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ABSTRACT

Evaluated were the effects of music therapy sessions on the behavior of approximately 300 moderately retarded, physically handicapped and multiply handicapped students. Data on attentive behavior and disruptive behavior were recorded by 37 special education teachers, 25 instructional aides and one principal who were trained to observe and record target behaviors. Music activities, led by music therapists, included singing, dancing, playing instruments, exercising to music, and simple composing. Emphasized were language, socialization, motor and basic academic skills. Results of a multiple linear regression analysis of variance performed on approximately 2,700 separate sets of observations indicated a significant gain in attentiveness and a decrease in disruptiveness during the music therapy program. (CL)

ABSTRACT

Effects of Music Therapy on Handicapped Students: A Title VI-B Project

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A program of music therapy was employed to increase attentive behavior and to decrease disruptive behavior of approximately 300 moderately retarded, physically handicapped, and multiple handicapped public school students. An inservice program based on a video tape presentation trained about 60 teachers to observe and record target behaviors.

Activities for sessions included playing instruments, singing, dancing, exercising to music, and creative playing (simple composing).

Observation data were scaled into continuous scores using a technique previously developed under HEW grant. Significant positive changes were observed in the target behaviors after performing a Multiple Linear Regression analysis of variance.

Supported by Title VI-B funds, the music therapy program had as primary objectives a significant increase in attentive behavior and a significant decrease in disruptive behavior. Four components of attentive behavior and five components of disruptive behavior were defined.

Attentive behavior

1. Maintains eye contact
2. Exhibits appropriate posture
3. Participates appropriately in musical activities
4. Maintains assigned position

Disruptive behavior

1. Speaking out of turn
2. Playing instrument out of turn
3. Physical aggression against others
4. Physical aggression against self
5. Making other noises

About 120 Special Education teachers were trained to observe and record these behaviors as illustrated in a video tape training presentation. Only about half of these actually participated in collecting data due to scheduling difficulties or failure to demonstrate competency during observer training.

Students with severe mental and/or moderate to severe physical handicaps participated in the project. Three full-time music therapists provided by the grant and one part-time county music therapist worked with these children on a resource basis for a period of nine months. Students participated in one 20 to 40 minute session from one to four times per week. Music activities were tailored to particular handicapping conditions, directed towards project objectives, and integrated with the regular Special Education programs. In-therapy observations were recorded monthly and entered into an automated Management Information System serving all Fairfax County Special Education programs. This facilitated merging observation data with background information including age, sex, race, handicapping condition, and school location.

Observations were recorded by frequency of occurence and then transformed into continuous scores using a Goal Attainment Scale (HEW 5 R01 MH 16789-02 SP). A rationale for implementing this scale was based on frequency distributions for the initial observation time period. In order to calculate GA scores based on these frequency distributions, each behavior component must be defined on a five point scale and weighted relative to other similar behaviors. The five

point scale (+2,+1,0,-1,-2) corresponds respectively to (most favorable, more than expected, expected, less than expected, and most unfavorable). The weighting of each behavior component was based on the degree to which the behavior was present during the initial observation period. A component of undesirable behavior occurring more frequently would have a lower outcome rating but a higher weight to equalize its contribution to the total GA score. Letting x_i = the component outcome level (+2 through -2) and w_i = the associated component weight expressed as a percentage, the derived formulas become

$$G_{attentive} = 50 + 0.143 \sum w_i x_i$$

$$G_{disruptive} = 50 + 0.139 \sum w_i x_i$$

These transformed scores became the dependent variables in a Multiple Linear Regression analysis of variance and were categorized into three phases: beginning, intermediate, and final observations. The Goal attainment scores steadily increased from beginning to final phases and these increases were statistically significant.

Music therapy is a worthwhile component of programs for handicapped children. Unlike unstructured music activities, music therapy is designed to actively rehabilitate some specific problems which academically handicap these students. Recorded parent responses to music therapy were entirely favorable and indicated a desire to continue present services and to extend music therapy to all handicapped children.

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EFFECTS OF MUSIC THERAPY ON HANDICAPPED CHILDREN: A TITLE VI-B PROJECT

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DESCRIPTION OF THE PROJECT

A. Project Staff

The music therapy staff included a project administrator and research evaluator who were full-time Fairfax County staff members, three (3) full-time therapists under the Title VI-B Grant, with a part-time therapist participating from local county funds.

The project administrator coordinated activities of other project staff members, integrated project activities with ongoing Fairfax County special education programs, ordered materials and equipment, and participated in development of various project components. The role of the research evaluator was to develop and implement an evaluation design. This included participation in the development of the observation instrument, coding and organizing the collected data, and carrying out the final statistical analysis.

The therapists participated in the development and design of the instrument used in data-taking, and planned and implemented special aspects of the grant: development of training tapes to include parent involvement programs, inservice training of staff, and direct music therapy services to handicapped children. Therapists acted as consultants to classroom teachers, giving ideas and pre-recorded or printed materials for use in their classrooms. Adaptations of existing materials were made to accommodate each student's developmental level, learning style, and specific handicap.

Forty-nine (49) special education teachers were trained to observe and take data. Thirty-seven (37) of these teachers participated in the actual data-taking process.

Forty-one (41) instructional aides were trained as observers with twenty-five (25) participating in the data-taking process.

Three (3) school principals participated in the training sessions along with their staff, with one (1) taking data on a regular basis.

Other personnel included eight (8) attendants, two (2) student teachers, one of which took data on a regular basis, and numerous volunteers who assisted in the classrooms during music therapy, but did not participate in the data collection. Two (2) occupational therapists, two (2) physical therapists, and one (1) speech therapist were trained as observers, with one (1) occupational and one (1) physical therapist participating as observers.

Due to the scheduling difficulties unique to each school and competency level needed for reliable and valid observations, not all staff trained participated in obtaining the necessary data.

B. Description of the Program

1. Training of Staff Observers

a. Development of Observation Forms

A form was designed for each of the two categories of behavior--non-attentiveness and disruptiveness. The design, based on a similar form previously developed by Charles H. Madsen, Jr., and Clifford K. Madsen at Florida State University, utilized a sampling procedure of measurement whereby each student was observed for several uniform periods during a music therapy session. Then, based on the sampled intervals, a percentage of occurrence of each observed behavior was determined for the entire session.

Four (4) components of non-attentiveness and five (5) components of disruptiveness were operationally defined. These definitions follow.

Definitions of Behavior

Non-Attentiveness Behaviors

E--Lack of Eye Contact: A receptive process; i.e., the child needs to be focusing visually on the teacher, instructional materials, or another child in order to receive information. Listening activities do not require eye contact. Verbal cue must be involved.

P--Inappropriate Posture: Child's head is at table level, he is leaning back, or his posture is totally inappropriate for the ongoing activity. Consideration is made for the child's ability to maintain appropriate posture.

A--Lack of Participation in Activity: Active process; child is not actively and appropriately participating in ongoing activity. This involves watching and doing.

M--Motor off task: Child is not maintaining assigned position.

Disruptive Behaviors

V--Verbal Disruptiveness: The child is speaking out of turn or making any inappropriate mouth noise.

I--Instrument: Inappropriate use of instruments or instructional materials. Child uses materials inappropriately or at inappropriate times.

MO--Motor Other: Child touches another person (teacher or child) inappropriately or at an inappropriate time.

MS--Motor Self: Child touches himself in a destructive manner or engages in self-stimulation.

O--Other Disruptive Behavior: Child is aggressive toward an object other than a person (MO) or an instructional material (I). Child exhibits aimless flailing. Child engages in passive-aggressive manipulation of the teacher or other children.

Figures 1, 2, and 3 in the Appendix are the final designs used for collecting data on non-attentive and disruptive behaviors with a cumulative form used to chronologically record

each set of observations throughout the school year. Information collected at the top of the non-attentive and disruptive forms includes name of the observer, total number of pupils present in the session, start and finish times of each session, child's name, and the date of observation. The time interval chart in the middle of the page is used to record the actual observation. Each horizontal line was used for one minute of observation; each box representing ten (10) seconds of observation time and five (5) seconds of recording time.

Any occurrence of one of the observed behaviors during a time interval is marked. A blank box indicates the absence of non-attentive or disruptive behavior. The percent occurrence of each behavior is then computed using the formula at the bottom of each form.

b. Development of Video-Tape

The task of training reliable observers was quite complex. First, over 100 observers were trained. The observers were located at six (6) separate special education centers located as far as 15 miles from the central office. Finally, there was a complex of nine (9) discrete behaviors for observers to understand and identify. An effective way to consistently train this large group was through the use of video-tape with as much of the presentation pre-recorded as possible.

In order to obtain clear examples of inattentive and attentive, disruptive and non-disruptive behaviors, music therapists and special education media specialists video-taped approximately three (3) hours of activity at the moderately retarded, multi-handicapped, and physically handicapped centers. After nearly 200 man-hours of editing, the training tape was

prepared. Included in it were preliminary examples of each of the nine (9) behaviors and practical examples to watch while recording on the observation forms. Beeps were dubbed into the tape to indicate ten (10) second observing and five (5) second recording intervals. A video-tape segment was produced which was used to validate observer performance.

c. Training Sessions

A training session was held at each of the six centers. Teachers and aides were required to attend; other staff were invited.

The session began with a brief explanation of the grant, its goals and procedures. An explanation of the observation forms was given, followed by the video-taped presentation. Questions and discussion were encouraged during and following the practice tape. At the end of the practice session, a test was given (included on the video-tape) to judge the performance of the observers. Any teacher or aide who did not agree 80 percent with the master key (the correct answers, as devised by the music therapists), either had to participate in another informal training session or had to be excluded from taking observations.

2. Parent Involvement

The goals of parent involvement were threefold. First, orientation of parents to the purpose and funding source of the music therapy program; second, demonstration of music therapy techniques and activities; finally, communication of the accomplishments of the project.

Parent meetings were held at the special education centers. A questionnaire sampled the perceptions of the parents toward the program after orientation. A majority of the parents attending

indicated a better understanding, more willingness to use music at home, and expectation of positive behavior changes. The results of the survey are detailed in the Appendix.

Music activities were demonstrated to parents using specific materials, illustrating the process by which music therapists isolate problems and create appropriate activities. Examples included a musical, written and performed by physically handicapped students. Participation in this activity was expected to enhance the children's sense of responsibility, cooperation, and self-concept in addition to exercising memory and listening skills. Other activities included exercises in following oral directions and identifying body parts within an action song. Still other lessons in auditory perception and sequential memory required the student to imitate on the drum the volume and rhythm played on the piano. Reinforcement of appropriate behavior (i.e., attentive and non-disruptive behavior) was incorporated into the lessons by rewarding children with instruments, and praise. A list of materials (Figure 5 of the Appendix) was distributed to parents for use with their children in the home.

The final results of the project will be summarized in non-technical terms and distributed by letter to the parents of those students participating in the project. Below are selected parent reactions to the program. Parent reactions were generally positive.

> The music therapy has done much to enrich the program at Oak Grove. Many students who were withdrawn, seldom responding to various programs now respond readily to the music activities presented.

> Music therapy is an essential element in the education of the retarded citizen throughout his lifetime. A program for multiply handicapped citizens of school age without concentrated music therapy is deficit in all respects. I trust the grant will be forthcoming next year and will be in full force for the multiply handicapped as it is this year.

I was familiar with music therapy prior to this meeting and believe very strongly in the value of this program. Its use to increase attention span is very important.

I now realize the great importance of rhythm in all physical functions.

I think this is an excellent program and hope it will be expanded next year.

3. Music Therapy Instruction

Students were worked with in large and small groups. When groups consisted of five (5) or less, individual instruction was given. Each session varied according to content and materials used, but the goal of increasing attentiveness and decreasing disruptive behavior remained present. Students were served one to four times a week, the rate being constant for each child except when classroom reassignments and absences occurred. The length of a particular session varied from 20 to 40 minutes. Individual and short-term goals and objectives varied with each program, depending on the student's level of cognitive functioning and learning style. Goals and objectives were consistent with the total education program.

Activities for sessions included playing instruments, singing, dancing, exercising to music, and creative playing (simple composing). Areas of emphasis were language development, socialization, fine and gross motor, and basic academic skills. Specific activities for these sessions includedthe following.

Students in the multi-handicapped center rotate daily to classes in three areas of concentration: fine motor and adaptive development, language development, and gross motor development. Typically, the children in the fine/adaptive area play instruments requiring varying degrees of fine motor ability, and sing about clothing, numbers, and colors. In the language area, speech sounds

and motor imitations were stressed ranging from simple to more complex sound discrimination. In the gross motor area, emphasis was placed on following directions, motor imitations and recreational skills. Students functioning on the sensori-motor level were led through exercises to music and were tested and trained in simple awareness to auditory and tactile stimulation.

In the moderately retarded centers, music sessions were devised to provide continuity in the sessions. Certain songs or activities were used and repeated for the opening and closing of each session. Songs were composed, arranged, adapted and chosen according to a particular student's or group of students' language abilities. Songs were composed by the music therapist to aid some students in special areas needing attention. As an example, a non-verbal student learned to sign twenty-three (23) functional words throughout the year. The therapist composed a song using these words while the response of the non-verbal student was to sign the words at the appropriate time during the song.

Instructional activities for the physically handicapped were structured to improve perceptual skills such as visual-motor and auditory-motor coordination, auditory discrimination, and directionality. Other units including movement activities were coordinated with physical therapists. Students were instructed to use many body parts to bend, stretch, swing, jump, roll, and walk-run.

C. Objectives

As a result of the music therapy program, a significant gain from initial evaluation will be shown in:

1. Attending Behavior

   a. Maintains eye contact

   b. Exhibits appropriate posture

   c. Participates appropriately in musical activities

   d. Maintains assigned position

2. Decreasing Disruptive Behavior

   a. Speaking out of turn

   b. Playing instrument at inappropriate time

   c. Physical aggression against others

   d. Physical aggression against self

   e. Making other noises

EVALUATION PLAN

Originally, attentive and disruptive behavior observations were planned for three periods in time--October 1975, January 1975, and May 1975. In practice, observations were recorded in each month October 1974 through May 1975. These eight sets of observations were then grouped into three time categories. T1 includes October and November 1974 observations; T2 includes December 1974, January and February 1975 observations; T3 includes March, April, and May 1975 observations.

Primary program objectives were aimed at increasing attentive behavior and decreasing disruptive behavior. Four components of attentive behavior were rated: E--eye contact, P--posture, A--participation, M--sitting still. Five components of disruptive behavior were rated: V--verbal, I--instrument, MS--motor self, MO--motor other, O--other sounds.

The analytical technique chosen for documenting attainment of these objectives is a multiple linear regression analysis of variance. To facilitate parametric analysis of the observation data which are in the form of percentages, a data transformation technique known as a Goal Attainment Scale (HEW 5 R01 MH 16789-02 SP) was employed. A description of this scale and a sample calculation are attached in the Appendix.

About 2,700 separate sets of observations were recorded over the eight-month period. These were then entered via keyboard into a sub-file of the comprehensive Special Education Management Information System, implemented on a Hewlett-Packard 3000 series Time-Sharing System. These observations were then merged with background information already on file for each student including age, sex, race, school attending, and category

of handicap. Music therapy staff members participated extensively in the data preparation and entry, and performed well although it was a novel experience. However, as usual with a large data file, inconsistencies arose during the various sortings, mergings, and range checks preliminary to the final analysis. Missing and/or invalid information on any one of the 32 variables associated with each of the 2,700 data records required deletion of the entire record. After this rigid filtering process, a little more than 2,200 data records survived intact. The following tables detail frequency breakdowns of the final observation sample.

PROGRAM ORGANIZATION

	No. of Observations
TMR (Moderately Retarded)	982
PHSC (Physically Handicapped)	529
MH (Multiple-Handicapped)	723
TOTAL	2,234

SCHOOL MEMBERSHIP

		No. Students	No. Observations
0219	Area I Training Center (TMR)	44	455
0283	Oak Grove (TMR)	21	214
0121	Holmes Center (TMR)	37	313
	Total TMR	102	982
0509	Belle Willard (PHSC)	41	327
0124	Bush Hill (PHSC)	18	202
	Total PHSC	59	529
0117	Lincolnia Center (MH)	67	723
	TOTALS	228	2,234

TYPE OF OBSERVATION

	No. Observations
Attentive Observations	835
Disruptive Observations	950
Attentive (in class)	60*
Disruptive (in class)	389
TOTAL	2,234

* This number should have been similar to the disruptive figure. A detailed analysis of reasons for missing data remains to be done.

TIME OF OBSERVATION

	No. Observations
October 1974	196
November 1974	315
T1	511
December 1974	1
January 1975	405
February 1975	444
T2	850
March 1975	193
April 1975	143
May 1975	469
T3	805
TOTALS	2,166*

* 68 observations were not dated properly.

The male/female ratio of observations was 55/45. The white/non-white ratio was 89/11.

A rationale for implementing the Goal Attainment Scale was based on frequency distributions of observations. The tables are produced from the original 2700 observations since a frequency distribution did not require any data other than the date of the observation.

T1 - NON-ATTENTIVE FREQUENCY DISTRIBUTION

p = % of time behavior occurred	TOTAL FREQUENCY	BEHAVIOR DESCRIPTION			
		E	P	A	M
$p = 0$	617	172	159	120	166
$0 < p \leq 5$	12	3	5	3	1
$5 \leq p < 10$	73	13	16	19	25
$10 \leq p < 15$	38	10	8	17	3
$15 \leq p < 20$	22	4	4	12	2
$20 \leq p < 25$	10	0	4	1	5
$25 \leq p < 30$	35	9	8	13	5
$30 \leq p < 35$	16	0	4	9	3
$35 \leq p < 40$	7	1	0	5	1
$40 \leq p < 45$	8	0	2	4	2
$45 \leq p < 50$	1	0	1	0	0
$50 \leq p$	10	3	0	5	2
TOTALS	849	215	211	208	215

T1 - DISRUPTIVE FREQUENCY DISTRIBUTION

p = % of time behavior occurred	TOTAL FREQUENCY	BEHAVIOR DESCRIPTION				
		V	I	MS	MO	O
p = 0	1,136	187	236	245	221	247
$0 < p \leq 5$	25	9	3	5	3	5
$5 \leq p < 10$	111	30	30	14	13	24
$10 \leq p < 15$	45	15	11	7	11	1
$15 \leq p < 20$	43	16	2	12	9	4
$20 \leq p < 25$	6	1	0	1	3	1
$25 \leq p < 30$	37	16	6	5	6	4
$30 \leq p < 35$	22	4	2	3	8	5
$35 \leq p < 40$	8	2	1	0	4	1
$40 \leq p < 45$	11	2	3	1	4	1
$45 \leq p < 50$	2	1	0	0	0	1
$50 \leq p$	8	6	0	0	2	0
TOTALS	1,454	289	294	293	284	294

In order to calculate Goal Attainment scores based on these frequency distributions, each behavior component must be defined on a five-point scale and weighted relative to other similar behaviors. The five-point scale (+2, +1, 0, -1, -2) corresponds respectively to (most favorable, more than expected, expected, less than expected, most unfavorable) behavior outcomes.

These behavior outcome levels were similarly defined for both attentive and disruptive components.

Letting p = % of time the behavior occurred:

Most favorable	(+2)	p = 0%
More than expected	(+1)	$0 < p < 15\%$
Expected	(0)	$15 \leq p < 30\%$
Less than expected	(-1)	$30 \leq p < 45\%$
Most unfavorable	(-2)	$45 \leq p$

The weighting of each behavior component was based on the degree to which the behavior was present during the course of the project. A component of undesirable behavior occurring more frequently would have a lower outcome rating but a higher weight to equalize its contribution to the total Goal Attainment Score. Based on the preceding tables, 232 non-attentive events occurred and 318 disruptive events occurred. Expressed in terms of each component:

$W_E = (215 - 172)/232 = 18.5\%$

$W_P = (211 - 159)/232 = 22.4\%$

$W_A = (208 - 120)/232 = 37.9\%$

$W_M = (215 - 166)/232 = 21.1\%$

$W_V = (289 - 187)/318 = 32.1\%$

$W_I = (294 - 236)/318 = 18.2\%$

$W_{MS} = (293 - 245)/318 = 15.1\%$

$W_{MO} = (284 - 221)/318 = 19.8\%$

$W_O = (294 - 247)/318 = 14.8\%$

Letting x_i = the component outcome level (+2 through -2) and w_i = the associated component weight expressed as a percentage, the formula for the Goal Attainment Score becomes:

$$G_{Attentive} = 50 + 10 \frac{\sum(w_i x_i)}{\sqrt{.7\,(18.5^2 + 22.4^2 + 37.9^2 + 21.1^2) + .3\,(100)^2}}$$

$$G_{Attentive} = 50 + 10\frac{\sum(w_i x_i)}{70.0564} = 50 + 0.14274\sum w_i x_i$$

$$G_{Disruptive} = 50 + \frac{10\sum(w_i x_i)}{\sqrt{.3\ (100)^2 + .7\ (32.1^2 + 18.2^2 + 15.1^2 + 19.8^2 + 14.8^2)}}$$

$$G_{Disruptive} = 50 + 10\frac{\sum(w_i x_i)}{72.1162} = 50 + 0.13867\sum w_i x_i$$

These are the formulas used to obtain the Goal Attainment Scores which are the dependent variable or criterion in the following regression analyses.

RESULTS BY OBJECTIVES

A. Attentive Behavior

As a result of the music therapy program, a significant gain from initial evaluation will be shown in:

I. Attending behavior
- *a. Maintains eye contact (-E)*
- *b. Exhibits appropriate posture (-P)*
- *c. Participates appropriately in musical activites (singing, dancing, playing instruments) (-A)*
- *d. Maintains assigned position (-M)*

1. Descriptive Results

Attentive Goal Attainment Scores were calculated using the procedures outlined in the preceding section. Tables follow which detail mean attentive G.A.S. scores and mean percentage occurrences for each non-attentive component sorted into various pertinent groupings.

TIME CATEGORIES	G.A.S.	Non-Att %'s				No. Obser.
		E	P	A	M	
T1	71.40	3.61	5.29	10.64	3.98	214
T2	72.38	3.60	4.05	9.11	2.31	307
T3	73.61	1.72	3.11	9.70	1.38	311
T3 - T1 (gain)	2.21	-1.89	-2.18	-0.94	-2.6	

PROGRAM ORGANIZATION	G.A.S.	Non-Att %'s				No. Obser.
		E	P	A	M	
TMR	73.72	1.67	2.49	9.18	2.59	353
PHSC	74.66	3.76	3.53	3.75	1.59	212
MH	69.46	3.85	6.42	15.18	2.76	267

SCHOOL MEMBERSHIP	G.A.S.	Non-Att %'s				No. Obser.
		E	P	A	M	
0219 Area I Training Center (TMR)	71.94	2.45	4.20	10.47	3.97	190
0283 Oak Grove Center (TMR)	76.09	1.48	0.89	6.21	0.37	62
0121 Holmes Center (TMR)	75.61	0.32	0.25	8.59	1.36	101
0509 Belle Willard (PHSC)	75.64	5.02	2.47	3.33	1.23	131
0124 Bush Hill (PHSC)	73.06	1.74	5.26	4.12	2.19	81
0117 Lincolnia Center (MH)	69.46	3.85	6.42	15.18	2.76	276

SEX & RACE	G.A.S.	Non-Att %'s				No. Obser.
		E	P	A	M	
Males	72.04	3.17	4.47	10.16	3.05	456
Females	73.26	2.58	3.47	9.19	1.59	376.
White	72.63	2.99	3.77	9.72	2.28	755
Non-White	72.19	1.99	6.48	9.75	3.45	77

2. Analysis of Variance

A multiple linear regression model was formulated using the Attentive Goal Attainment Score as the dependent variable or criterion. The independent or predictor variable was time period of observation, i.e., membership in time category T1, T2 or T3. Included as control variables were age, sex, race, and school membership. This regression model accounted for 17% of the total variance of the attentive scores (R squared = 0.166). Those variables which emerged as significant predictors of the criterion are listed below.

PREDICTOR	F-Ratio	D.F. 1	D.F. 2	Level Signif.
T1, T2, T3--Time Categories	9.058	2	818	0.01
Age	27.12	1	818	0.01
School Membership	25.38	5	818	0.01
Sex	6.29	1	818	0.05

3. Conclusions

There was statistically significant gain in attentiveness during the progress of the music therapy program. This increase is a positive linear function of length of time the program was in effect. Higher attentiveness is associated with older students, and also with female students. Attentiveness varied noticeably from school to school. These factors were appropriately included as controls in the unrestricted or full regression model.

B. Disruptive Behavior

As a result of the music therapy program, a significant gain from initial evaluation will be shown in:

II. Decreasing disruptive behavior
- *a. Speaking out of turn (V)*
- *b. Playing instrument at inappropriate time (I)*
- *c. Physical aggression against others (MO)*
- *d. Physical aggression against self (MS)*
- *e. Making other noises (O)*

1. Descriptive Results

Disruptive Goal Attainment Scores were calculated using the procedures outlined in the Evaluation Plan section. The mean disruptive G.A.S. scores and mean percentage occurrences for each disruptive component are tabulated below using the same groupings as for the attentive data.

TIME CATEGORIES		Disruptive %'s					No.
	G.A.S.	V	I	MS	MO	O	Obser.
T1	72.64	7.58	3.55	7.62	3.25	3.29	294
T2	74.18	5.43	1.95	5.03	2.45	3.88	309
T3	74.52	4.92	2.14	5.03	2.15	5.66	317
T3 - T1 (gain)	1.88	-2.66	-1.41	-2.59	-1.10	2.37	

PROGRAM ORGANIZATION	G.A.S.	Disruptive %'s					No. Observ.
		V	I	MS	MO	O	
TMR	74.76	4.38	2.67	5.95	2.84	3.75	374
PHSC	74.68	6.93	1.55	2.83	1.30	2.02	213
MH	72.17	7.06	2.98	7.67	3.17	6.39	333

SCHOOL MEMBERSHIP	G.A.S.	Disruptive %'s					No. Observ.
		V	I	MS	MO	O	
0219 Area I Training Center (TMR)	73.60	5.33	3.49	6.35	3.65	4.54	195
0283 Oak Grove Center (TMR)	77.16	2.90	1.62	4.02	1.84	2.62	61
0121 Holmes Center (TMR)	75.44	3.58	1.87	6.31	2.03	3.03	118
0509 Belle Willard (PHSC)	75.65	7.42	0.19	3.31	1.23	1.84	131
0124 Bush Hill (PHSC)	73.13	6.16	3.72	2.06	1.35	2.32	82
0117 Lincolnia Center (MH)	72.17	7.06	2.98	7.67	3.17	6.39	333

SEX & RACE	G.A.S.	Disruptive %'s					No. Observ.
		V	I	MS	MO	O	
Males	72.87	6.87	3.20	7.32	3.11	5.29	506
Females	74.94	4.81	1.71	4.06	1.98	3.11	414
White	73.89	5.66	2.50	5.43	2.59	4.27	829
Non-White	72.99	8.48	2.76	9.75	2.74	4.65	91

2. Analysis of Variance

A multiple linear regression model was formulated using the Disruptive Goal Attainment Score as the dependent variable or criterion. The independent or predictor variable was time period of observation, i.e., membership in time category T1, T2, or T3. Included as control variables were age, sex, race, and school membership. This regression model accounted for 8% of the total

variance of the disruptive scores (R squared = 0.078). Those variables which emerged as significant predictors are listed below.

PREDICTOR	F-Ratio	D.F. 1	D.F. 2	Level Signific.
T1, T2, T3 Time Categories	5.204	2	906	0.01
School Membership	8.85	5	906	0.01
Sex	19.86	1	906	0.01

3. Conclusions

There was a statistically significant decrease in disruptiveness during the music therapy program. Disruptiveness showed a tendency to decline from time period T1 to T2 and then to level off from time period T2 to T3. Males were generally more disruptive and disruptiveness varied from school to school.

A P P E N D I X

ATTENTIVENESS OBSERVATION FORM

Observer(s) _____ Student _____

Number in Class _____ Date _____

Time: Start _____ End _____

TIME	1	2	3	4
1	E P A M	E P A M	E P A M	E P A M
2	E P A M	E P A M	E P A M	E P A M
3	E P A M	E P A M	E P A M	E P A M
4	E P A M	E P A M	E P A M	E P A M
5	E P A M	E P A M	E P A M	E P A M
6	E P A M	E P A M	E P A M	E P A M
7	E P A M	E P A M	E P A M	E P A M
8	E P A M	E P A M	E P A M	E P A M
9	E P A M	E P A M	E P A M	E P A M

	TOTALS		INTERVALS OBSERVED		%
E=Does not maintain eye contact	E=____	÷	____	=	____%
P=Exhibits inappropriate posture	P=____	÷	____	=	____%
A=Does not participate appropriately in activities	A=____	÷	____	=	____%
M=Does not maintain assigned position (motor)	M=____	÷	____	=	____%

Figure 1

DISRUPTIVE BEHAVIOR FORM

Observer_____ Student_____

Number in Class_____ Date_____

Time: Start_____ End_____

TIME	1	2	3	4
1	V I MO MS O	V I MO MS O	V I MO MS O	V I MO MS O
2	V I MO MS O	V I MO MS O	V I MO MS O	V I MO MS O
3	V I MO MS O	V I MO MS O	V I MO MS O	V I MO MS O
4	V I MO MS O	V I MO MS O	V I MO MS O	V I MO MS O
5	V I MO MS O	V I MO MS O	V I MO MS O	V I MO MS O
6	V I MO MS O	V I MO MS O	V I MO MS O	V I MO MS O
7	V I MO MS O	V I MO MS O	V I MO MS O	V I MO MS O
8	V I MO MS O	V I MO MS O	V I MO MS O	V I MO MS O

	TOTALS		INTERVALS OBSERVED		%
V=Verbal--Speaks out of turn	V=____	÷	____	=	____%
I=Plays instrument at inappropriate time.	I=____	÷	____	=	____%
MO=Motor--Is aggressive toward others	MO=____	÷	____	=	____%
MS=Motor--Is aggressive toward self	MS=____	÷	____	=	____%
O=Exhibits other disruptive behavior	O=____	÷	____	=	____%

Figure 2

CUMULATIVE DATA FORM

A T T E N T I V E N E S S

D I S R U P T I V E N E S S

Student _____ ID Number _____

Date	Atten-dance	E %	E R	P %	P R	A %	A R	M %	M R	Date	Atten-dance	V %	V R	I %	I R	MO %	MO R	MS %	MS R	O %	O R

Student _____ ID Number _____

Date	Atten-dance	E %	E R	P %	P R	A %	A R	M %	M R	Date	Atten-dance	V %	V R	I %	I R	MO %	MO R	MS %	MS R	O %	O R

Figure 3

School your child attends Oak Grove, Area I Training Center, Holmes Center, Bush Hill, Belle Willard School, Lincolnia Center

Date _____

1. How has this meeting affected your understanding of music therapy?
   No answer 1 (2%)
   (a) Confused _____
   (b) No change 2 (4%)
   (c) Better understanding 42 (94%)

2. As a result of this meeting, how often will you use music at home?
   No answer 1 (2%)
   (a) Less than before _____
   (b) Same as before 13 (29%)
   (c) More often than before 31 (69%)

3. How much change do you feel music therapy can cause in the following areas?

	No answer	No change	Some change	Much change
(a) Physical development	9 (20%)	5 (11%)	15 (33%)	16 (36%)
(b) Fine motor development	8 (18%)	1 (2%)	19 (42%)	17 (38%)
(c) Speech	6 (13%)	0	18 (40%)	21 (47%)
(d) Vocabulary	5 (11%)	0	19 (42%)	21 (47%)
(e) Listening Skills	3 (7%)	0	7 (15%)	35 (78%)
(f) Number skills	7 (15%)	1 (2%)	21 (47%)	16 (36%)
(g) Self-help skills	8 (18%)	0	22 (49%)	15 (33%)
(h) Vocational skills	7 (15%)	4 (9%)	21 (47%)	13 (29%)
(i) Social/emotional development	6 (13%)	0	9 (20%)	30 (67%)
(j) creative and/or expressive capacities	4 (9%)	0	8 (18%)	33 (73%)

4. Additional comments:

Figure 4.

MATERIALS FOR USE AT HOME

1. Getting to Know Myself

   Learning Basic Skills Through Music, Volumes 1 and 2
   Vocabulary
   Health and Safety

   *Homemade Band

   Mod Marches

   Simplified Folk Songs

   Folk Song Carnival

   Patriotic and Morning Songs

   Modern Tunes for Rhythms and Instruments

   Holiday Songs and Rhythms

   Creative Movements and Rhythmic Exercises

   Math Readiness--Vocabulary and Concepts

   Math Readiness--Addition and Subtraction

   Alamons and the Nothing Song

   Around the World in Dance

All by Hap Palmer. These records are helpful in teaching various concepts, augmenting physical development, and guiding instrumental playing.
*Particularly useful if you have rhythm instruments.

Order from: Educational Activities, Incorporated
Freeport, Long Island, New York 11520

2. Rhythmic Activity Songs for Primary Grades, Volumes 1 to 4.

Also good for concepts, physical development, and playing instruments.
Order from: Kimbo Educational
Box 246
Deal, New Jersey 07723

3. By Ella Jenkins: My Street Begins at My House
   Order from: Kaplan
   600 Johnston Road
   Winston-Salem, North Carolina 27103

   Call and Response Rhythmic Group Singing
   Order from: Constructive Playthings
   1040 East 85th Street
   Kansas City, Missouri 64131

Good for singing, physical development, various concepts, and playing instruments.

Figure 5

3. The Beat Goes On

Good for exercises. Order from: Educational Activities, Incorporated
Freeport, Long Island, New York 11520

4. Singing Sounds

Good for speech. Order from: Latta
Box 1276
Huntington, West Virginia

5. Sesame Street Albums

Good for listening and vocabulary. Order from: ABC School Supply
Box 13084
Atlanta, Georgia 30324

Any records or cassettes you may have at home could be used as reinforcers of appropriate behavior.

GOAL ATTAINMENT FOLLOW-UP GUIDE

LEVELS OF PREDICTED ATTAINMENTS	SCALE HEADINGS AND SCALE WEIGHTS				
	SCALE 1: ($weight_1$ =)	SCALE 2: ($weight_2$ =)	SCALE 3: ($weight_3$ =)	SCALE 4: ($weight_4$ =)	SCALE 5: ($weight_5$ =)
most unfavorable outcome thought likely					
less than expected success					
expected level of success					
more than expected success					
most favorable outcome thought likely					

Revised, October, 1974

PROGRAM USING G.A.S. _____

TREATMENT TO BE USED FOR THIS PROBLEM AREA: _____

1. _____
Client Name

2. _____
Client Number

3a. _____ b. _____
Date of Intake Interview(s)

4. _____
[illegible]

5. [illegible] Involved in Construction of the Goal Attainment Follow-up Guide:

_____ a. [illegible]

_____ b. Client

_____ c. Clinician Only
_____ d. Family Member
_____ e. Other:

_____
_____

6. _____
Recommended Follow-up Date

7. _____
Approved for Follow-up

8. _____
Follow-up Interviewer(s)

_____

9. _____
Date of Follow-up

Comments:

Reminders for Follow-up Guide Construction

1. Scale headings are optional conceptual guides used to communicate general dimensions of change to the follow-up worker. They identify the aspect of client functioning that the scale is intended to measure.

2. Scale weights are numbers assigned to the scales which reflect the relative importance of each scale. Large numbers should be assigned to the more important scales. Weight numbers may be any digits from 1 to 100. (They need not sum to 100 or any other number.) Weight assignment is optional, but without specific weights, all scales are weighed equally.

3. For each scale, from three to five scale levels must be defined by statements of behavioral or social events which correspond to levels of attainment. These events must be specific and well defined so that the levels will not overlap and the follow-up worker may accurately determine the client's status at the time of the interview.

4. Scales should include only one variable per level. There may be, however, more than one scale pertaining to a single problem area.

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HOW IS THE GOAL ATTAINMENT SCORE CALCULATED?

This commentary explains the mechanics of calculating the Goal Attainment Score which is one possible method of expressing the results of the Goal Attainment Scaling system. For the purposes of demonstration, the following sample Goal Attainment Follow-up Guide will be used:

	Scale 1: Happiness (w_1 = 10)	Scale 2: Creativity (w_2 = 5)	Scale 3: Accuracy (w_3 = 20)
MOST UNFAVORABLE			
LESS THAN EXPECTED		*	
EXPECTED	*		
MORE THAN EXPECTED			
MOST FAVORABLE			*

On this sample "w" stands for weight. Thus, this Goal Attainment Follow-up Guide shows that the intake interviewer thought that "happiness" should be weighted 10, twice as much as the "Creativity" scale which was only weighted 5.

Each of the five outcome levels, "most favorable" through "most unfavorable," should be assigned a value (+2 through -2) as indicated on the sample.

The "" shows the "outcome level" of the client as scored by the follow-up rater. In other words, the client was scored at the expected level (0) on Scale 1, at less than expected (-1) on Scale 2 and at (+2) on Scale 3. On a real Goal Attainment Follow-up Guide, of course, each scale would contain items pertaining to one of the major concerns for the client. THE WEIGHTS AND RAW SCORES ON THE GOAL ATTAINMENT SCALING GUIDE ARE THE ONLY NUMBERS NEEDED TO CALCULATE THE GOAL ATTAINMENT SCORE. In the formula below, "x" refers to the "raw score" or "outcome level."*

* * * * * * * * * * * * * *

The formula for calculation is: Goal Attainment Score = $50 + \frac{10\Sigma w_i x_i}{\sqrt{.7\Sigma w_i^2 + .3(\Sigma w_i)^2}}$

or 50 + 10 $\frac{(w_1 \text{ times } x_1 + w_2 \text{ times } x_2 + \ldots \text{out to as many items as you have scales for})}{\sqrt{.7(w_1 \text{ squared} + w_2 \text{ squared} + \ldots \text{out to as many items as you have scales for}) + .3 \text{ (all the weights added together)}^2}}$

The formula for this sample would read:

$$\text{Goal Attainment Score} = 50 + \frac{10(w_1x_1 + w_2x_2 + w_3x_3)}{\sqrt{.7\{(w_1)^2 + (w_2)^2 + (w_3)^2\} + .3(w_1 + w_2 + w_3)^2}}$$

* * * * * * * * * * * * *

Using the Weights and Raw Scores from the demonstration guide above:

$$\text{Goal Attainment Score} = 50 + \frac{10 \text{ (0 times 10) + (-1 times 5) + (2 times 20)}}{\sqrt{.7\{(10)^2 + (5)^2 + (20)^2 + .3(10 + 5 + 20)^2}} =$$

$$50 + \frac{10(0 - 5 + 40)}{\sqrt{.7(100 + 25 + 400) + .3(35)^2}} = 50 + \frac{10(35)}{\sqrt{.7(525) + .3(1225)}} = 50 + \frac{350}{\sqrt{367.5 + 367.5}}$$

$$50 + \frac{350}{\sqrt{735}} = 50 + \frac{350}{27.11} = 50 + 12.91 = 62.91$$

12/73