhythm, the room should be soundproof or isolated to avoid disturbing other classes, or being disturbed by outside noise.

In the beginning it was planned to hold the sessions in the hall of the school, which also served as the Occupational Therapy room. The piano was there and all the Occupational Therapy (O.T.) equipment: boxes, wheels, a hammock, etc. In order to share the room with the O.T., a complicated timetable had to be worked out. This was the first obstacle. The second was that considering LD children tend to be easily distracted, it was inconvenient to hold the sessions in a room full of equipment.

A small "rondavel" (circular separate hut, very common in South Africa) was

discovered in the playground at the back of the school. It was decided to transform it into a music room because (1) it was at a reasonable distance from the main building; and (2) it could offer the children the impression of "something different", a music room of their own, a different activity, a room with its own rules and a new opportunity to succeed.

There was enough room for the children to sit in a semi-circle, and the necessary space to store the percussion instruments on a table and inside boxes which the children were asked to decorate. For movement activities the group had to take turns, moving only 4 - 5 at a time, but the playground outside the "rondavel" offered the required space for movement. As soon as the children understood the idea of "freedom within limits", it was possible to use the playground when a larger space was needed.

The room was decorated with photographs of instruments and music-making groups cut out of colourful advertising in catalogues obtained from the music shops.

5.3.3. The instruments

The lack of finance for buying the expensive percussion instruments required for a music therapy project is the second well-known obstacle to challenge the imagination of the music therapist.

Pretoria Preparatory School, being a private school with no outside subsidy, was not an exception to this problem.

5.3.3.1. Solving budgetary problems

A concert for children was devised with a double purpose: (1) to raise the funds for buying the instruments needed for the project, and (2) to complement the project with a live performance of high quality specially devised for the children. (See Programme of Concert, Appendix No. 6, p. 98)

5.3.3.2. Requirements

The requirements for the instruments were:

- (1) Quality of sound: in order to work on auditory discrimination, a good quality of sound is required. Cheap tambourines and toy-like instruments must be avoided.
- (2) Instruments of different materials are used, for the children to experience timbre differentiation: two or three of each type are sufficient.
- (3) Instruments that produce unusual sound effects are a valuable resource: flexation, sliding flute, cou-cou call, bird's call, jew's harp, cazoo, the imitation of animal calls, the plastic pipe that imitates the wind when turned around strongly.
- (4) Instruments that can be made should not be bought:

- All shapes and kinds of shakers: the children can prepare them at home as "homework".
- Rhythm sticks: can be cut out of old broom sticks. The older the stick and the harder the wood, the better the sound.
- Metal pieces that can be hung to produce interesting sounds when struck.
- Dried fruits from trees can be used for movement and special sound effects.

Gathering objects that produce interesting sounds was a part of the learning unit "awareness of sound in the environment" (see Chap. 5.6., p. 56). They can be complementary to the bought percussion equipment.

5.3.3.3. Instruments acquired: description and use
The percussion instruments acquired for the project were of two types:

- (1) tuned
- (2) non-tuned.

(1) Tuned instruments: a bass xylophone, a soprano glockenspiel (to have a different timbre and a higher pitch than the xylophone), 10 Chime bars from Doh to Me', providing enough sounds to combine into chords for harmonic accompaniment.

(2) Non-tuned instruments: made out of different materials: (a) wood, (b) metal, (c) skin (drums).

(a) Wood: Japanese castanets: these offer the child the challenge to exercise the opposition of the thumb to the rest of the fingers.

- Rhythm sticks: these were made by the boys in the woodwork class, cutting broom sticks into 20 cm long pieces. One pair per child was required.

- 1 guiro, a Brazilian instrument. The good quality ones produce a variety of sound effects when a wooden or metal stick is slid along the rough surface.

(b) Metals:

- 3 triangles. Small but of a solid quality. Light ones generally produce a poorer sound.

- Indian cymbals (finger cymbals): these small cymbals produce a rich and prolonged sound when lightly clashed together. They offer a good challenge for the child's coordination when played with both hands. Long flowing movements can be made, listening until the sound disappears.

- Big cymbals: a second-hand standing double cymbal with a pedal was purchased. The cymbals were sometimes separated and used as clogs. Played with beaters or wire brushes, a variety of sound effects could be produced. Coordination was practised by playing with both hands.

- Bells: 3 pairs. Different sizes produce different pitches and volumes. Auditory discrimination is required to work out the differences.

(c) Skin (drums): This is the most delicate item in the planning of a percussion setting. Children love drums and drumming. A good set of drums would be a great attraction at school but could be a source of conflict as well: whatever instrument a child may play, he will not be satisfied until he is also allowed to play the drums. Children may identify with the pop-players they see on TV, and the amount of noise they can produce may surpass any therapeutic aim. For our particular circumstances, we purchased a bongo, the Central American drum. A bongo comprises two drums of different sizes joined by a piece of wood. In order to play, the child must hold it between his knees and play with both hands. Motor planning and control are needed for playing "professionally". A bongo may also be placed on the ground for playing.

- Tambours: 2 tunable ones. Children were taught to play them with both hands: one for holding the instrument and the other for obtaining two different qualities of sound: striking with the thumb close to the frame produces a prolonged sound, whereas using the whole hand in the middle gives a short sound.

- Tambourines: 2 of a medium size.

Special sound effects

Apart from the percussion equipment, some unusual instruments were acquired:

- A sliding flute, made of the same material as a clarinet, producing a clear sliding sound from very high to low pitch. Several combinations of ascending and descending sounds can be played in glissando, producing a cheerful effect. We shall refer to the use of sliding flute in the learning unit "Pitch discrimination" (p. 58).

- A cazoo: the metal ones produce a better sound and are not breakable. The sound is produced by singing "tu-tu" inside the cazoo. 4 cazoos were acquired.

- Cou-cou call, bird call and two jew's harps of different sizes completed the equipment.

The instruments acquired and gathered, carefully selected, offered a rich variety of possibilities for developing auditory discrimination, rhythmic ability, motor coordination, imagination, creativity and social skills. Children were highly motivated to play the instruments. In order to use this potential for therapeutic purposes, a gradual process was designed, which will be described in sub-chapter 5.4 dealing with "the therapeutic approach".

5.4. The therapeutic approach

Based on the theoretical considerations described in the chapter Music Therapy in the treatment of LD (see p. 18), a special programme was devised

for the E group.

For the planning of the sessions the writer chose an eclectic approach, based on the more suitable elements of different methods: Kodaly (1967), Orff (1960), Willems (1976); and approaches in music education: Gainza (1982), Shafer (1969, 1975), Paynter & Aston (1970); and in music therapy: Alvin (1975), Nordoff & Robbins (1975), integrating music activities with therapeutic principles.

5.4.1. Integration of therapeutic and music aims

In order to improve specific perceptual-motor, psychologic and social abilities within the E. group, musical activities were organized into "learning units" followed by "integrative activities" dealing with the following areas:

- (1) Fine and gross motor coordination: through body and space awareness and rhythmic training.
- (2) Right-left discrimination and crossing the middleline, practised every session as part of the different learning units.
- (3) Perception of patterns, sequencing, rhythmic recall: from echo game to gum boots dance. Musical forms: A/B, A/B/A, ABACABA.
- (4) Auditory discrimination: from awareness of sound in the environment to the use of sound effects, with rhymes, nonsense rhymes and poems. Enhancing verbal expression through the use of the elements of music.
- (5) Expression of moods and feelings: through pantomime, movement and music improvisation.
- (6) Creative thinking: using imagination to go through the different tasks during the session.
- (7) Concept formation: to understand concepts through multisensory stimulation. Exploration and discovery as a teaching technique. Verbalization of the sensorial experience.
- (8) Social skills: Awareness of self and the group through non-verbal communication. Body language. Eye contact. Listening to others. Being the leader and being part of the group: team work.

5.4.2. Principles observed

- (1) Activities were planned according to musical and remedial aims, graduating the difficulties in order to enlarge the ability of the child, give him the feeling of progress and success in performing each task and offer him new challenges he will feel confident to handle.
- (2) Good quality instruments were used (see The instruments, p. 45), starting with the therapist's voice and her way of speaking to the children.
- (3) A relaxed atmosphere was maintained throughout. The therapist was in

control of the situation not as an authority but as a facilitator, delimiting the frame within which the child could show his uniqueness and relate to the group through a meaningful activity,

(4) The music to be used was chosen according to the children's cultural background, their knowledge and their personal taste. This did not mean that the therapist limited the repertoire to what the children knew. Children's personal taste was taken into account in order to know how to develop and grow from it.

(5) The child's world was enriched by presenting to him music of different countries, instruments of all kinds, live performances when possible, thus enhancing his curiosity and sense of discovery.

(6) The child as an individual with specific strengths and weaknesses and the group dynamics were the centre and the target of the session, not the music. But the music is the therapist's tool. The better the sound obtained, the clearer the performance of every single clapping, the higher the quality of the music heard or played, the better the experience for the child. Music is an art and an aesthetic experience. Every single sound the child produces or hears may attain this aesthetic quality to make the experience more fulfilling. Still, it was the child's expression that was looked for, not the musical results. The children enjoyed an integrated experience, felt free to express themselves in a structured situation, concentrated on performing with precision the different activities and were given the feeling that they succeeded in all these tasks.

(7) In presenting the learning units and integrative activities, special care was taken to graduate the difficulties in order to give the children the feeling of gradual progress.

5.4.3. Learning Unit

This concept is defined as a compendium of activities related to a specific objective. Initial activities were carefully matched to the children's abilities. Progress to more complex activities was dependent on the mastery of previous stages.

The learning units in the project dealt with:

- (1) Awareness of sound in the environment: from listening to sound in the environment to music-making with self-made percussion instruments.
- (2) Pitch discrimination: from high-low differentiation with the sliding flute to the graphic representation of sound.
- (3) Rhythmic training: from the "echo game" to the "gum boot dance".
- (4) Creative use of percussion instruments: from timbre discrimination to improvisation in small groups.

At least two learning units were dealt with in each session. The basic

control of the situation not as an authority but as a facilitator, delimiting the frame within which the child could show his uniqueness and relate to the group through a meaningful activity,

(4) The music to be used was chosen according to the children's cultural background, their knowledge and their personal taste. This did not mean that the therapist limited the repertoire to what the children knew. Children's personal taste was taken into account in order to know how to develop and grow from it.

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At least two learning units were dealt with in each session. The basic

skills thus acquired were complemented by "integrative activities". These were a combination of the different skills already learned.

5.4.4. Integrative activities

- (1) Rhymes and percussion: using sound effects to accompany rhythmic speech. Percussion instruments to enhance rhymes and poetry.
- (2) Listening to music through movement and graphic representation.
- (3) Onomatopoeic rhymes combined with creative movement and percussion.
- (4) Singing was given special attention every session, considering it can be a highly integrative experience for:
 - learning musical concepts: melody, phrasing, question-and-answer, A-B-A form, harmonic accompaniment with the metallophone;
 - working on pitch discrimination: repeated sounds, ascending and descending sounds in the melody;
 - auditory discrimination: learning onomatopoeic words to the melody, or songs in different languages. Singing the melody only with la-la to concentrate on the right intonation. Internal singing (recalling the melody without singing it, while clapping the rhythm);
 - control and coordination: clapping only in some parts of the melody.

Singing was always something special, done with a purpose that required concentration and precision. Careless singing was discouraged. The guitar was used as an accompaniment to the singing. The advantages of this are that the therapist could keep eye-contact with the children while playing, create a relaxed atmosphere, and provide the rhythmic and harmonic structure. The simplest song can thus provide a rich aesthetic experience.

Singing as a global experience involves the expression of mood as well. The elements of the song can be analyzed, understood and integrated again at a higher level.

A further integration of the skills learned by the children was achieved in a public performance that took place at the end of the term (July) for the whole school and the parents.

5.4.5. Public performance

The 20 children of the Experimental group performed on stage the "gum boots dance" and an onomatopoeic rhyme (see App. No. 7, p. 99), accompanied by movement and percussion. The older group also participated in a Speech Festival, reciting by heart poems they had learned with their teacher, to which they created sound effects and movement in the music sessions.

A small group participated in the creation and playing of sound effects to a puppet play. The puppets and the script were created by the children with the art teacher.

Public performances, when handled with therapeutic aims in mind, may be a positive and highly stimulating experience for the children.

They require discipline, team-work, perseverance, precision and mastering of the material performed. The approval of the public and the feeling of achievement provide important boostings of the child's self image.

5.5. The sessions

As explained in sub-section 5.3.1., the 20 children of the E. group belonged to 3 different classes, and came to the sessions with their respective teachers as 3 separate sub-groups, for half-an-hour twice a week, during the five months of the project.

Although the therapeutic and musical aims were the same for the 3 sub-groups, the activities were slightly changed in order to adapt them to the age differences.

Each session comprised the gradual acquisition of skills in the different learning units (sub-section 5.4.3.) and Integrative activities (sub-section 5.4.4.) planned for the project.

The sessions were planned on the same type of "observation sheets" as those given to the teachers for their follow-up.

The following three sheets describe the plan of the first session for each of the 3 sub-groups. They show the structure of the sessions and the similarities and differences in the planning for the three sub-groups. This same structure was observed during the five months of the project.

DESCRIPTION OF THE 1ST SESSION WITH THE E. GROUP

Sub-group No. 1

ACTIVITY	MUSICAL AIM	THERAPEUTIC AIM	OBSERVATIONS FOR THE CLASS TEACHER
1. Song: "Good morning to you!"	Sing in tune, auditory recall, memorize	Express a greeting, readiness	Sing every day
2. Hello to ... in sol-mi	Tune voice to sol-mi	Individual attention	
3. "Elevator Game" (See Learning Unit No. 2, p. 58)	Pitch: high-low Tempo: slow-fast	Audio-motor coordination. Conceptualization. Space-body relation.	
4. "Echo Game" (See Learning Unit No. 3 p. 62)	Perception of a rhythmic pattern	Motor co-ordination. Rhythmic recall.	Practise every day
5. Names sol-mi on the glockenspiel	Memorize sol-mi. Play in tune.	Individual attention. Coordination hand-eye-ear	Practise.
6. Song-rhyme "Tinker-Tailor"	Move to the beat of the song. Memorize sol-mi	Summing up all the aspects of the class. Memorize song.	Explain the different professions.
7. Choose one of the professions and move accordingly	Sing and move.	Motor organization.	

Sub-group No. 2

ACTIVITY	MUSICAL AIM	THERAPEUTIC AIM	OBSERVATIONS FOR THE CLASS TEACHER
1. Song: "Row your boat!"	Three beats (waltz)	Feeling of togetherness. Singing a known song.	Sing and accompany rhythmically during the week.
"Jingle Bells"	Two beats		
2. Rhythmic accompaniment to different songs	Feeling two-three beats in music	Motor coordination	
3. "Elevator Game" (See Learning Unit No. 2, p. 58)	Pitch: high-low Tempo: slow-fast Differentiation between pitch and tempo	Audio-motor coordination. Conceptualization: Space-body relation. Right-left discrimination.	
4. "Echo Game" (See Learning Unit No. 3, p. 62)	Dynamics: loud-soft Perception of a pattern. Timbre of the different parts of the body.	Motor co-ordination. Rhythmic recall. Focussing on parts of body. Left-right discrimination.	Practise every day.
5. The children asked for "Yellow Submarine" (Beatles) as farewell.	Fitting different clapped rhythms to the song.	Same as "Song"	

Sub-group No. 3

ACTIVITY	MUSICAL AIM	THERAPEUTIC AIM	OBSERVATIONS FOR THE CLASS TEACHER
1. Song: "Deep in the heart of Texas" (taught by one of the children)	To sing in Tune together (rhythmically)	Relating to the group. Auditory recall. Memorizing words.	Sing whenever fitting during the day.
2. "Elevator Game" (see Learning Unit No. 2, p. 58)	Pitch: high-low Tempo: slow-fast Readiness for reading music.	Audio-motor coordination. Conceptualization. Space-body relation. Differentiation.	
3. "Echo Game" (See Learning Unit No. 3, p. 62)	Perception of a rhythmic pattern. Timbre. Dynamics.	Motor coordination. Rhythmic recall. Focusing on different parts of the body.	Practise every day (5-10 min.) Difficulty in using more than one part of body.
4. Awareness of sound in the environment, checking the sounds around us. Classifying sounds (see Learning Unit No. 1, p. 56)	Timbre. Ways of producing sound. Qualities of sound and their sources.	Exploration self-induced auditory discrimination. Concept formation.	Bring an interesting sound from home (homework).
Rhythmic and vocal improvisation.	Rhythmic patterns based on ostinato.	Non-verbal communication.	
During the session use of right or left hand for the different activities.			Work on right-left hand differentiation while performing the activities.

5.6. Description of four learning units

Four learning units are described in detail in order to illustrate: (1) the gradual process followed by the E. group in the different areas dealt with in the project; (2) the intervention techniques used in this approach; (3) the different reaction of the children to specific activities.

5.6.1. Learning Unit No. 1: Awareness of sound in the environment

From listening to sound in the environment to music-making with self-made percussion instruments.

5.6.1.1. Main objective

- (a) Self-induced auditory discrimination: the children were motivated to explore different sounds, become aware of the source of sound and ways of producing different intensities and qualities of sound.
- (b) Social interaction: the children learned to listen to each other's "discoveries" and combine them creating rhythmic improvisations (non-verbal communication). A schematic description of the activities and the musical and therapeutic aims involved in the first stage of one unit is presented below to provide an illustration of how the learning unit was gradually developed.

For stages 2, 3 and 4, as well as for the remaining Learning Units only the description and analysis of process are provided.

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