THE USE OF MUSIC THERAPY ASSESSMENTS WITH HEARING-IMPAIRED CHILDREN

A THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF MASTER OF ARTS

IN THE GRADUATE SCHOOL OF THE

TEXAS WOMAN'S UNIVERSITY

COLLEGE OF HUMANITIES AND FINE ARTS

BY

PEGGY D. LAWYER, RMT-BC

DENTON, TEXAS

DECEMBER 1988

TEXAS WOMAN'S UNIVERSITY

DENTON, TEXAS

August 11, 1988

To The Provost of the Graduate School:

I am submitting herewith a thesis written by Peggy D. Lawyer entitled "The Use of Music Therapy Assessments With Hearing Impaired Children". I have examined the final copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts in Music Therapy.

Donald E. Michel

Dr. Donald E. Michel, Chairman

We have read this dissertation and recommend its acceptance:

Nancy A Hadsell

Dorothy J. Grant

Accepted

Leslie M Thompson

Provost of the Graduate School

ACKNOWLEDGEMENTS

Special thanks is extended to the members of my thesis committee, Dr. Donald Michel, Dr. Nancy Hadsell, and Dr. Dorothy Grant, for their assistance and guidance.

Sincere appreciation is given to Kathleen Holmes, Jane Malone, and Janet Bardin for providing subjects for the assessments. Appreciation is also expressed toward the McNair Elementary School for allowing me the use of its facilities to assess the children.

Loving thanks is extended to my family for their encouragement and support.

THE USE OF MUSIC THERAPY ASSESSMENTS

WITH HEARING-IMPAIRED CHILDREN

Peggy D. Lawyer

December 1988

ABSTRACT

The purpose of this study was to examine the effectiveness of the Auditory Perceptual Tool-Assessment in Music (APT-AIM) and the Musical-Perception Assessment of Cognitive Development (M-PACD) in assessing developmental skills of the hearing impaired and, further, to determine if adaptive procedures are necessary in order to use these assessments with the hearing impaired. The APT-AIM and the M-PACD were administered individually to twelve hearing children and to twelve severely hearing impaired children from one public school.

The t-test revealed a significant difference between the scores of the hearing and the scores of the hearing impaired subjects on the APT-AIM and the M-PACD assessments. The scores of the hearing impaired subjects were consistently lower than those of the hearing subjects on both the APT-AIM and the M-PACD.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

INTRODUCTION

The generic term, hearing impairment, indicates a hearing disability which may range in severity from mild to profound. This term, when used in education, denotes any child who is in need of special services because of hearing loss. These services may range from selected seating in a regular classroom and speech and language therapy, to a full program in a special self-contained classroom. The term "hearing impairment" includes the subsets of those who are deaf, deafened, or hard-of-hearing (Peters, 1987).

A deaf person is one whose hearing disability is so severe that, with or without a hearing aid (or even the finest amplification system), the person cannot process language or understand speech using only the auditory system. A deafened person is an individual who has suffered a severe hearing impairment after having acquired speech. A hard-of-hearing person is one who has some degree of hearing loss but who, with or without the use of a hearing aid, has sufficient hearing to understand speech and process language through audition (Heimgartner, 1982).

There are several dimensions of hearing ability which may be impaired. Sensitivity is the ability to hear soft, or low intensity, sounds, and intensity is the physical

dimension designated in decibels, by which sensitivity is measured. The human ear perceives intensity as loudness. Frequency range is the dimension of low to high sounds, as on a musical scale, which can be measured precisely in terms of cycles per second, or Hertz. The frequency of a sound is perceived as its pitch. Other dimensions of hearing can be tested, but sensitivity, as measured in terms of physical intensity, and pitch, in terms of frequency range, are among the most basic measures.

A person's threshold of hearing is that point at which a person can hear the softest sound of a given frequency in 50% of a given number of trials. Threshold of hearing is most often stated in terms of decibels. Normal hearing levels range from -10 to +15 decibels (Buechler, 1982). Roeser and Downs (1981) have categorized the extent of hearing loss according to the following terms:

Marginal - loss of 15 to 30 decibels in the better ear.

Mild - loss of 31 to 50 decibels.

Moderate - loss of 51 to 70 decibels.

Severe - loss of 71 to 90 decibels.

Profound - loss of 91 or more decibels.

Audiology (the study of hearing and hearing loss) determines the degree of a person's hearing loss by means of the administration of tests which measure hearing acuity. Pure tone sound stimuli are presented, usually through earphones

in a soundproofed setting, at specified frequencies. The threshold measurements, or hearing levels, are plotted on a graph, called an audiogram, on each ear.

Music therapy has a part to play with people who have lost hearing over a period of time for one reason or another, as well as with those who have never heard (Michel, 1985). It is not only a way of helping the hearing impaired become aware of vibrations made by musical instruments and perceive rhythm and rhythmic organization in music and in speech, but it can be valuable as well in helping them become aware of and use sounds which may be within their individual residual hearing capacities.

Assessing a client's current state of development is an integral part of music therapy. With the hearing impaired as with any other handicapped child, music therapists have first to assess at which level they can start and to find the technique through which they can reach the child and contribute to his or her growth. In order to make progress in any type of therapy, the client's current condition must be clearly understood and a "baseline" or therapeutic point of departure determined. Assessment can also be the first step in documenting the treatment of a given client, and thus become a foundational phase of establishing accountability for the therapeutic process as well as establishing the basis for treatment programming.

Gaston (1968) asserted that "music therapy clinicians have found music to play a key role in accomplishing the following goals:

1. The establishment or reestablishment of interpersonal relationships;
2. The bringing about of self-esteem through self-actualization;
3. The utilization of the unique potential of rhythm to energize and bring order" (p. 18).

Researchers in music therapy have recently used these goals of music therapy to facilitate the process of client assessment. Examples of such research include the Auditory Perceptual Tool-Assessment in Music (APT-AIM) by Westplate (1981), the Musical-Perception Assessment of Cognitive Development (M-PACD) by Rider (1984), and the Music Therapy Assessment Profile (MTAP) by Michel and Rohrbacher (1982). The APT-AIM provides a profile of a child's perceptual development from birth to six years. The M-PACD is based on the developmental psychology theories of Jean Piaget and is designed to test mental functioning from birth to fifteen years. The MTAP is modeled in form on the work of D'Eugenio and Moersch, et al. (1981), authors of Developmental Programming for Infants and Young Children (DPIYC). The MTAP assesses gross and fine motor, communication, cognition, and social/emotional skills of children aged

0-27 months.

The developmental approach to assessment includes the aspect of eliciting optimal response from the client being tested. One way in which this response can be reached in the context of a music therapy assessment form is by choosing music and instruments that will best reach a specific client at his or her specific geographic location, socio-economic level, cultural level, chronological age level, and family situation. The APT-AIM, M-PACD, and MTAP are assessments designed to elicit optimal response by the specific client being assessed.

Purpose of the Study

The purpose of this study was to examine the effectiveness of the APT-AIM and the M-PACD in assessing developmental skills of the hearing impaired and to determine if adaptive procedures are necessary in order to use these assessments with the hearing impaired. The differences in developmental skill areas between those with normal hearing and those with a hearing impairment were also examined.

CHAPTER II

REVIEW OF LITERATURE

Music has been used in special education and therapy for the hearing impaired since the 1800's (Solomon, 1980). Since that time, several techniques for using music with hearing impaired clients have been developed. Michel (1985) listed four basic uses of music with the hearing impaired:

1. The use of vibration, especially the organized vibrations of music, to gain and expand attention;
2. The use of music and its wide range of frequencies to assist in the diagnosis of hearing loss and development of hearing potential;
3. The use of the rhythmic pulsation of music to help develop social relationships in movement with others;
4. The use of music to regulate speech mechanisms in the development of language.

When working with hearing impaired clients, it is important to remember that the vibrations of music have a tactile as well as an auditory component. Even clients with severe or profound hearing impairments are able to perceive the vibrational patterns of music through their tactile sense. Because vibrations can be felt through the player's lips, mouth, and teeth, the kazoo has been a useful instrument for hearing impaired students, enabling

them to grasp the concepts of high and low, loud and soft, and fast and slow. It has also been used to teach the deaf to read rhythms, eventually leading to improved verbal communication (Birkenshaw, 1965).

May (1961) encouraged the use of tactile sense as she taught students to distinguish sounds of orchestral instruments by touching them while they were being played. Also, the students participated in a rhythm band using instruments that afforded direct tactile stimulation through contact with the player's hands. Likewise, the tactile sense was responsible for a deaf trumpet student's ability to adjust his embouchure to produce the correct pitch at any given valve combination (Folts, 1977). The student learned this by placing his hand first on the bell of the teacher's trumpet as the correct pitch was played, and then placing his hand on the bell of his own trumpet, matching the vibrations, and thus producing a pitch of the same vibration.

Kapla (1975) recommended that auditory training programs for the hearing impaired use musical instruments to help the clients learn to distinguish vibrations and sensations in their environment. In this type of program, clients first would be asked to sit near a piano or bass xylophone and touch the instrument directly to feel its vibrations. When the vibrations stopped, clients were to

indicate this by word or gesture. Gradually, clients would be asked to tell when vibrations stopped and started with fewer and fewer direct visual and tactile cues.

Tactile stimulation from the patterned vibrations of music may also provide cues that facilitate the ability to reproduce rhythm patterns. Korduba (1975) found that deaf third-grade students could experience rhythms presented on a bass drum and then reproduce those rhythms on a snare drum significantly better than could third-grade normal hearing students.

Group music experiences can provide hearing impaired clients with important opportunities for socialization both with other hearing impaired individuals and with normal hearing persons. Thomas (1976) found that rhythm band activities, rhythmic movement activities, and dances helped deaf clients improve their motor and social skills and increase their trust of hearing persons.

Since music has such a wide range of frequencies, it also can be useful in helping determine what functional areas of hearing a client might still possess. Robbins and Robbins (1980) devised a hearing perception test in which clients' responses to auditory stimuli from a drum and piano were used to give a fairly reliable estimate of functional hearing ability.

Finally, the rhythm and pitch patterns found in music

can be very beneficial in helping hearing impaired clients develop more normal speech patterns. Richards (1964) developed a music program for hearing impaired students entitled "Education Through Music" (ETM). Allen (1975) used Richard's ETM with hearing impaired students. In her first use of ETM, Allen used only the words of the songs to teach rhythm. She soon realized that the students wanted the music as well and were able to understand rhythmical patterns in the words and music.

Brown (1980) noted that Carl Orff's approach to music education for the deaf began with a child using his or her voice in singing. Next, the child employed clapping, snapping, and patsching (slapping thighs) to gain rhythmic knowledge. The child was next taught to play a small percussive instrument. Brown felt that this progression strengthened the student's understanding of rhythm.

Stern (1975) reported on the music program at the Lexington School for the Deaf, which included dancing, singing, listening, and playing music. Improvements of the students were noticed in awareness of rhythm, sound vibrations, breathing patterns, and phrasing. Auditory acuity was also sharpened.

Bang (1980) found that specially constructed large wooden and metal tone resonator bars were very useful in increasing sound and pitch perception and in eliciting

vocal production in hearing impaired clients.

McDermott (1971) theorized that lipreading and speech could be helped by assisting the hearing impaired child to acquire a sense of rhythm. Singing rhythms as well as movement activities and tactile discrimination of pitches have aided deaf students in improving speech abilities (Fahey and Birkenshaw, 1972). In Holland, van Uden (1970) practiced a method of teaching speech to the hearing impaired that involved stimulating the child's speech through music sounds and then imitating and adding to that speech. Dancing and music have been part of this method giving the child experience and information on rhythm and so adding to the intelligibility of the child's speech.

Allen (1975) devised a way of grouping rhythms in language to make it more easily understood. Rhythms are grouped according to three criteria: (a) intensity, (b) duration, and (c) pitch. Words or phrases are grouped into categories and converted into rhythm groups. Allen used these rhythm groups to present songs and stories and to teach grammar, writing, and reading. Allen felt that areas such as visual motor coordination, body awareness, and auditory discrimination were greatly enhanced by this method.

Ewing and Ewing (1956) proposed a rhythmic program for teaching speech to hearing impaired children from five to

sixteen years of age. Goals for the students were: (a) spontaneous use of complete sentences, (b) the addition of vocabulary through experiences with new vocabulary, (c) the use of all parts of speech, and (d) rhythmic training using hearing, percussion instruments, and physical activities that create a knowledge of rhythm in speech. The vocabulary and the grammar used can be adjusted to the ages and abilities of the children.

The Verbotonal Method (Guberina, 1963) maximizes auditory awareness in developing speech and language. The four components of this method are: (a) body movement, (b) musical stimulation, (c) implementation (speech and language learned through nursery rhymes), and (d) individual works. This approach has helped deaf children make maximum use of their residual hearing. Craig, Craig, and DiJohnson (1972) conducted a study of the Verbotonal Method with preschool students. One-half of the students were given speech instruction using the Verbotonal system and the other half were given instruction using a multisensory approach. The results showed that the Verbotonal group improved more in their ability to produce speech than those in the multisensory group.

Swaiko (1974) used eurhythmics programs, which instill rhythmic concepts through whole-body movement to auditory and vibrational stimuli, to facilitate development of total

communication skills and expression of feelings. Music activities have also been used to help clients learn and practice sign language skills (Prueter & Giles, 1981).

In summary, the literature on the uses of music with the hearing impaired emphasizes the value of aural, visual, and tactile stimulation within various musical activities. To date, no research has been reported concerning the adaptation of music assessments with the hearing impaired.

CHAPTER III

STATEMENT OF PROBLEM

The problem of this study was to determine whether the APT-AIM and the M-PACD music assessments are effective tools for use in assessing the developmental levels of the hearing impaired, and to determine what general skill areas distinguish the hearing impaired from persons with normal hearing.

Null Hypotheses

H_1: There will be no significant differences in scores made by severely hearing impaired children and normal hearing children of the same age and developmental level as measured by the APT-AIM music therapy assessment form.

H_2: There will be no significant differences in scores made by severely hearing impaired children and normal hearing children of the same age and developmental level as measured by the M-PACD music therapy assessment form.

Discussion Questions

1. How effectively do the APT-AIM and the M-PACD measure developmental skills of severely hearing impaired children?
2. What modifications to the APT-AIM and the M-PACD may be necessary to more adequately assess severely hearing impaired children?
3. Can music therapy assessments contribute to programming for severely hearing impaired children?

Assumptions

For the purpose of this study, the following assumptions were made:

1. The developmental characteristics of an individual can be measured through the use of music therapy assessments.
2. Music activities can be used in assessing an individual's development.
3. Music to the hearing impaired is a series of vibrations which may be perceived through the visual and tactile channels as well as through the auditory channels.

Limitations

Variables uncontrolled in this investigation which limit the findings were:

1. Attribute variables such as the subjects' socioeconomic status and previous musical knowledge were not considered.
2. This study was limited to students at one public school.
3. Time of onset of hearing loss, degree of hearing loss, and sign language systems used by the hearing impaired subjects were uncontrolled variables in this study.
4. Matching of the hearing and hearing impaired subjects in developmental month levels was limited.

Significance of the Study

The significance of this study lies in the power of music to aid in the assessment of developmental skill areas.

If music enhances methods of assessing development of the hearing handicapped, a skilled and knowledgeable music therapist may have a powerful medium for assessing the hearing impaired toward more precise programming for their individual development through music therapy.

By examining current research regarding music assessments and the hearing impaired, important information will be gathered. Since accountability is so important in every therapy, it is beneficial to the field of music therapy to know how music assessments may be used successfully with hearing impaired clients. Furthermore, it is of interest to those working in deaf education to know that music therapy can be an added modality in the enhancement of education of the hearing impaired.

CHAPTER IV

METHOD

Subjects

The subjects for this study were 12 hearing impaired students and 12 normal hearing students between the ages of 3 and 12 years from the McNair Elementary School. They were matched according to age and developmental level by two classroom teachers on the basis of scores on the Wechsler Intelligence Scale for Children (WISC) and on their own personal observations of the students (see Table 1).

Apparatus

Materials for this study consisted of the Auditory Perceptual Tool-Assessment in Music (APT-AIM), the Musical-Perception Assessment of Cognitive Development (M-PACD), and the materials required to administer these tests. Westplate (1981) based her norm-referenced test, the APT-AIM, on four stages of perception: attention, stimulus localization, discrimination, and auditory memory. The first stage, attention, tests the ability to guide and maintain attention to sounds, to choose an appropriate stimulus from a background of inappropriate stimuli, and to maintain attention to this stimuli for a relevant amount of time. Stimulus localization, the second stage of auditory perception, is tested by assessing the client's ability to determine the

Table 1

Subject Descriptors

Description		Number of Subjects	
		HEARING	HEARING IMPAIRED
Sex	Female	5	6
	Male	6	7
Age	3-4 years	2	2
	5-6 years	3	3
	7-8 years	3	3
	9-10 years	2	2
	11-12 years	2	2
Developmental Month Level			
	0-36 months	-	1
	36-48 months	1	1
	48-60 months	3	2
	60-72 months	1	1
	72-84 months	1	1
	84-96 months	2	1
	96-108 months	2	2
	108-120 months	-	-
	120-132 months	1	-
	132-144 months	2	1
	144-156 months	-	1

correspondence between the auditory stimulus and the event, object, or person which causes it. The third stage, discrimination, requires the ability to discriminate one stimulus from another. Various types of stimuli, such as a steady pure tone, an unsteady pure tone, and speech and nonspeech sounds, are used for testing discrimination ability. Auditory memory, the fourth stage in auditory perception, is used to recall and sequence information, and is tested by asking the client to recall such things as names, rhymes, jingles, and story details. The Westplate test structures all four stages in a hierarchical fashion in the form of 50 skill tasks. For each of the 50 tasks, Westplate designed an instructional form which specifies materials required, the assessment procedure, scoring instruction, and the normative developmental age for that skill (see Appendix A).

Basing his cognitive skills assessment on Piaget's developmental psychology, Rider (1984) used the Stages of Cognitive Development as a foundation for the M-PACD. The first stage, sensory motor (0-1 year) consists of tasks requiring circular reactions in which the child purposefully manipulates the environment to obtain an object or cause a desired effect. The symbolic stage (1-3 years) involves symbol formation in which the child imitates actions and sounds surrounding him. The third stage,

pre-operational (3-6 years), involves seriation abilities through which the child arranges objects in order according to a single dimension. The concrete operational stage (6-11 years) involves attaining the ability of conservation which calls for the recognition of invariance in one dimension when other dimensions change. The last stage, formal operational, involves abstract thinking (11 years and up), which relies on the child's abilities to formulate hypotheses, make inferences, and draw conclusions (Rider, 1981). The M-PACD contains 20 tasks in which Rider specifies the materials needed for the task, the procedure for administering the task, the scoring protocol, the approximate mental age of development, and remarks for administering the task to handicapped populations (see Appendix B).

The materials required to administer the APT-AIM are listed in Appendix C. Materials required for the M-PACD are listed in Appendix D.

Procedure

For the present study, each subject was tested individually with the APT-AIM and the M-PACD. All materials were within reach of the experimenter. The experimenter and subject were seated facing each other.

The M-PACD was administered in developmental order. The starting point was chosen by the investigator according

to test protocol at three tasks below the suspected mental age of the subject. If the subject failed this task, then the experimenter retroceded three more tasks. The experimenter proceeded upward from that point until the subject had failed three tasks in a row. The M-PACD was scored using "+" for pass, "-" for fail, and "0" for a transitional or an almost correct response. Rider (1984) included comments on scoring his test, describing the responses needed to receive either a passing or failing score. These scoring procedures were followed by the examiner in determining correct or incorrect responses.

For administration of the APT-AIM, the experimenter completed the entire assessment since any individual subject could demonstrate some variation in maturation, as indicated by "splinter skills". The experimenter identified the level of development by distinguishing between skills mastered and those yet to be developed. Scores of 0 to 4 were given on each task. If the child immediately responded as anticipated, a score of "4" was given. The instructional form for each task described a procedure to identify varying functional levels if the child did not demonstrate the specified response. In each case, the numerical score value decreased as the administrator increased assistance. When the administrator elicited the response by adding a verbal or signed cue, the score was "3"; a response to a cue and a

partial prompt was scored "2". When the child responded only to a cue, partial prompt, and a gross physical prompt, the score was "1". If none of the measures elicited a response, or if the child actively refused to respond, the specified score was "0". Skills with scores of "4" were considered mastered for the purpose of describing the child's present level of function/development. The highest developmental age level in which most of the skills were mastered was accepted by the examiner to represent the child's developmental age level.

Test data for the APT-AIM and the M-PACD were recorded on the appropriate test forms (see Appendixes E and F). Scores for both tests were computed in terms of developmental months. According to procedures followed in validating the Music Therapy Assessment Profile, scores were derived by taking a basal number of the age range preceding the subject's lowest failure, counting the number of items passed above that basal level, dividing this number of passes by the number of months in the next age range, and adding the results to the basal level for the final score (Burton, 1985). Table 2 illustrates this process.

Table 2

Methodology for Determining Developmental Month Level

Age Range	Item Number	Score
24-27 months	23	P
	24	P
27-36 months	25	P
	26	P
	27	P
36-48 months	28	P
	29	F
	30	P
	31	F
	32	F
	33	F
	34	F

Step 1 -- Basal level = 27-36 months

Step 2 -- Highest number of months in basal level = 36

Step 3 -- Number of P's (passes) above basal level = 2

Step 4 -- $\frac{7 \text{ (Number of items in 36-48 month level)}}{13 \text{ (Number of months in 36-48 month level)}} = .54$

Step 5 -- $\frac{2 \text{ (Result of step 3)}}{.54 \text{ (Result of step 4)}} = 4$

Step 6 -- 4 (Result of step 5) + 36 (Result of step 2) = 40

The developmental level on this scale is 40 months.

(Burton, 1985).

CHAPTER V

RESULTS

The t-test for related measures was used on both the APT-AIM and the M-PACD to determine whether there was a significant difference between the scores of the hearing and the scores of the hearing impaired subjects. A comparison of test score means revealed significant ($p \leq .01$) differences between the scores of the two groups on both assessment scales. Scores of the hearing impaired subjects were lower than those of the hearing subjects on both the APT-AIM and the M-PACD assessments.

Table 3 shows the t value for the scores on the APT-AIM assessment ($t=3.151$, $df=11$, $p<.001$).

Table 3

T-Test for Differences Between Scores of Hearing and Hearing Impaired Children on the APT-AIM Assessment

	Mean (H)	Mean (HI)	t Value	df	2-tail Prob.
APT-AIM	69.61	53.29	3.151	11	$p<.001$

The t value for the scores on the M-PACD assessment are shown in Table 4 ($t=3.092$, $df=11$, $p<.01$).

Table 4

T-Test for Differences Between Scores of Hearing and Hearing Impaired Children on the M-PACD Assessment

	Mean (H)	Mean (HI)	t Value	df	2-tail Prob.
M-PACD	89.50	69.50	3.092	11	$p<.01$

There were significant differences in scores by hearing and hearing impaired subjects on both the APT-AIM and the M-PACD assessments. Therefore, the null hypotheses for this study were rejected.

CHAPTER VI

CONCLUSION AND DISCUSSION

The purpose of this study was to examine the effectiveness of the Auditory Perceptual Tool-Assessment in Music (APT-AIM) and the Musical-Perception Assessment of Cognitive Development (M-PACD) in assessing developmental skills of the hearing impaired as compared to age-matched normal listeners, and determining if adaptive procedures were necessary in order to use these assessments with the hearing impaired. Differences in developmental skill areas, as measured on these instruments, between children with normal hearing and those with a hearing impairment were also examined.

The APT-AIM, a norm-referenced developmental assessment, and the M-PACD, an assessment based on Piaget's Stages of Cognitive Development, were given individually to 12 hearing subjects and to 12 hearing impaired subjects, age-matched from 3 to 12 years, at the McNair Elementary School in Denton, Texas. In scoring the APT-AIM, the highest age level in which most of the skills received the score of 4 was used as the final developmental age score in each case. In scoring the M-PACD, the age level of the last task passed was used as the individual's final developmental age score. These scores were converted to developmental level

in months, and a statistical analysis of mean scores for both groups was computed using the t-test.

Results from the t-test supported the rejection of this study's null hypotheses:

H_1: There will be no significant differences in scores made by severely hearing impaired children and normal hearing children of the same age and developmental level as measured by the APT-AIM music therapy assessment form. A statistical comparison of the means yielded a t value of 3.151. Since the t value was greater than the critical value, at a probability of .01, this hypothesis was rejected.

H_2: There will be no significant differences in scores made by severely hearing impaired children and normal hearing children of the same age and developmental level as measured by the M-PACD music therapy assessment form. A statistical comparison of the means yielded a t value of 3.092. Since the t value was greater than the critical value, at a probability of .01, this hypothesis was also rejected.

This study also examined the differences in developmental skill areas between children with normal hearing and those with a hearing impairment. One area that differed between the hearing and the hearing impaired students was communication. Observations made by the test administrator were that hearing impaired subjects attempted very little vocalization. They seldom approximated pitches or imitated

the experimenter's humming/singing. Without adequate acoustical information, hearing impaired children cannot monitor the quality of their speech. The modification of speech deficits requires effective speech training for the hearing impaired child to develop adequate communication skills.

The hearing impaired subjects were also visually oriented because of the small amount of auditory feedback. At times when instruments were removed from a hearing impaired subject's visual field, the subject quickly lost interest.

Although the data collected for this study suggests that the APT-AIM and the M-PACD may not assess severely hearing impaired children as effectively as they assess hearing children, these assessments should not necessarily be excluded from testing the hearing impaired. Most of the subjects included in this sample were severely hearing impaired according to verbal report of their teachers. Further investigation using mildly and moderately hearing impaired subjects may reveal considerably different performance data.

Modifications to the APT-AIM and the M-PACD used to assess each of the hearing impaired subjects included: the use of sign language, lipreading, fingerspelling, hearing aids, amplification of tape recorded music, and

tactile stimulation. Directions to the tests were communicated to the hearing impaired subjects through the use of sign language, fingerspelling, and lipreading.

Hearing aids were worn by the hearing impaired subjects during testing. Songs for both the APT-AIM and the M-PACD assessments were tape recorded and played on a high quality sound system with two detachable speakers. Instruments which transmit large amounts of vibration, such as the bass metallophones, were used with the hearing impaired subjects to stimulate the tactile sense. The hearing impaired subjects were seated very close to the sound system and were encouraged to place their hands on the system for tactile reception.

With regard to programming, the aim of the music therapist is to be centered on the client's growth/development. The music therapist starts from a diagnosis, and the music activities are planned and chosen according to the specific needs of the client. The APT-AIM and the M-PACD reflect the two-fold purpose of assessment: to identify the child's current functioning level and to formulate goals for further development. The APT-AIM and the M-PACD enable the music therapist to establish specific goals and objectives. The therapist, in conjunction with the teachers of the hearing impaired child, can help create a program for the child at the indicated developmental level,

including specific skills not yet mastered. The APT-AIM and the M-PACD assessments not only make an initial evaluation of the hearing impaired child's functional level, but also provide for monitoring developmental progress. This allows teachers and music therapists working with hearing impaired children to structure programs that are more efficient and suitable to the special needs of this population. Coordination between music therapists and the teachers of the hearing impaired may aid in the development of goals for regulating speech mechanisms in the development of language.

Despite the implications of this study that the APT-AIM and the M-PACD may not assess hearing impaired children as adequately as they assess hearing children, insight was gained by the experimenter as to developmental skills of each child. It is this researcher's opinion that music therapists can adapt and program for the special needs of their hearing impaired sutdents through assessments such as the ones used in this study.

REFERENCES

Allen, M. (1975). Education Through Music--An Innovative Program for Hearing Impaired Children. The Volta Review, 77(6), 381-383.

Alvin, J. (1976). Music for the Handicapped Child. London: Oxford University Press.

Bang, C. (1980). A World of Sound and Music With Hearing Impaired and Multihandicapped Children. Journal of British Association of Teachers of the Deaf, 4(4), 106-115.

Birkenshaw, L. (1965). Teaching Music to Deaf Children. The Volta Review, 67(5), 352-358.

Brown, P. (1980). The Orff-Instrumentarium: What is its Purpose? In Orff-Schulwerk (Ed.), Music for Children (pp. 320-322). USA: Schaff Music Corp.

Buechler, J. (1982). Music Therapy for Handicapped Children: Hearing Impaired. Ft. Lauderdale, FL: National Association for Music Therapy, Inc.

Burton, R. (1985). Music Therapy Assessment: Correlation of the M-TAP with the DPIYC. Unpublished Master's Thesis. Texas Woman's University, Denton, TX.

Craig, W. M., Craig, H. B., & DiJohnson, A. (1972). Preschool Verbotonal Instruction for Deaf Children. The Volta Review, 74(4), 236-246.

Doffort, V. M. (1976). Auditory Training for the Hearing Impaired: A Music Therapy Handbook. Unpublished Master's Thesis. Texas Woman's University, Denton, TX.

Edwards, E. M. (1974). Music Education for the Deaf. South Waterford, ME: The Merriam-Eddy Company.

Ewing, A. W. G., & Ewing, I. P. (1956). Programs for Speech Improvement: Rhythmic Training. In E. L. Jones (Ed.), Speech and the Deaf Child (pp. 194-227). Washington, D. C.: The Volta Bureau.

Fahey, J. & Birkenshaw, L. (1972). Bypassing the Ear: The Perception of Music by Feeling and Touch. Music Educators Journal, 58(8), 44-49.

Folts, M. (1977). Deaf Children Cannot Play a Musical Instrument . . . Can They? The Volta Review, 79(7), 453-456.

Gaston, E. T. (1968). Man and Music. In E. T. Gaston (Ed.), Music In Therapy, (pp. 7-29). New York, NY: Macmillan.

Heimgartner, N. L. (1982). Behavioral Traits of Deaf Children. Springfield, IL: Charles C Thomas.

Hodges, Donald A. (1980). Human Hearing. In Donald A. Hodges (Ed.), Handbook of Music Psychology. Lawrence, KS: National Association for Music Therapy.

Kapla, P. S. (1975). Music and the Hearing Handicapped Child. In R. M. Graham (Compiler), Music for the Exceptional Child, (pp. 61-71). Reston, VA: Music Educators National Conference.

Korduba, O. M. (1975). Duplicated Rhythmic Patterns Between Deaf and Normal Hearing Children. Journal of Music Therapy, 12(3), 136-146.

Lackey, J. F. (1985). Assessment Comparison of Westplate's APT-AIM and Rider's M-PACD. Unpublished Master's Thesis. Texas Woman's University, Denton, TX.

May, E. (1961). Music For Deaf Children. The Volta Review, 63(5), 220-223, 247.

McDermott, E. F. (1971). Music and Rhythms--From Movement To Lipreading and Speech. The Volta Review, 73(4), 229-232.

Michel, D. E. (1985). Music Therapy: An Introduction to Therapy and Special Education Through Music. Springfield, IL: Charles C Thomas.

Michel, D. E. & Rohrbacher, M., Eds. (1982). The Music Therapy Assessment Profile for Severely/Profoundly Handicapped Persons, Research Draft III. Washington, D. C.: National Association for Music Therapy.

Peters, J. S. (1987). Music Therapy - An Introduction. Springfield, IL: Charles C Thomas.

Prueter, B. A. & Giles, M. M. (1981). The Effect of Music on Acquisition of Sign Language by EMR Children. Voice of the Lakes (Newsletter of the Great Lakes Regional Chapter, National Association for Music Therapy), 25(1), 20-25.

Reber, I. E. (1980). Creative Movement with Hearing-Impaired Students. Unpublished Master's Thesis. Texas Woman's University, Denton, TX.

Rider, M. S. (1984). Musical-Perception Assessment of Cognitive Development.

Riekehof, L. (1963). Talk to the Deaf. Springfield, MO: Gospel Publishing House.

Robbins, C. & Robbins, C. (1980). Music for the Hearing Impaired: A Resource Manual and Curriculum Guide. St. Louis, MO: Magnamusic-Baton.

Rogers, S. J. & D'Eugenio, D. B. (1981). Developmental Programming for Infants and Young Children, Vol. 1. In D. S. Schafer and M. S. Moersch (Eds.), Developmental Programming for Infants and Young Children, (Vol. 1-5). Ann Arbor, MI: University of Michigan Press.

Scott, R. (1985). A Descriptive Study of Rhythm Programs In School for Hearing-Impaired Children. Unpublished Master's Thesis. Texas Woman's University, Denton, TX.

Smith, R. M. & Neisworth, J. T. (1975). The Exceptional Child: A Functional Approach. New York, NY: McGraw-Hill.

Solomon, A. L. (1980). Music in Special Education: Hearing and Speech Development. Journal of Research in Music Education, 28(4), 236-242.

Spicknall, H.W. (1968). Music for Deaf and Hard-of-Hearing Children in Public Schools. In E. Thayer Gaston (Ed.), Music in Therapy. New York: Macmillan Company.

Stern, V. (1975). They Shall Have Music. The Volta Review, 77(8), 495-500.

Swaiko, N. (1974). The Role and Value of an Eurhythmics Program in a Curriculum for Deaf Children. American Annals of the Deaf, 119(3), 321-324.

Thomas, M. W. (1976). Implications for Music Therapy as a Treatment Modality for the Mentally Ill Deaf. Voice of the Lakes (Newsletter of the Great Lakes Regional Chapter, National Association for Music Therapy), 76(1), 19-22.

van Uden, A. (1970). New Realizations in the Light of the Pure Oral Method. The Volta Review, 72(9), 524-536.

Westplate, M. (1981). Devising an Assessment for the Music Therapist Working with Handicapped Children in Public School Education Programs: Auditory Perceptual Tool-Assessment in Music (APT-AIM). Unpublished Master's Thesis. Texas Woman's University, Denton, TX.

APPENDIX A

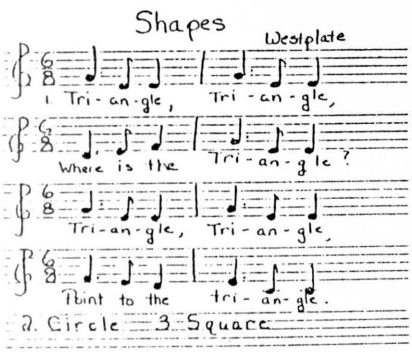
SAMPLE PAGE FROM APT-AIM

4-5 yrs.	42. Recognizes Shapes	Memory

Materials

shapes - triangle (height 3 inches)
(base 3 inches)
circle (diameter 3 inches)
square (3x3 inches)

song - "Shapes"



Assessment

	Procedure	Response
4	-Place triangle, circle, square in front of child -Sing song	Child identifies triangle, circle, square
3	"Point to the triangle (circle, square)"	
2	Administrator point to triangle (circle, square)	
1	Take child's hand and point to the triangle (circle, square)	
0		Active Refusal

APPENDIX B

SAMPLE PAGE FROM M-PACD

M-PACD Task 14: Seriation of Duration

A. Age: 5½ - 6½ years

B. Materials Needed: hand drum

C. Procedure:

The S must play (in imitation of A) on the hand drum a series of five or more beats which get progressively faster (from approximately 60 to 180 bpm). If the A is doubtful whether there is any acceleration, i.e., demonstrating only two tempos -- slow then fast, the task can be repeated by starting at the fast tempo and then decelerating.

If motor handicap prevents the S from effectively carrying out this procedure, the S can vocalize on any syllable the same response (still in imitation of A).

D. Scoring:

There must be some sense of progression to the speeding-up or slowing-down of the tempo. Simply slow, then fast does not constitute a "+". There must be present at least three tempos and in the correct seriated order. A tape recording might be needed if no determination can be accurately made.

E. Remarks:

As in the discrimination tasks for tempo and duration, these two tasks occur so close developmentally that if the S is prevented from accomplishing this task due to motor handicap then the A may choose to forego this task and proceed to M-PACD Task 15.

APPENDIX C

MATERIALS FOR APT-AIM

MATERIALS REQUIRED FOR ADMINISTRATION OF APT-AIM

2 cymbals
2 bells
2 triangles and strikers
2 drums (1 large, 1 small)
1 maraca
1 xylophone and mallet
1 tape player
1 puppet
stop watch
long and short pencils
3" X 3" squares - colors red, blue, yellow, green
3" X 3" shapes - triangle, circle, square
coins - penny, nickel, dime
red and blue kite
Music Box - box filled with drum, cymbals, maraca, bells, triangle, wood block, tone block, jingle tap
Hap Palmer Recordings - Funky Penguin, Jamaican Holiday, Tipsy, Wildwood Flower, King Cotton, Manhattan Beach, El Capitan, Nobles of the Mystic Shrine

APPENDIX D

MATERIALS FOR M-PACD

MATERIALS REQUIRED FOR ADMINISTRATION OF M-PACD

1 octave of resonator bells from C to C
1 hand drum
1 woodblock
2 tambourines
2 mallets
1 autoharp
1 wristbell
3 animal puppets
2 screens approximately 12" X 12"
1 piece of terrycloth to dampen resonator bell

APPENDIX E

APT-AIM DATA RECORDING SHEETS

APT-AIM FORM

	4 PROCEDURE	3 PROCEDURE	2 PROCEDURE	1 PROCEDURE	0	DESIRED RESPONSE
1.	4 Crash cymbals together out of sight	3 "Listen"	2 Crash cymbals together in line of vision	1 Crash cymbals together approximately eight inches from ears and face	0	Displays startle response
2.	4 Play bells softly out of sight	3 "Listen for the bells"	2 Play bells in line of vision	1 Play bells approximately eight inches from ears and face	0	Acknowledges bell sound through bodily gestures (smiling, eye movements, etc.)
3.	4 Give bells to child "You may play them" Strike triangle ten times out of sight	3 "Listen for the triangle"	2 Strike triangle in line of vision	1 Strike triangle and cease child's current	0	Current activity stops, quiets, diminishes at sound of triangle
4.	4 Stand behind child Shake maraca out of sight approximately twenty inches from child's right ear Repeat left ear	3 "Find the sound"	2 Point to direction of sound source	1 Turn head toward sound source	0	Child turns toward sound source
5.	4 Ring bells in front of child "You may play the bells"	3 "Take the bells"	2 Lightly tap child's hand	1 Take child's hand and reach for the bells	0	Child reaches for the bells
6.	4 Sing "Name Game"	3 "Child's name" "Look at me"	2 Touch face lightly	1 Position head for eye contact	0	Responds to name (smiling, eye contact, etc.)
7.	4 Sing "Name Game" with background music	3 "Child's name" "Look at me"	2 Touch face lightly	1 Position head for eye contact	0	Attends to dominant sound
8.	4 Sing "Old MacDonald"	3 "Sing with me" Sing song using "la" sound	2 Sing song in line of vision displaying tongue movement using "la"	1 Take child's hand and place it on administrator's throat to feel movement Administrator sing song using "la"	0	"Sings along" with music with/without using the words

APT-AIM Data Gathering Form

Name	Date of Birth													
Developmental Age	Auditory Perceptual Skill	A	L	D	M	S	Date of Assessment							
Birth-4 wks	1. Startle Response	x												
1-2 months	2. Responds to Bell Sound	x												
2-3 months	3. Responds to Sound Heard Out of Sight	x												
3-4 months	4. Localizes Sound Beside Ear		x											
4-5 months	5. Reaches for Sound Source		x											
	6. Responds to Name	x												
5-6 months	7. Attends to Dominant Sound	x												
7-8 months	8. "Sings Along"	x												
7-9 months	9. Attends for One Minute	x												
	10. Localizes Sound Below Ear		x											
8-9 months	11. Imitates Hand Movements			x										
	12. Imitates Foot Movements			x										
	13. Moves Body to Music			x										
9-10 months	14. Performs Action Songs			x										
10-11 months	15. Moves Body in Rhythm			x										
11-12 months	16. Intones-Vocalizes			x										
	17. Rhythmic Hand Movements			x										
	18. Rhythmic Foot Movements			x										
12-13 months	19. Attends for Two Minutes	x												
13-16 months	20. Localizes Sound Above Ear		x											
18-20 months	21. Identifies Body Parts				x									
20-22 months	22. Follows Simple Directions					x								
24-27 months	23. Identifies Body Parts				x									
	24. Sings-Hums Songs			x										
27-30 months	25. Sings Approximate Pitch			x										
	26. Recognizes One Color				x									
	27. Sequences Two Digits					x								
3-4 years	28. Discriminates Sound vs Silence			x										
	29. Discriminates Instruments/Sound			x										
	30. Discriminates Loud/Soft Fast/Slow			x										
	31. Understands Size				x									
	32. Understands Prepositions				x									
	33. Sequences Three Digits					x								
	34. Imitates Rhythm Patterns					x								
4-5 years	35. Identifies Dominant Sound			x										
	36. Moves Body Parts to Rhythm			x										
	37. Identifies Different Sound			x										
	38. Walks to Rhythm			x										
	39. Differentiates Long/Short			x										
	40. Recognizes Colors				x									
	41. Counts One-Five				x									
	42. Recognizes Shapes				x									
	43. Imitates Melody				x									
	44. Sequences Four Digits					x								
5-6 years	45. Recognizes Coins				x									
	46. Discriminates High/Low			x										
	47. Recognizes Left/Right				x									
	48. Plays rhythm instrument to beat			x										
	49. Runs in Rhythm			x										
	50. Jumps in Rhythm			x										

*A, L, D, M, S indicate critical stages: attention, localization, discrimination, memory, and sequencing

APPENDIX F

M-PACD DATA RECORDING SHEET

M-PACD DATA RECORDING SHEET

	Responses	Correct	Almost Correct	Incorrect
1.	Head movement in direction of sound stimulus			
2.	Successfully imitates sounds or movements/exhibits self-stimulatory behavior			
3.	Grasps instrument & shakes it/physically strikes instrument			
4.	Vocally repeats 2-beat cadence/physically responds with 2-beat hand tap			
5.	Strikes instrument with mallet			
6.	Identifies loudest bell sound 2 times/imitates volume when playing, 2 times			
7.	Places both instruments in correct boxes/plays correctly-matched instruments			
8.	Plays corresponding instruments for both animals (allowed to change instruments after visually seeing error)			
9.	Plays appropriate instrument for animal to move (strike xylophone, pluck autoharp)			
10.	Correctly points to fastest bell 2 times/correctly imitates speed of tester's playing			
11.	Correctly points to bell lasting longest/vocally imitates tester with one long and one short syllable			
12.	Makes glissando on xylophone first without prompting/second time with prompting			

APPENDIX G

CONSENT FORMS

TEXAS WOMAN'S UNIVERSITY
Box 22939, TWU Station
RESEARCH AND GRANTS ADMINISTRATION
DENTON, TEXAS 76204

HUMAN SUBJECTS REVIEW COMMITTEE

Name of Investigator: Peggy D. Lawyer Center: Denton

Address: 1068 Colony Street Date: 9-22-87

Flower Mound, Texas 75028

Dear Peggy Lawyer

Your study entitled "The Use of Music Therapy Assessments with Hearing-Impaired Children"

has been reviewed by a committee of the Human Subjects Review Committee and it appears to meet our requirements in regard to protection of the individual's rights.

Please be reminded that both the University and the Department of Health, Education, and Welfare regulations typically require that signatures indicating informed consent be obtained from all human subjects in your studies. These are to be filed with the Human Subjects Review Committee. Any exception to this requirement is noted below. Furthermore, according to DHEW regulations, another review by the Committee is required if your project changes.

Any special provisions pertaining to your study are noted below:

____ Add to informed consent form: No medical service or compensation is provided to subjects by the University as a result of injury from participation in research.

____ Add to informed consent form: I UNDERSTAND THAT THE RETURN OF MY QUESTIONNAIRE CONSTITUTES MY INFORMED CONSENT TO ACT AS A SUBJECT IN THIS RESEARCH.

____ The filing of signatures of subjects with the Human S Review Committee is not required.

XX Other: The consent form needs to be included.

The consent form has now been included

OCT 0 1 1987

____ No special provisions apply.

Sincerely,

Jean Pyfer

Chairman, Human Subjects Review Committee

at Denton

cc: Graduate School
Project Director
Director of School or
Chairman of Department

8/10/82

TEXAS WOMAN'S UNIVERSITY
HUMAN SUBJECTS REVIEW COMMITTEE

CONSENT FORM A (Written presentation to subject)

Consent to Act as a Subject for Research and Investigation:

The following information is to be read to or read by the subject. One copy of this form, signed and witnessed, must be given to each subject. A second copy must be retained by the investigator for filing with the Chairman of the Human Subjects Review Committee. A third copy may be made for the investigator's files.

1. I hereby authorize Peggy Lawyer
(Name of person(s) who will perform procedure(s) or investigation(s))

to perform the following procedure(s) or investigation(s):
(Describe in detail) *Refer to page 8, Part II, Guidelines.*

Administer the Musical-Perception Assessment of Cognitive Development (M-PACD) and the Auditory Perceptual Tool-Assessment in Music (APT-AIM) to the child. Both tests consist of a series of music activities which will indicate the child's developmental level. Testing will take place at the McNair Elementary School between October 5 and October 30, each test taking a maximum of one hour to complete.

2. The procedure or investigation listed in Paragraph 1 has been explained to me by Peggy Lawyer
(Name)

3. (a) I understand that the procedures or investigations described in Paragraph 1 involve the following possible risks or discomforts: (Describe in detail)

A possible risk may be improper release of data. To reduce this risk, no student will be identified by name or reported as an individual within this study.

FORM A - Continuation

3. (b) I understand that the procedures and investigations described in Paragraph 1 have the following potential benefits to myself and/or others:

If music does enhance methods of assessing development of the hearing impaired, music therapists may have a powerful medium to work with in assessing the hearing impaired toward more precise programming for their individual development.

Test results, on request, will be given to both parents and teachers at McNair within one month after testing.

3. (c) I understand that - No medical service or compensation is provided to subjects by the university as a result of injury from participation in research

4. An offer to answer all of my questions regarding the study has been made. If alternative procedures are more advantageous to me, they have been explained. A description of the possible attendant discomfort and risks reasonably expected have been discussed with me. I understand that I may terminate my participation in the study at any time.

_____ _____

Subject's Signature Date

If the subject is a minor, or otherwise unable to sign, complete the following:

Subject is a minor (age _____), or is unable to sign because:

Signatures (one requires)

_____ _____

Father Date

_____ _____

Mother Date

_____ _____

Guardian Date

_____ _____

Witness (one required) Date

Denton Independent School District
OFFICE OF CURRICULUM/INSTRUCTION
P. O. BOX 2387
DENTON, TEXAS 76202

September 16, 1987

Peggy D. Lawyer
1068 Colony St.
Flower Mound, Texas 75028

Dear Ms. Lawyer:

Your research proposal, "The Use of Music Therapy Assessments with Hearing-Impaired Children", has been approved.

The study should prove to be a very interesting one, and we shall look forward to receiving the final summary on its completion.

Sincerely,

Dean W. Anthony

Dean W. Anthony, Ph.D.
Director of Elementary Education

nm