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AUTHOR Coyne, Nancy M.; Dwyer, Mary L.; Kennedy, Marianne; Petter, Nancy M.

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ABSTRACT

This action research project investigated the effects of music on the behavior and performance of students (ages 3-21) with multiple disabilities, mental retardation, or severe mental retardation in four self-contained special education classrooms. The teacher researchers involved in the study made no assumptions with regard to the outcomes. It was hoped that music would provide a variety of positive outcomes on students' learning and attitudes, a calming effect on students with mercurial behaviors, an energizing effect on students with low affect, a reduction of disruptive self-stimulatory behavior, and an increased ability to focus on a task. The intervention involved playing the music to alter the climate of the classroom. Music was an additional component to regular classroom procedures. Data collection included anecdotal records, direct teacher observation, and student interviews. In all four classrooms, music proved itself to be a powerful tool in altering student behavior. A reduction was observed in volume of the participants' voices. Out of seat behavior decreased. In a single case, there was a light reduction in self-stimulatory behavior. The teachers involved in the study will continue to use classical, 60 beat per minute selections during various activities. (Contains 37 references.) (Author/CR)

THE EFFECTS OF SYSTEMATIC IMPLEMENTATION OF MUSIC ON BEHAVIOR AND PERFORMANCE OF THE SPECIAL NEEDS STUDENT

Nancy M. Coyne
Mary L. Dwyer
Marianne Kennedy
Nancy M. Petter

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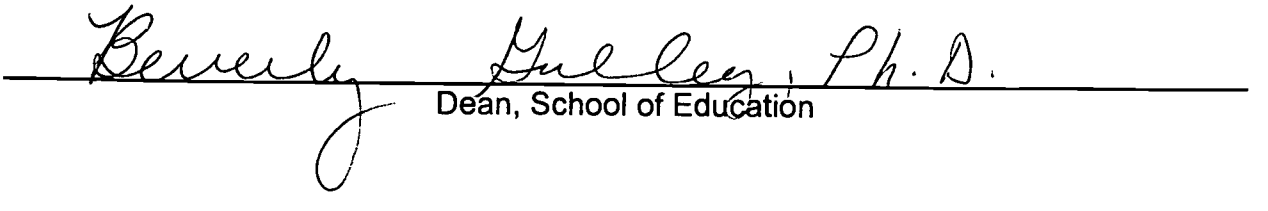

Dean, School of Education

Abstract

As a component of this research project, the special educators examined the effects of music on students' behavior and performance. The targeted population comprised a severely, multiply handicapped group of students from four different self-contained classrooms.

The researchers made no assumption with regard to the outcomes of the study. It was hoped that music would provide a variety of positive outcomes on students' learning and attitudes, a calming effect on students with mercurial behaviors, an energizing effect on students with low affect, a reduction of disruptive self-stimulatory behavior, and an increased ability to focus on a task.

Data collection included anecdotal records, direct teacher observation, and student interview. The focus was on proactive action research in a descriptive format. The investigators desired to expand and enrich their professional base of knowledge through review of the literature focusing on music and special education. The intervention involved playing the music to alter the climate of the classroom. Music was an additional component to regular classroom procedures.

In all four classrooms, music proved itself to be a powerful tool in altering student behavior. A reduction was observed in volume of the participants' voices. Out of seat behavior decreased. In a single case, there was a slight reduction in self-stimulatory behavior. The teachers will continue to use classical, 60 beat per minute selections during various activities.

DEDICATION

We dedicate this project

-to our loving families

for their support and encouragement,

-to our students

whose spirit touches our hearts and lives every day.

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CHAPTER 1

STATEMENT AND CONTEXT

General Statement of the Investigation

"From the discovery that listening to Mozart can raise your IQ to clinical trials showing that music can improve memory, regulate vital signs like your heart rate and blood pressure, control your pain, change your emotional outlook, and direct your mental and physical energy levels throughout the day, science is finding that music can be a tool for better performance and health," (Miles, 1997, p. 1). To date, funding for fine arts enrichment programs has been seriously slashed. As a result, many school districts have eliminated music and art programs from their curricula. Consequently, opportunities for music awareness and appreciation have been greatly diminished for school age children. "Using music is as natural as breathing or sleeping, and while many people do so instinctually, recent research indicates that the systematic use of music can be an effective way to consciously manage your mind, body, and mood," (Miles, 1997, p. 1).

"...Teachers believe that every student needs access to all of the arts because the arts enhance our humanity," (Manning & Manning, 1992, p. 46). Research indicates that some benefits to children include increased cognitive processes, elevation of immune function, reduction of stress levels, and boost of productivity. Neuroscientists have discovered that infants are born with neural mechanisms developed exclusively for music. Studies show that early and ongoing musical training helps organize and develop children's brains (Black, 1997). Harvard University's Howard Gardner, renowned for his Multiple Intelligences Theory, suggests that the musical intelligence probably carries more emotional, spiritual, and cultural weight than all the

other intelligences and, perhaps most important, can help people organize the way they think by enhancing the development of math, language, and spatial reasoning (as cited in Black, 1997). As portrayed in the movie Mr. Holland's Opus, metacognitive processes such as imaging and emotional quotient were utilized to produce an exceptional performance by the young flautist. "It's no exaggeration to say that the right music, played at the right time, can turn a child's life around," (Morton, 1992, p. 51).

Music may have a salutory effect on students while lack of exposure to a systematic, viable music program may have a negative impact on general school performance and emotional well being. The targeted students for this investigation are multiply handicapped 3-8 year olds, severely autistic 5-9 year olds, and trainable mentally handicapped 14-21 year old students. Assessment processes consist of teacher observation and student self-reflections.

Immediate Context of the Investigation

The site serves as a special education cooperative located in a western suburb of a large Midwestern city. This cooperative services eight neighboring communities at the elementary school level, as well as tuitioning in students from other communities in a case-by-case basis. When students become of high school age, they are incorporated into a single high school district.

The students come from a number of surrounding feeder communities. However, this study will focus solely on the community on which the special education buildings are located. The special education cooperative includes two main buildings as well as rented public school and community spaces.

The special education center accommodates administrative offices and classrooms for the multiply handicapped, trainable mentally handicapped, severely/profoundly mentally handicapped, and autistic populations. Programs service students from 3-21 years old. The newly constructed, $3.2 million building adjacent to the main building houses the early childhood programs and the severely behavior disordered programs at the elementary and high school levels. The mentally impaired educable and select trainable mentally handicapped classes are located within public school and community facilities. Several community sites are rented due to the increasing enrollment as well as the philosophical belief that special needs students benefit from being educated with their non-disabled peers.

The special education center is a one-level brick structure built in 1970. Its design is unusual, with a center hub and four connecting pods. The building was originally designed for open classrooms with removable partitions. The partitions divide the open space into smaller classroom units which presently do no adequately meet the needs of an ever-increasing student population.

Total enrollment in the building is 152 students. Ethnic breakdown is as follows: African American 69%; White 16%; Hispanic 14%; Asian and Pacific Islander, greater than 1%; Other, greater than 1%. The teaching staff consists of 20 certified, 34 non-certified, and 19 support staff members. The ethnic breakdown is as follows: African American 27%, White 69%, and Hispanic 4%.

Operating expenditures total $14,642,040 with an average operating expenditure per pupil of $11,886.43. The average teacher's salary is $32,654 at the bachelor's level and $47,718

at the master's level. Average administrator's salary is $66,402. Teachers have an average of 14.28 years of teaching experience, with 30 teachers holding master's degrees or above.

With all of the participating elementary schools feeding into the high school district, the researchers will examine the findings of that report card. Total enrollment is 4,157 students. Ethnic breakdown is as follows: African American 70.0%, White 7.8%, Hispanic 19.9%, and Asian and Pacific Islander 2.3%. The attendance rate is 81.6% with 35.2% mobility. Figures indicated that chronic truancy is 3.8% (School Report Card, 1998).

Average class size is 20.1 students. Low-income students figure at 26.8%. Students with limited English proficiency total 5.6%, and the dropout rate is 8.2%. The graduation rate is 62.5% (School Report Card, 1998).

Of the teachers, 52.2% are female and 47.8% are male. Ethnic breakdown of the teachers is as follows: African American 14.4%, White 82.6%, Hispanic 1.9%, Asian and Pacific Islander 0.7%, and Native American 0.4%. Teachers have an average of 16.6 years of teaching experience, with 58.5% holding master's degrees or above (School Report Card. 1998).

Operating expenditures (1996-97) total $44,207,626 with an average operating expenditure per pupil of $9,902. Average teacher's salary is $55,823, and the average administrator's salary is $84,832. The teachers at the center are not paid according to the comparable schedule of the high school..

The Surrounding Community

The community in which the special education facility is located covers 2.5 miles and has a population of 27,139. Of the residents, males constitute 46.8% and females 53.2%. Ethnic breakdown is as follows: African American 83.3%, White 10.1%, Hispanic 6.0%, and Other

0.6%. Median age is 30.1 years, and the median years of school completed is 12.6 (Local Newspaper, 1999).

Median family income is $42,174, with 16.8% of the households earning less than $15,000. Single-family homes comprise 62.6% of dwellings, and multi-family units account for 37.4%. The medial home value is $88,399, and the median gross rent is $483 (Local Newspaper, 1999).

The community is served by a public train and bus system and a major health facility. There are two fire stations and a police station. The public library has recently undergone extensive reconstruction.

Seven public elementary schools are in the community, as well as three private elementary schools and one public high school. There is a Little League baseball program, a Pop Warner football program, and other sports, art, dance, and religious activities organized by the park district. There are 11 parks, many of which are in need of renovation. There is a public swimming pool.

There are 34 churches in the community, as well as a variety of small retail stores and service businesses. A limited new housing development has been built in the last three years. Some deteriorating manufacturing buildings have been razed, and an industrial part is in the planning stages. There is a recreational racetrack facility, which brings considerable income into the community.

CHAPTER 2

Project Documentation

These special educators strongly believe that every child is a unique individual with a variety of special needs to be considered. Each student has an Individualized Educational Plan written on an annual basis that addresses his or her educational needs. The Individual Educational Plan encompasses six domains: (a) academic, (b) communication, (c) socialization, (d) motor, (e) vocational, and (f) self-help. Specific long-term goals and short-term objectives are formulated for each area. The school day revolves around these goals and activities.

Students aged 5-21 years attend school 6 hours daily; students 3-5 years attend half-day sessions. In addition to a certified teacher, each classroom employs program assistants who support the execution of established instructional and behavioral programs. A private bus company provides transportation to and from school. Ramp buses accommodate children in wheelchairs.

Bowling and swimming activities, which take place in public facilities, occur on a rotational basis. Adaptive physical education, home living, and computer lab are mutual components of the overall school schedule. To date, there is no fine arts program, however a volunteer with Asperger's Syndrome, a condition characterized by high cognitive functioning with autistic traits, comes to each of the classrooms to sing one to two times weekly. The vocalist and students are actively engaged and interactive. His manner is personal and direct, though his presentation of songs is limited and rote.

The educational program has a strong commitment to community participation; therefore each classroom is entitled to 2 half-day field trips a week. Destinations are left to the discretion of individual teachers with emphasis on remaining in the immediate surrounding area. Community outings must be reflective of goals as documented on the Individual Educational Plan.

Many of the students receive speech and language, occupational therapy, and physical therapy. Other related services such as mobility training, vision therapy from an itinerant specialist, and hearing services are provided on an individual agenda if recommended by the teacher and the team. Direct therapy minutes are determined by the multidisciplinary team as a cooperative unit. Due to the nature of the students' disabilities, the optimal classroom environment needs to be highly structured and supportive. Learning is enhanced by the repetition of activities and consistency of instruction.

This chapter will illuminate the infrastructure of the daily schedules and programs of Classrooms A, B, C, and D. Philosophies and theories that support best practices will follow individual classroom descriptions.

Description of Classroom A

Classroom A is comprised of an average of twelve students, ages 3 to 8 years old, who are multiply handicapped. Medical diagnoses are quite involved and varied. Each student presents with significant developmental delays across all domains. Cognitive functioning varies greatly ranging from severe/profoundly retarded to trainable mentally handicapped levels. True and accurate assessment of a child's functioning, especially at this age, is extremely difficult since most standardized testing requires motor and verbal responses. The majority of the students are non-verbal and all demonstrate severe expressive language delays. To date, none

have established any kind of functional communication systems. Several of the students are ambulatory, while most are non-ambulatory and utilize wheelchairs for mobility and transportation.

The classroom program is structured with a strong emphasis on communication throughout all activities. A total communication approach (speech, sign language, gestures, vocalizations, and pictures) is utilized in order to facilitate and stimulate language. Music is also used to enhance the flow of social language and learning. Other priority areas include functional skills, adaptive living skills, pre-academic skills, socialization skills, and motor development.

In the communication domain, focal areas include expanding expressive and receptive vocabularies and increasing expressive communication, specifically through expressing needs and wants, making choices, and following directions. A variety of augmentative speech devices with direct select and auditory scanning capabilities are utilized to encourage communication.

Pre-academic skills include activities such as receptive identification of personal information (printed name with and without a picture cue, address, telephone number), colors, thematic vocabulary pictures, and numeral identification with matching number sets. Simple puzzles, form boards, and shape sorters reinforce fine motor skills as well. Repetition of activities benefits these students. Multiple opportunities for learning concepts, which are presented within a variety of contexts, enhance the learning process.

The socialization domain includes developing appropriate social skills within the classroom and the community. The development of play skills, in both parallel and peer play, is also highlighted.

The focus of the adaptive living domain is to achieve a level of functional independence and participation in daily living skills that is commensurate with the students' physical ability

level. Activities include dressing skills, oral motor and feeding skills, personal hygiene, and other skills relevant to daily living.

The development of gross and fine motor skills is also a priority area. The non-ambulatory students participate in a program designed to improve range of motion. This program provides physical stimulation to all muscle groups; it decreases abnormal tone, maintains and increases current range of motion and helps to prevent muscle contractures. The use of adaptive, therapeutic equipment and positioning provides the students a variety of postural challenges and opportunities. The students' reach, grasp, and release of objects are points of concentration so that the child can interact with his immediate environment.

Classroom schedules vary daily. Upon arrival in the morning, several of the students are expected to remove their coats, and then hang them along with their book bags on designated hooks. The first half-hour is designated for leisure and free play, while individual toileting and diapering needs are being met. The program designed to improve range of motion is also completed at this time. Positioning of the students in appropriate equipment precedes all activities.

Activities that follow may include "circle time" or small work groups. "Circle time" begins with the review of calendar and weather facts. Social skills, including identification and greeting of peers and staff, turn taking, and following directions are reinforced at this time. Students are also working on the identification of personal information, thematic pictures, and selection of songs. Small group work may include fine motor tasks, cause and effect work with switch toys, sensory stimulation activities, or simple games.

Students who are under 5 years of age are dismissed after a half-day. At this time, full-day students prepare for lunch. Improving oral motor functioning, eating skills, and daily living

skills (tooth brushing, hand washing, toileting) are the focus of this period, striving for levels of functional independence. Several of the students have had gastro-tubes (g-tubes) surgically inserted for various medical reasons and receive their nutrition and medication via these g-tubes. A few of these students have begun oral introduction of small amounts of pureed or soft-textured foods as part of their diet. However, most of their nutrition still comes from a balanced liquid dietary supplement. Increased tolerance for and acceptance of a variety of foods and food textures is the goal for these students. Some students with g-tubes have medical restrictions and may not receive any food by mouth.

After lunch, the students have a short rest period, which allows them additional relaxation time and permits the staff lunches to be completed. Afternoon activities may include large gross motor games, table activities, art, story time, or music.

This class visits a nearby library once a month. During the visit, story time is enjoyed and books are selected to be brought back to school. Other community outings may include trips to local malls, restaurants, or other community points of interest. The objectives of these trips are to reinforce classroom themes, maintain appropriate social behaviors, and to increase functional communication skills.

Theories and Best Practices of Classroom A

Over the years, a more conservative approach to the identification of students as mentally retarded has evolved and is reflected in the current definition endorsed by the American Association on Mental Retardation (AAMR Ad Hoc Committee on Terminology and Classification, 1992):

> *Mental retardation* refers to substantial limitations in present functioning. It is characterized by significantly subaverage intellectual functioning, existing concurrently

with related limitations in two or more of the following applicable adaptive skill areas: communication, self-care, home living, socials skills, community use, self-direction, health and safety, functional academics, leisure, and work. Mental retardation manifests before age 18. (p. 5)

Students possessing severe handicaps are small in contrast to those having milder disabilities (.05% of the population). The severely handicapped most often have a secondary or even tertiary disability such as cerebral palsy, a sensory impairment, or serious maladaptive behavior. When this group is characterized by their severe needs, the following definition holds true: [These individuals] "who require ongoing support in several major life areas in order to participate in the mainstream of community life, and who are expected to require such support throughout life" (Bellamy, 1985, p. 6). The majority of the students in Classroom A possess multiple disabilities, physical disabilities, severe retardation, and other impairments.

Children with physical disabilities possess physical limitations or health problems that interfere with school attendance or learning to the extent that special services, training, equipment or facilities are required. There is an incredible range and variety of physical disabilities. One of the most common causes of physical disabilities in children is damage to or deterioration of the central nervous system, the brain or spinal cord. A wide spectrum of behavioral symptoms may also present themselves including mental retardation, learning problems, perceptual problems, lack of coordination, distractibility, emotional or behavioral disorders, and communication disorders. Cerebral Palsy (CP) is a non-progressive insult to the brain that results in motor dysfunction characterized by weakness, paralysis, and incoordination. Vining, Accardo, Rubinstein, Farrell and Rogen (1976) state that 50%-70% of children with cerebral palsy are mentally retarded, though there is a wide range of intellectual impairment.

Related disabilities may include mental retardation, oral dysfunction resulting in feeding or language problems, hearing loss, poor visual acuity and strabismus, seizures, and behavioral problems. There are multiple chromosomal, genetic, and metabolic disorders that also result in significant handicaps and retardation. Down Syndrome is the most widely known and most commonly diagnosed cause of retardation (Peterson & Cleveland, 1975). As a group, children with physical disabilities represent the total range of impairment and their behavioral and physical characteristics vary greatly.

Because of recent changes in legislation and the developing philosophy promoting the educational rights of the developmentally disabled, the education of the handicapped individuals is moving away from the home and institutions and towards the local community schools. The fact that the primary distinguishing characteristics of children with physical disabilities are medical conditions, health problems, or physical limitations highlights the necessity of interdisciplinary cooperation. There simply must be communication between physicians and special educators to maintain the child's health and at the same time develop whatever capabilities he or she has (Bigge, 1991; Verhaaren & Connor, 1981a). It is critical that the primary special educator work directly with the entire educational team including parents, physicians, and all related services (speech therapists, occupational therapists, physical therapists, school nurses, and social workers). A multidisciplinary approach is utilized when developing the educational plan for a student. During the curriculum developing process, necessary information concerning the child is gathered from all persons able to provide relevant information. Given the diverse needs of students with severe handicaps, no one professional or method of assessment is adequate to document the needs of a student. However, when assessment information from each of the related services is considered collectively, a

comprehensive view of the capabilities and deficits demonstrated by the individual student is obtained. Integration of all this information is critical. The teacher acts as a coordinator, using the information as a framework to assist in the identification of priority targets for intervention, as well as to coordinate the delivery of related services. Close and continued communication among the educational team allows the integration of common goals and objectives across all services within the least restrictive environment.

Education of students with multiple disabilities must focus on making the most of their assets. One goal is the meaningful participation in the activities relevant to the student's current and future life. Effective programming depends on the integration of both therapeutic and instructional methods so that the student can learn greater independence (Campbell, 1985b). Instructional methods and techniques are varied and are individualized for each student. With any method, students' strengths should be maximized, making necessary adaptations so that success and independence can be fostered. Assistive adaptive technology (augmentative speech devices, switch accesses for computers and toys, and positioning equipment) will facilitate student participation. Instruction must include proven techniques and systematic guidance. When teaching is systematic, it is a defined, replicable process that reflects currently accepted "best" practices, uses performance data to make modifications, and includes acquisition, proficiency, maintenance, and generalization learning. Other instructional strategies utilized in Classroom A include direct instruction, modeling, chaining, top-down instruction, multisensory approaches, and use of multiple intelligences which have proven effective in the other targeted classrooms as well and more specific descriptions will follow in this chapter.

Description of Classroom B

Classroom B is usually comprised of five or six 5-10 year old boys functioning at a severely mentally handicapped level. All of the students are non-verbal, have behavioral issues, and fall along the autistic continuum with communication delays and lacking appropriate social skills. Each student has a notebook that travels daily between home and school to foster regular communication between parents and staff.

Upon arrival in the morning, the students are expected to place their book bags and coats in their proper locations. They spend a short time engaging in leisure activities and playing with toys with teacher prompting. There is emphasis on making choices, utilizing toys in the correct manner, taking turns, and cleaning up one's materials.

During a morning circle activity the students learn to identify peers and staff members, appropriately greet others, identify calendar information, and review the daily schedule. In the pre-academic and pre-vocational areas, the students are learning to complete a variety of fine motor tasks, identify their pictures and printed names, complete simple worksheets, and perform object and picture identification activities. The ultimate goal is always independent completion of tasks, and the level of teacher assistance is faded as student skill level increases. There is weekly thematic activity, such as flowers, and all activities are designed to emphasize some aspect of the theme.

In the communication domain, the students work on the ability to express needs and desires via gestures, sign language, and the use of a Picture Exchange Communication System (PECS) while any attempts at verbal language are encouraged. All the students have individual picture communication books, and the daily schedule is set up in picture format and reviewed at

the completion of each activity. Increasing receptive communication skills and the ability to follow one-and two-step directions receives special emphasis.

The focus in the behavioral realm is on maintaining appropriate behavior in school and community settings, interacting with other people in socially appropriate ways, and developing appropriate play skills. There is a strong commitment to community participation, and the students regularly frequent fast-food restaurants, a shopping mall, grocery stores, department stores, the public library, and playgrounds. In all community outings, the emphasis is on maintaining behavioral controls that will enable some degree of participation and increasing functional communication skills. Some areas of special emphasis include refraining from touching items on store shelves, pushing a shopping cart, utilizing playground equipment appropriately, and controlling one's behavior despite presence of excess visual and auditory stimuli. Some of the students are not regularly exposed to community activities in the home environment, and the community component at school is of critical importance.

In the adaptive living skills arena, the focus is on appropriate use of eating utensils, toileting, dressing skills, hand and face washing, and tooth brushing. Simple food preparation, performing meal-related tasks, and showering are other areas of emphasis. These skills areas are planned with a functional design; for example, dressing skills occur before physical education class as students change into gym uniforms, and tooth brushing occurs after lunch.

The students eat lunch in the gym with the majority of other classes in order to learn to eat appropriately, utilize communication skills, and perform meal-related tasks such as scraping their plates and sorting utensils.

In the afternoon, music activities, tactile discrimination and sensory-motor materials, gross motor activities, and art projects are included on a regular basis to appeal to the students'

multiple intelligences. The school day is planned such that table or group activities and movement activities are interspersed, allowing for students to have the physical movement they require. The students go to the school's computer lab twice a week where they engage in simple computer games via a touch screen or mouse. At the end of each school day, the students complete a schedule paper in which two of the day's activities are highlighted.

Because of the autistic students' severe cognitive, social, and sensory processing limitations, the program needs to be highly structured and supportive in order to maximize student progress. The students' world is very concrete, and their need is for functional skills that will have value in the real world. Progress does occur, but it is gradual and incremental. Transfer of skills must be consciously taught if the students are to master essential life skills.

Theories and Best Practices of Classroom B

Autism is a developmental disability that has a neurobiological basis, and the majority of people with autism also suffer from mental retardation. It is a syndrome or collection of characteristics that is diagnosed through behavioral criteria, and there is evidence that autism is increasing in incidence to 1 in 400. Autism occurs in all races, in all parts of the world, and in all economic groups. It is characterized by uneven development of skills across all areas of development. Autism is apparent by age 3 and, although there is no known cause, a study by Miller and Stromland (1994) indicates that many cases of autism, perhaps all, are initiated very early in gestation, 20 to 24 days after conception (as cited in Rodier, 2000).

The diagnostic categories for autism include: impairment of social interaction such as failure to use eye contact, failure to use or interpret facial expression, and failure to seek comfort or develop relationships with peers; impairment of communication evidenced by failure to use spoken language, deficiencies in initiating or sustaining conversation, and aberrant language

patterns, i.e. echolalia; and restricted and repetitive interests and behaviors such as repetitive movements, intense preoccupation with one subject or activity, insistence on routines and rituals, and distress regarding change (Rodier, 2000).

People with autism may have learning strengths in spatial awareness and memory, rote memory, object use, visual memory and processing, and sequential learning. Difficult areas for people with autism may include understanding and using spoken language, understanding non-verbal communication, predicting events, describing internal states, processing rapidly changing stimuli, simultaneously processing multiple stimuli, understanding cause and effect, learning social rules and behavior, generalizing across settings, understanding safety or danger, and processing sensory information (Doyle, 1998).

Although these characteristics help to describe people with autism, it is important to note that autistic persons are a heterogeneous and not a homogeneous group. The same sensory input, for example, may be calming and settling for one person with autism while for another, the input is extremely disturbing and disruptive. This is one of the many challenges facing a teacher of autistic individuals.

HOXA1 is a gene that plays a central role in the development of the brain stem, making it an excellent candidate for autism research (Rodier, 2000). While brain researchers investigate HOXA1 for autism research and occupational therapists deal with autistic persons from a sensory integration perspective, Lovaas (1993) has described a successful learning-based, behavioral approach focusing on building behaviors through replicable experimental designs. Effective treatment was seen to necessitate early intervention carried out through most of the child's waking hours, addressing behaviors in all the child's environments, by all significant persons, for many years (Lovaas, 1993).

Applied behavior analysis, based on the principles of operant conditioning, originated with the work of B.F. Skinner. The basic premise was that events in a person's environment trigger the occurrence of behaviors and responses, and these behaviors are either reinforced or punished.

The current use of applied behavior analysis focuses on behavior management and skill building. Programs are individualized and eclectic, and the curriculum is comprehensive encompassing all essential domains. The emphasis on behavior management involves the use of behavioral techniques, primarily from a positive perspective, to reduce problem behaviors. Functional analysis is conducted to determine behaviors to be addressed and techniques to be implemented. Functional analysis consists of providing an operational, measurable definition of the behavior, determining the antecedent to the behavior, identifying the functional value of the behavior, and assessing the current consequences for the behavior. Behaviors to be addressed are prioritized: first, behaviors that are dangerous or destructive; second, behaviors that interfere with the acquisition of new skills; and third, behaviors that set the individual apart. There is no one universally effective technique, but some viable behavior management techniques include differential reinforcement, extinction, verbal cue, forced compliance, time-out, stimulus control, and over correction.

In the skill building domain, there is emphasis on compliance, attending, motor imitation, match-to-sample, verbal/vocal imitation, early receptive language, and early expressive language. Teaching techniques include prompt-fade toward independence, discrete trial teaching, response shaping or approximation, and the use of chaining, backward or forward.

A recent study by Charlop-Christy and Carpenter (2000) examined the effectiveness of discrete trial teaching, incidental teaching, and a newly designed strategy, modified incidental

teaching sessions. The discrete trial approach consists of the creation of a work area with a specially trained therapist seated face to face with the student. With rapid acquisition of the target behavior as the goal, 10 trials are presented with a clear discriminative stimulus and clear discriminative consequences. Target responses are prompted and shaped, and tangible reinforcers are utilized. While efficacy of the discrete trial method has been demonstrated, one key limitation is lack of generalization of the learned behavior to other, less structured settings.

Incidental teaching involves teaching children directly in the natural environment. Learning trials are initiated by the student, and reinforcers are student-selected. Parents are typically more involved in the incidental teaching mode than in the discrete trial method. Limited number of opportunities for response has led to slower learning rates using the incidental teaching method, although generalization to other settings is more likely to occur.

Modified incidental teaching sessions are designed to combine aspects of the discrete trial method with features of incidental teaching in an attempt to increase speed of acquisition attributed to discrete trial training and enhance generalization associated with incidental teaching methods.

Results of the comparison study indicated that the modified incidental teaching sessions procedure was associated with better skills acquisition and generalization than either the discrete trial method or the incidental teaching procedure.

Classroom B is set up with a strong orientation toward best practices for educating children with autism. Principles of applied behavior analysis are an integral component in the classroom, with much emphasis on behavior management and skill building. The classroom is a highly structured setting with predictable and consistent routines and functional, real-life

activities. There is little "down time" as attempts are made to keep the students' brains connected to the world rather than allowing them to tune out (Grandin, 1998).

Daily activities are depicted in a picture schedule format, and the schedule is reviewed after each activity. At the completion of an activity, students place the appropriate picture in an "All Done" folder and review the picture of the next activity to be implemented.

Functional communication is strongly emphasized in Classroom B. Pointing, gestures, sign language, use of pictures, and attempts at verbalization are prompted as means to indicated needs and desires. An adapted modified incidental teaching strategy is used, in that communication training sessions occur as well as the eliciting of communication in real-life situations, i.e. students must sign "go" prior to leaving classroom for physical education class.

The students in Classroom B are presented with numerous opportunities for decision-making and choice-making throughout the school day. Research continues to support that student-selected reinforcers maximize learning outcomes, so students are offered a choice between a food treat or a toy for target responses. There is also opportunity for choice among activities at certain sessions in the school day. Autistic persons, particularly low-functioning students as in Classroom B, need to have some measure of control over their environment, which is so often determined by others.

Other important teaching methodologies include avoiding long strings of verbal instructions, using concrete visual methods to teach number concepts, using sensory input such as weighted vests, and pairing real objects with pictures and written words (Grandin, 1998).

Description of Classroom C

Classroom C has approximately 10-14 students each year that are categorized as Trainable Mentally Handicapped (TMH). The students all have speech/language and cognitive delays. Their age ranges between 14-21 years. All the students are ambulatory.

The students follow a specific daily routine. In the morning time, the focus is functional academics. This includes calendar time: recognition of the day, week, month, year, and weather. Each student has to answer a "question of the day" presented by the teacher (i.e., "What did you have for dinner last night?"). Many different questions are presented so that this may improve upon the student's short-term focus memory. This exercise assists in having the students recall past information. Answering the question enables the student to promote self-reflection and increase their receptive and expressive language.

A number of lessons are implemented during the remainder of the morning. Developing the students' functional survival sight word vocabulary is a main priority. The class encounters these words and signs on a daily basis. The students work on identifying their personal information, which includes: recognizing their name, address, and phone number. The students are learning number recognition, telling time to the hour, half-hour, quarter hour, and the minute. Basic money skills such as identifying coins and their values are implemented in the classroom and the community. A high repetition of these activities is essential for achieving these goals.

The afternoon activities vary. A very important aspect of the classroom is developing the students' social skills. A number of social skill strategies are used to facilitate the students' abilities to role-play, problem solve, and work together cooperatively. A very significant part of social skills is having the students appropriately express their feelings. Role-playing is necessary for their transfer of learning. The curriculum is community-based instruction. The students

participate in community outings either to a retail store or a fast food restaurant two times per week. Specific goals for these outings are implemented. The students are expected to identify and locate a specific item at a store. The students are given a picture to match the specific item and write down the correct price. Opportunities are provided for the students to develop their money skills by purchasing an item, ordering, and paying for lunch. Appropriate social skills are reinforced throughout the community experience.

All of the students work on prevocational activities, which include 2-piece assembly, sorting colors and shapes, collating, and stapling. Student jobs are posted and rotated, which include washing the board, erasing the board, cleaning their desk, and vacuuming.

The classroom is on a behavioral plan that uses a token economy. The behaviors targeted are following directions, remaining on-task, appropriate voice tone, and maintaining eye contact. The students earn a token every half hour. The students need to earn 8/11 tokens to earn their day. If they earn their day, they receive a sticker and a treat of their choice.

Description of Classroom D

This classroom is designated as Classroom D. It is a heterogeneous setting that consists of an equal number of males and females. The TMH students who comprise this classroom range from 14-21 years of age and function at a 3-8 year chronological level. Their cognition and language are severely impaired; therefore, academic levels generally are pre-kindergarten to first grade.

Reading and math skills fall substantially below grade level. The students' deficits impede ongoing learning. Due to the tremendous developmental delays and enormous obstacles the students are confronted with daily, a functional curriculum with emphasis on applied pre-academics is the systematic approach used in this classroom.

The day commences at 9 a.m. when the students push their designated "wheelchair buddy" from the bus to their classrooms. When the students arrive in the self-contained setting, they update their monthly calendars by copying the day and the date from the board. They are given an opportunity to interact with one another in small groups. Conversation about the previous evening and the day ahead is encouraged. Appropriate grammar, particularly the use of complete sentences, is modeled with hope and expectations that transfer of learning will occur. A higher rate of frequency is always desired since the students tend to speak in broken sentences, and vocabulary and grammar are areas of concern.

The daily schedule is next on the agenda. It is ultimately used as a tool to help students anticipate transitions, organize and tell time, and realize the importance of time and its elements throughout everyday life. Completing a daily schedule promotes sequencing and prediction of skills, though these metacognitive areas are often too difficult for most of the students to grasp. Their skills are ordinarily rudimentary and rote.

The main focus of the program inevitably emphasizes improvement of social skills. The students frequently forget or neglect appropriate social protocol and how to treat each other respectfully. Therefore, twice a week they "role play" various scenarios. The students are highly motivated by performing short skits, which generate thoughts and questions about a solution to a problem. When role playing is used as a teaching strategy, the students effectively brainstorm with verbal prompting and arrive at suitable outcomes to simple problems. Redirection, paraphrasing, dictating quiet time, "catch them being good" and positive incentives are behavior management techniques that work effectively.

Math and reading lessons incorporate basic pre-kindergarten to first grade skills, such as number and letter recognition; identification of functional sight word vocabulary (Edmark

Functional Word Series, 1993; The Reading Milestones Series, 1991); addition of numbers up to 20 with manipulatives if necessary; letter/sound association; spelling two to three letter words; sequencing numbers; counting by ones, fives and tens; and basic money and time-telling skills. The students experience supplemental computer sessions during which they practice and reinforce previously learned skills such as word building skills (phonics), addition, counting, calendar usage, reasoning, and memory skills.

In the afternoon, more than one-half of the students depart for an onsite or offsite vocational training session. Students learn and demonstrate a variety of job-related tasks. Two students engage in janitorial duties at nearby community sites. Several students work in other classrooms and master work challenges such as dish washing and other domestic housekeeping skills, as well as playing with younger children. An onsite kitchen offers dishwasher operator jobs. All students are given a work-related task and an opportunity to experience the satisfaction of collecting compensation for their efforts. Each student receives a $10.00 monthly stipend. The students are given the privilege to buy something they truly want with their "pay." At the time of the transaction, they pay the cashier to the nearest dollar amount, which includes the change to be returned.

The students who remain in the classroom participate in recreational/leisure activities. At this time, they choose from a wide variety of less-structured events. They take turns choosing a tape or CD to play, make jewelry, play a card game or table game with peers, work on additional math and reading activities or practice sight word memorization on the computer or Geo-Safari. Listening to music is a popular choice; pop rock and acceptable rap tunes are predominantly preferred. The students freely sing along with the music. They know most of the lyrics and often attempt to harmonize with each other.

The recreation and leisure domain is considered a highly relevant area of development for the TMH population. It emphasizes critical social interaction skills in a group situation. Students are encouraged to make choices and cooperate with team members. Self-initiation and independence in a solitary or "free time" situation are also highlighted.

As the day winds down and the 3 p.m. dismissal time approaches, the students count individual tokens and collect a tangible reward for a "great day." They must have eight or more tokens to receive an incentive. The tokens are delivered on a half-hourly basis throughout the day. Some of the students prepare the room for the next day by accomplishing cleaning chores. The others meet their "wheelchair buddies" and take them to their assigned busses so they can go home.

On the days community outings are scheduled, the students visit a grocery store, retail store or fast food restaurant to eat a meal. The students also go to the library to look at books/magazines and listen to stories. Appropriate social skills, expanded language building, sight word reading and money skills are addressed. These experiences facilitate transfer of learning from one environment to another and offer additional practice and reinforcement of skills.

Theories and Best Practices of Classrooms C and D

Since the curricula and instructional techniques are similar in Classrooms C and D, the information has been combined for the following section. The students in Classrooms C and D are categorized as TMH. Trainable Mentally Handicapped refers to students whose programs place an emphasis on the "training" of basic functional skills and self-help skills (Beirne, Ittanbach, & Patton, 1998). Functional academics are a main part of the curriculum. Students who are TMH have cognitive ability and adaptive behavior significantly below average

functioning. The students' adaptive behavior focuses on how well individuals function and maintain themselves independently and how well they meet personal and social demands (Netherton, Holmes, & Walker, 2000). The special educators in Classrooms C and D assess their students' present level of functioning in both these areas and prioritize instructional items to be taught.

Individuals who are classified as mentally handicapped have significant delays. Various processes (attention, mediation strategies, memory, generalizations) associated with learning can be problematic for this group. Speech and language problems occur with great frequency among this population and delays in language development are expected (Beirne, Ittanbach, & Patton, 1998). All of the students in Classrooms C and D have cognitive and speech and language delays.

Some physical health characteristics may be a delay in motor development. Sensory deficits are common among persons who are mentally handicapped. Cerebral Palsy and seizure disorders occur more frequently in persons who are handicapped (Beirne, Ittanbach, & Patton, 1998). A vast number of the student population in Classrooms A, B, C, and D exhibit some of these characteristics.

A functional academic curriculum is the approach the educators of Classrooms C and D most widely use. The curriculum focuses on the criterion of ultimate functioning. The goal is for students to learn skills that make them as productive and independent as possible. Skills that are taught are based on the needs that challenge students daily in their surrounding environments. Skills taught should be age-appropriate and helpful in achieving the highest level of independence.

A "top-down" model or functional skills teaching allows for the instruction of appropriate skills without prerequisite skills being currently in place (Beirne, Ittanbach, & Pattton, 1998). Partial active participation can increase with the "top-down" philosophy in that students can obtain skills that permit them to participate in less restrictive activities and environments. Five adaptations or modifications that promote this outcome to occur are (p.154):

1. Use materials that make skills more readily obtainable such as picture cards, concrete hands-on experience with actual objects, and calculators.

2. Adapt skill sequences like telling time to the nearest 5 minutes or using closest dollar strategy.

3. Use others to help such as bringing along a friend. This particular strategy encourages cooperative learning and social competence. Students are taught to request assistance from an appropriate resource such as a clerk while shopping.

4. Modify rules, for example, extending the time in which a student can complete a task.

5. Use social-attitudinal modifications such as having a store employee invoke consequences for negative social behaviors.

Community, social, leisure, recreational, and vocational aspects of the student's life should always be considered (Beirne, Ittanbach, & Patton, 1998). Real-life or daily living criteria should be the emphasis of the curriculum (i.e. locating a time card, signing in and out at work, or using a bus schedule according to time constraints).

Three phases of learning need to take place within the framework of the functional curriculum. They are learning acquisition, fluency, and maintenance and transfer. During the acquisition phase, skills are reinforced every time they occur. Skills should be taught in the natural environment or setting in which they normally are observed. Skills should also be taught

at the time they actually transpire (i.e. paying the cashier at the grocery store upon the purchase of items). However, if real-life practice is not always possible, classroom simulations offering various situations should be presented and adequately monitored for purposeful repetition of skill training and transfer of learned behavior (Beirne, Ittanbach, & Patton, 1998).

Fluency of a desired outcome or skill is individualistic. Every student learns at a different rate, and levels of competency may differ depending upon the developmental delays and handicapping conditions, which impact the student's performance. Therefore, considerations for time and acceptable level of mastery for completion of the targeted goal are mandatory. For most special needs children, practice sessions need to be highly structured and presented several times throughout the day for short intervals of time.

During the generalization or transference phase, reinforcement and guidance whether physical, verbal, or tactile are faded and ultimately eliminated. A variety of environments are accessed to perform the learned skill. Students must demonstrate a skill in all situations and settings to achieve transfer of learning. At this time in the learning process, students use memory and environmental cues. Assessment of independence replaces direct instruction of the task at this particular stage (Beirne, Ittanbach, & Patton, 1998).

Direct instruction, essentially, refers to the pattern of teaching these special educators use. It consists of the teacher's explaining a new concept or skill to a group of students, having them test their understanding by practicing under teacher direction or controlled practice, and encouraging them to continue to practice under teacher guidance or guided practice (Joyce & Weil, 1996, p. 345).

A major goal of direct instruction is to maximize student learning time. As special educators, this model of teaching is designed to create a structured, academically oriented

learning environment in which students are actively engaged or on task to the best of their ability. Fluency or mastery is most frequently noted at 80% or better; however, disabled students may achieve consistent performance at reduced percentages.

In the direct instruction classroom, the social climate is positive and free of negative effect (Joyce & Weil, 1996). A variety of reinforcers, predominately praise, are frequently used as well as tangible incentives and consequences congruent to behavior. On-task behavior, generally parallels appropriate conduct and acceptable social skills.

One of the most fundamental learning areas emphasized is the Social Skills or Adaptive Behavior domain. Basic, yet primary skills like using 6" voices, talking to one person at a time, staying with the group, helping your partner, encouraging each other and keeping hands and feet to yourself are worked on daily with multiple repetitions to practice refinement of these target behaviors (Bellanca & Fogarty, 1991). Special learners require continuous reminders and reinforcement of these skills to successfully adapt to cooperative interaction and instruction in small groups.

The dynamics of classrooms C and D are multifaceted and diverse. The cognitive ability and unique character traits of the students indicate that instruction for cooperative skill development be ongoing and consistent to perfect a skill until it is automatic. The T-chart is a purposeful tool to use to outline specific behaviors that make up a targeted social skill. Words and pictures that illustrate praise and gestures of encouragement are paramount in solidifying a desired social outcome (Bellanca & Fogarty, 1991).

Role playing is another valuable strategy these educators employ to teach social ramifications of behavior, promote problem solving, higher metacognitive thinking skills like cause and effect, prediction, and self esteem. According to F. Shafftel and G. Shafftel (as cited

in Joyce & Weil, 1996), role-playing creates student unity prior to exploring feelings, attitudes, values, and problem solving techniques. The Shaftels' version of role playing stresses the intellectual content as well as the emotional content; analysis and discussion of the enactment are as important as the role playing itself. The enactment elicits genuine, typical emotional responses and behaviors from the students.

The students in classrooms C and D are highly motivated by assuming roles and performing significantly social and real-life scenarios. The analysis or discussion, which follows the enactment, generates rudimentary, yet thought provoking responses though notably lower than the students' actual age and grade level. Students describe their emotions and solutions in simple and direct terms. It is quite satisfying to witness the energy and effort the students demonstrate during role playing activities.

Self-reflection is a critical and desirable goal to master during the role playing process. This metacognitive skill does not often become spontaneous and automatic for the special needs students, but can be facilitated by the teacher asking a series of questions similar to Mrs. Potter's evaluative inquiries.

The special educators in these particular classrooms present questions regularly to guide students' responses, to encourage independent student thinking, and self-correction. Choice making replaces continuous teacher directives and gives the individual or group control over the classroom environment to increase students' self esteem and productivity. The questions ordinarily presented are: (a) What are you supposed to do? (b) What should you do next? (c) What did you do well? (d) What would you do differently next time? and (e) Do you need help? (Bellanca & Fogarty, 1991). These questions are essential to foster positive emotional growth and academic development.

William Glasser and Alfie Kohn both advocate the decision making process in the classroom. Students take an active role in setting the climate for learning. Glasser and Kohn believe that we focus too much on negative behaviors rather than "prompting" positive ones (Burke, 1995). The teachers in classrooms C and D believe in a collaborative approach to behavior and focus on rewards rather than punishment.

In classrooms C and D, the teachers have their students on a token economy system to modify their behavior and for classroom management. A systematic method for programming reinforcement is through the establishment of a token economy. The token system is based on items symbolizing actual reinforcers, which is like a monetary reward system of free enterprise. Just as adults receive money or tangible rewards for their performance, students can earn tokens for appropriate behavior and completion of tasks. Adults can exchange their money for food, clothes, entertainment; students can redeem their tokens for items they desire (Patton & Polloway, 1997). The teachers of Classrooms C and D allow the students a chance to redeem their tokens and choose a reward of their choice at the end of each day.

Token systems assist with motivation and management within the instructional setting. Token economies have a positive effect on teachers by emphasizing the need to reinforce students frequently and consistently in order for them to succeed.

Tokens represent items that learners desire, they will work to earn those tokens because they are paired with actual reinforcers (Patton & Polloway, 1997). The students in classrooms C and D understand the concept of earning tokens and receiving an item with their redeemed tokens. The token system has proved to be very motivational to the students, and have improved their behaviors overall.

Positive reinforcement or "catch 'em being good" is another classroom management the teachers use in classrooms C and D. The concept is to ignore negative behavior, while identifying and praising good behavior (Burke, 1995).

Praise is a major technique of positive reinforcement. Praise should be sincere, personalized, descriptive, and focused on the students' actions, not on their personalities. Teachers can reward good behaviors with nonverbal reinforcers (nods, smiles, pat on the back) or with concrete reinforcers such as token reinforcers used in the token economy (Burke, 1995). Positive reinforcers are used throughout the school day to keep the students motivated and on tasks, and increase positive behaviors.

A high level of repetition is used in Classrooms C and D to keep the students on track. Monitoring means keeping a constant check on student performance and behavior. Teachers should make personal contact with each student during a lesson, and they should circulate frequently among students. Monitoring enables the teacher to provide individualized instruction and can have a significant positive effect on the classroom atmosphere (Burke, 1995).

CHAPTER 3

Literature Review

The personal experiences of the teachers in Classrooms A, B, C, and D have shown that music is a powerful tool that has significant effects on students spanning a wide variety of age, interest, and ability levels. Some of these effects are of a therapeutic benefit to students.

There is extensive research on the effects of music on students concerning their behavior and ability to learn. These findings have prompted the teachers in the four classrooms to take an introspective look into their own professional realm and investigate the possible benefits that music may have on the student population.

The hopes and dreams of the participating educators include looking for positive changes with the use of music in the classroom. These areas include improvement in focusing on a task, stimulating interest, calming excitable behaviors, aiding in the appropriate interaction of students with their peers, skill building, lowering voice levels, socialization, and communication skills.

Music's impact on the mind and body begins with the physiological process of hearing. The ear is the first sensory organ to develop in the womb, preceding even the nervous system, so sound is the first source of information about the world. Once a person is born, the primary function of the auditory system is orientation and self-defense. The entire hearing apparatus is designed to detect, locate, and identify sound for the purpose of integrating these signals into propulsive behavior for self-preservation. From an evolutionary standpoint, hearing is life itself

and as such, people were given a sophisticated system for processing sound in the brain, body, and nervous system (Miles, 1997).

Physiological Aspects

The inner ear transforms sound waves in the air into electricity in the body. Once inside the brain, these electrical impulses move through the brain stem, the oldest layer of the brain and the locus of the instinctual responses. Musical energy activates the limbic system, structures such as the hypothalamus, hippocampus, amygdala, and parts of the thalamus that wrap around the brain stem and control the emotions (Hachinski & Hachinski, 1994, as cited in Miles, 1997).

In search of scientific explanation for the reasons why music has such a powerful effect on all people, a large body of clinical evidence shows that music can counteract stress on both physical and psychological levels. It can slow one's pulse, heart rate, and breathing, lower the blood pressure, and relax muscles (Blumenstein, Breslev, Bar-Eli, Tenenbaum, & Weinstein, 1995, as cited in Miles, 1997). It can also reduce levels of stress hormones in the blood that lead to fatigue and illness (Mockler, Stork, Vollert, Rocker, Danne, Hochrein, Eichstadt, & Frei, 1995, as cited in Miles, 1997).

The autonomic nervous system regulates one's vital signs, indicators such as heart rate, pulse, blood pressure, breathing, and the electrical activity of muscles that measures one's arousal level and determine one's physical readiness for various activities. The first published American experiment with music's effects on the autonomic nervous system was a study by Hyde (1924) of electrocardiograms (EKGs) and blood pressure of people listening to music (as cited in Miles, 1997). Since then, decades of research in music therapy have linked listening to music with autonomic nervous system responses, as well as internal secretions and activity on the sympathetic nervous system (a subdivision of the autonomic system). The right music can

affect one's hormonal secretions and, working in tandem with autonomic functions, can help realign one's biorhythms with one's energy needs (Rider, Floyd, & Kirkpatrick, 1985, as cited in Miles,1997).

Effects of Music

The results of Chalmers, Olson, and Zurkowski (1999) provide a reason why music has such influence over people. They believe that humans have a physical response to music because our biologic being is a rhythmic entity. Such things as our breathing, digestion, nervous system, and brain all appear to have an intrinsic rhythmicity. There is research that indicates that music stimulates the brain at lower levels, especially in the area that controls emotions. There is available research going back at least fifty years that suggests that music played in study hall classes increased reading comprehension in adolescent students. Sedative music was noted to calm the emotions of disturbed children (Chalmers et al., 1999, p. 44).

An experiment conducted in a school lunchroom is an example of the effects music can have in altering student behavior. The lunchroom in this particular school had a decibel level equivalent to that produced by a passing subway. Four supervisors were kept busy correcting inappropriate student behavior, which included such offenses as yelling, hitting, and throwing food. Music was introduced into the lunchroom and a record was kept of the changes in decibel levels and in the number of times the supervisors were forced to admonish improper behavior. Results varied depending on the type of music being played, but in every case decibel levels declined and the need for behavioral intervention decreased when music was played in the noisy lunchroom. The most dramatic impact was in the need for behavioral intervention, which saw a decline of 65%. It was undetermined whether this reduction in need for intervention was a result

of music's effects on the supervisors or on the children. Regardless, it is clear that music had a beneficial effect on that particular lunchroom (Chalmers et al., p. 44).

The first hope and dream of these special educators targeted improving students' ability to focus on task. Davidson and Powell (1986) conducted an experiment to determine if easy-listening background music could have a positive effect on on-task-performance of children in a classroom setting.

Easy listening music is characterized as music that is very melodic with non-dissonant chordal structures and has a non-percussive beat. The orchestration is traditional with strings and winds predominating. It is often alternately called elevator music. An analysis of effects of the addition of easy listening music showed that it had a significant positive impact on the on-task performance of all the students. However, the effects had a stronger impact on the boys rather than the girls although the girls' on-task performance before the addition of the easy listening music was already 99%. But this score was raised even higher with the addition of the music even though the difference was statistically insignificant (Davidson & Powell, 1986).

Listening to classical music has also been shown to reduce general and task-related anxiety while triggering increased alpha wave activity in the brain, both of which bring the added bonus of enhanced concentration. From studies in which background music boosted test scores in students with high test anxiety and others linking music to improved performance by surgeons under stress, music has been shown in induce not only physical relaxation but also mental clarity (Blumenstein, et al).

Theory on why music works as a learning aid has lagged behind wide ranging evidence that it has positive effects on math, language, reading, and fact memorization. One possibility is that music induces a receptive mood that enhances cognitive processes in general. It is possible

that music serves as a mnemonic memory aid to help encode information in the mind. Whether one uses music as a background enhancement or sings new words and concepts aloud, music seems to help initial learning, recall, and transference (Taniguchi, 1991).

The Musical Intelligence

Undercofler (1997) believes that music was first included in the school curriculum as a means to improve the substandard state of church singing in the earliest days of our country's history. Going beyond that historical point, Undercofler states that music has many benefits to schools. These include enhanced student motivation, increased attendance, improved social skills, and perhaps most important, he cites research at the University of California that shows an association between participation in musical activity and improved reading and logical thinking processes. This leads Undercofler to the work of Howard Gardner and his theory that music is a distinct intelligence worthy of measurement and development. Undercofler also cites the work of Paul Haack, a professor at the University of Minnesota, who argues that music literacy is essential in today's marketplace because it enables people to make sense of their environment and make appropriate choices (Undercofler, 1997, p.17).

Undercofler (1997) asserts that music is important because it simultaneously combines simple and complex mental processes, something that is not duplicated within the core subject areas. He compares the study of music to the study of English in that both subjects require the ability to read, write, and understand a complex language and music study also requires the student to be creative and analyze formal structures. The special educators involved in this study are more concerned with how the addition of music to the core curriculum will positively affect student performance in previously described areas. Undercofler's findings reinforce the hopes of the teachers concerned that the addition of music will have a positive effect on their students.

No exploration of the hopes and inspiration of the potential of music to affect student behavior and performance can be complete without a more detailed examination of the work and theories of Dr. Howard Gardner. Gardner (1993) believes that, "Of all the gifts with which individuals may be endowed, none emerges earlier than musical talent" (p. 9). "Music," says Gardner, "might be a special intelligence that should be viewed differently from the other intelligences" (Black, 1997, p. 116). Gardner, renowned for his theory of multiple intelligences, first described in Frames of Mind, says musical intelligence probably carries more emotional, spiritual, and cultural weight than the other intelligences. But most important, Gardner says that music helps some people organize the way they think and work by helping them develop in other areas, such as math, language, and spatial reasoning.

While one thinks of musical talent primarily as composing and performing, musicologist Edward T. Cone suggests, "active listening is after all a kind of vicarious performance effected by 'inwardly reproducing the music' as maintained by Roger Sessions, twentieth century American composer" (as cited in Gardner, 1993, p.104). Another central aspect of music is rhythmic organization, can exist apart from auditory abilities. Individuals can feel the music even if they cannot hear it. Seeing music performed by orchestra or dance troupe is another manner in which the rhythm of music can be translated for non-hearing people. Music's effect of the limbic system is part of why certain pieces make one happy or sad, and it may also explain the relationship medical researchers have found between match pitch, loudness, and melodic contour of their mothers' songs. In the middle of their second year of life, children begin to invent spontaneous songs and reproduce small sections of familiar songs such as E-I-E-I-O. After school begins, there is little further musical development except among children with unusual musical talent or exceptional opportunities (p. 109).

The role of culture and environmental exposure cannot be denied. Dramatic cultural differences exist in the Anang tribe of Nigeria, where music and dance are introduced in the early stages of infancy. By age 5, Anang children can play several percussion instruments, sing hundreds of songs, and perform dozens of complex dance movements. Anthropologists who have studied this group claim to have never encountered a non-musical member (Gardner, 1993, p.110).

The separation between language and music is distinct, and investigators working with normal and brain-damaged people have demonstrated that different processes and mechanisms serve these two areas. There is documentation of children with autism who are severely disturbed affectively and cognitively. They can barely communicate with others but are not been altered in the area of musical intelligence. This is demonstrated by their ability to flawlessly sing a piece of music they have heard (Gardner, 1993, p.100). Literature abounds with accounts of musical feats carried out by autistic children (p. 120).

Lazear (1999) goes into considerable detail concerning the music component of Gardner's multiple intelligences. The primary concern of the participating teachers involves the one intelligence Gardner refers to as musical rhythmic intelligence. This intelligence includes the ability to recognize and use rhythmic and tonal patterns, hear and identify various sounds from the surrounding environment and gain meaning from them, as well as the human voice and musical instruments. Lazear (1999) claims that because of the altering effect of the musical rhythmic intelligence on the brain that this musical intelligence is the greatest of all of the intelligences. He points out the calming effects music can have under stressful conditions or can stimulate excitement when that is required. Music has been and still does inspire religious belief, intensify national loyalties, and are used to express both great loss and intense joy. There is no

question in Lazear's view that music is a powerful force that can be utilized to affect human behavior.

Weinberger (1998) points out that there is clinical evidence to support the idea that music is not merely a product of culture and social actions but may actually be a part of one's biological endowment. He refers to types of scientific findings that support the belief that music has strong biological roots: (a) animals such as monkeys have fundamental musical abilities; (b) biological behaviors are universal and music is universal; (c) biological behaviors are revealed very early in life and very young children exhibit musical abilities long before cultural factors could have taken effect; (d) the human brain is pre-wired or organized to process musical activities. The brain's right hemisphere processes melody while the left hemisphere processes language. Weinberger believes it is very significant that the functional left/right architecture of the brain honors music as much as it honors language.

Weinberger cites literature that shows learning and performing music actually exercises the brain by strengthening the synapses between brain cells. By making music, one exercises the sensory and perceptual systems, the cognitive system, muscle action and coordination, feedback and evaluation, the pleasure systems, and the memory system. Weinberger's point is that musical activity increases the brain's capacity by increasing the strengths of connections among neurons. He summarizes the benefits of musical activity with children by stating that it facilitates language acquisition and reading readiness, fosters positive attitudes, enhances creativity and general intellectual development, and promotes social adjustment, personality adjustment, and self-worth (Weinberger, 1998).

The Mozart Effect

For an indication of how powerful music can be, classroom teachers from sites A, B, C, D now turn to a brief discussion of something called the "Mozart Effect." The "Mozart Effect" refers to the temporary increase of spatial-temporal mental functions upon listening to selections by Mozart (Reimer, 1999). Spatial-temporal reasoning is a right-brain function that assists with higher math and some other types of abstract thinking. The most famous exponent of the healing and creative powers of sound and music is a French physician by the name of Alfred Tomatis. Dr. Tomatis has founded Listening Centers around the world that have treated over 100,000 patients for listening disabilities, vocal and auditory handicaps, and learning disorders. Perhaps one of his most famous patients is the actor Gerard Depardieu who sought help from Dr. Tomatis because, as a student in drama school, Depardieu found himself stammering so badly he could hardly speak. Dr. Tomatis's diagnosis was that Depardieu's voice and memory problems were caused by deep emotional problems he suffered from a very difficult childhood. Dr. Tomatis's prescription was for Depardieu to come to the Listening Center every day for several weeks and listen to two hours of uninterrupted Mozart. A doubtful Depardieu followed this prescription and after a few days found his appetite to be improved, found he was more energetic, and most important, found himself speaking more clearly. As a result, Departieu returned to acting school able to speak clearly and went on to become a successful and respected actor (as cited in Campbell, 1997).

Regardless of personal tastes, the question of why Mozart seems to be the best composer for everyone is an intriguing one. Whether the patient is from Africa, Europe, or Asia, it is the music of Mozart that seems to work most effectively in calming listeners, improving spatial perceptions, and helping them speak more clearly. The reason Mozart seems to work the

best is a matter of conjecture. One theory is that his music is not emotional in the sense that Beethoven is, or excitable like rock music, but it is both accessible and mysterious at the same time (Tomatis, 1998, p. 15). Mozart's music seems to impart balance. Sound apparently changes the energy in our bodies in specific ways and Mozart's particular sound seems to impart energetic balance. In other words, Mozart's music does what other healing systems attempt to do which is to help the patient find energetic balance. The rhythms of Mozart seem to positively affect the rhythms of the autonomic nervous system (Tomatis, 1998, p. 15). The Mozart team, researchers from the University of California at Irvine, suggests that listening to Mozart helps organize the firing patterns of neurons in the cerebral cortex, especially strengthening creative right-brain processes associated with spatial-temporal reasoning.

At this point, the participating educators are convinced that music indeed is a powerful force in the lives of all humans and now turn to a brief examination of the actual experiences of teachers who have used music in the classroom to positively affect student's performance. Previously, the classroom teachers cited research with average students so they now turn to an examination of the use of music with special learners.

Music and Special Learners

Some occupational therapists now have available to them a technique called Auditory Integrative Training (Frick & Lawton-Shirley, 1994) that has shown promising results for persons with sensory processing disorders such as autism, pervasive development disorder, and learning disabilities. The method involves listening to modulated music for two and a half hours a day for ten consecutive days. The changes observed in the persons participating in this treatment vary with the individual but most persons experience consistent improvement in many areas. Documented growth occurred in the following: attending or focus, self-initiation of

purposeful activity, arousal and sensory modulation, balance and movement perception, gravitational security, speech and language development, social or emotional maturity, praxis and sequencing, and eye control. In some cases, persons who undergo auditory training have experienced major improvements that have immensely improved their physical, emotional, and social functioning. (Frick & Lawton-Shirley, 1994)

Buck and Gregoire (1996) assert that music participation can play a major role in assisting young people with disabilities to improve their motivation and increase their confidence. The authors warn that special education teachers who want to foster development of music related skills with their students must first identify the musical skill levels of their students. If the special education teacher chooses a musical activity beyond a student's abilities then frustration rather than improvement will result. The authors strongly recommend that students should have as many music listening and participation experiences as possible (p. 44).

Humpal and Dimmick (1995) provide several practical ideas for the use of music with students who have special needs. They offer ideas that they have been implemented to successfully help students with special needs experience music. Depending on the disability of the learner, the authors recommend various strategies. For students with communication disorders or limited speech, they recommend augmentative devices such as symbol systems, electronic speech synthesizers, and switch-activated tapes. For learners with limited mobility or physical difficulties, they recommend adaptive equipment, that allows for active participation. Augmentative devices can facilitate special learners in a variety of ways. For example, a switch-activated tape can be utilized to great effect by having different parts of a song recorded onto a loop tape. A loop tape allows the same message to be repeated. A switch activated tape machine gives the special education student the opportunity to play repetitious lyrics of a song or story.

Exercises with multiple repetitions allow the student to sharpen anticipatory responses. For instance, in the song "Yakkity Yak" the refrain "Don't talk back" is regularly a part of the music. The song would be played, permitting the learner sufficient time to insert the "Don't talk back" portion (Humpal & Dimmick, 1995).

Another recommended activity involves the Squiggle Wiggle Writer manufactured by Hart Enterprises. It is a thick pen that vibrates causing a wiggly, spiraling print. Students holding this unique vibrating pen and drawing while listening to classical music create remarkable images. The pen can also be used as a musical instrument by removing the pen tip and just holding it against a drum or tambourine head thus allowing children with limited physical mobility to play the drum when the pen is turned on. Humpal and Dimmick (1995) emphasize the idea that music more than any other subject matter is something that can be experienced by everyone regardless of their degree of disability.

In summary, the educators in Classrooms A, B, C, and D have reached some conclusions concerning the use of music with special learners. It is clear that music has profound effects on everyone's physical and emotional well being. Music is universally important to everyone From their exploration into the effects of music on all people, the participating teachers are determined to explore this phenomenon with their own students in the hopes of enriching and improving their intellectual, emotional, physical, and social lives.

Project Objectives and Processes

As a result of the introduction of music into regular programming, during the period of January 2000 to April 2000, the behavior and the performance of the multiply handicapped 3-8 year old, severely autistic 5-9 year old, and the trainable mentally handicapped 14-21 year old

students will be positively impacted. Student observation checklists, student interviews, and anecdotal records will measure changes in student behavior and performance.

In order to accomplish the project objective, the following processes are necessary:

1. Student behavior will improve as evidenced by an increase in the ability to follow directions, to remain in seat, to utilize a 6-inch voice, to visually attend to task, to decrease self-stimulating behavior, and to increase arousal in low affect students.
2. As a result of the implementation of the musical strategies, improved school performance will be demonstrated.
3. Exposure to music will result in a prolonged calming effect on students.

Project Action Plan

Calendar of Interventions

The following outline reflects our proposed schedule of musical interventions. The inclusion or absence of music will occur during the same targeted activities twice weekly.

Week 1: No music. Observation of students for gathering data.

Weeks 2, 3, 4, 5: Introduction of classical music during selected activities. Possibilities include selections by Mozart, Beethoven, and Gary Lamb. Data collection continues.

Week 6: Introduction of alternate music during selected activities. Data collection continues.

Weeks 7, 8, 9, 10: Re-introduction of classical music during selected activities. Data collection continues.

Week 11: Re-introduction of alternate music during selected activities. Data collection continues.

Weeks 12, 13, 14, 15: Continuation of classical music during selected activities. Data

collection continues.

Week 16: No music. Observation of students continues.

Methods of Assessment

In order to assess the effects of the intervention, observations of students' reactions to music will be observed. In addition, teacher logs and records will be maintained. Furthermore, those students with the ability to communicate verbally will be interviewed.

CHAPTER 4

PROJECT RESULTS

Historical Description of the Investigation

This discovery process has been an uncharted journey for these researchers. Data collection commenced in March 2000 and was maintained through June 2000. The objective of this research was to discover the effects of music on the special needs population. Prior to the implementation of the musical agenda, no assumptions were made regarding the intervention outcomes.

Observational data were collected during the first week of the intervention. Targeted behaviors varied among the four sample classrooms (see Appendix A). A structured schedule of music was designed for implementation during weeks 1 through 16. Data were collected twice weekly during scheduled activities. Each researcher also compiled anecdotal records to supplement the data. Prior to the intervention, a written survey was distributed to the parents of students in Classrooms A, B, C, and D, requesting feedback regarding the use of music in their homes. All parents responding to the survey indicated that their child enjoys music (see Appendix B).

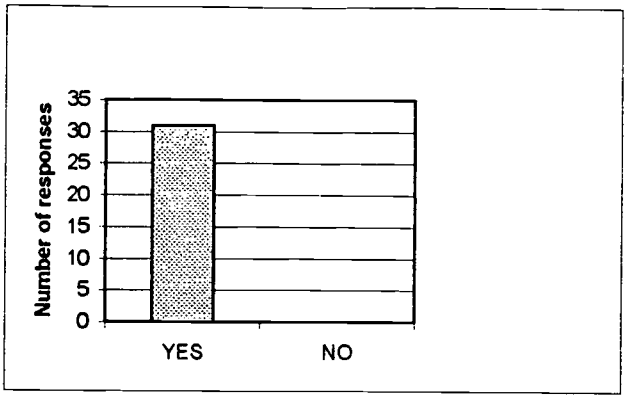

Figure 1. Parent response to the question, "Does your child enjoy music?"

Two-thirds of the students actually communicated their desire for music and may have sought it out themselves (Figure 2). It is important to note that the remaining one-third includes some students who's physical or communication deficits may have prevented the ability to express their desire for music.

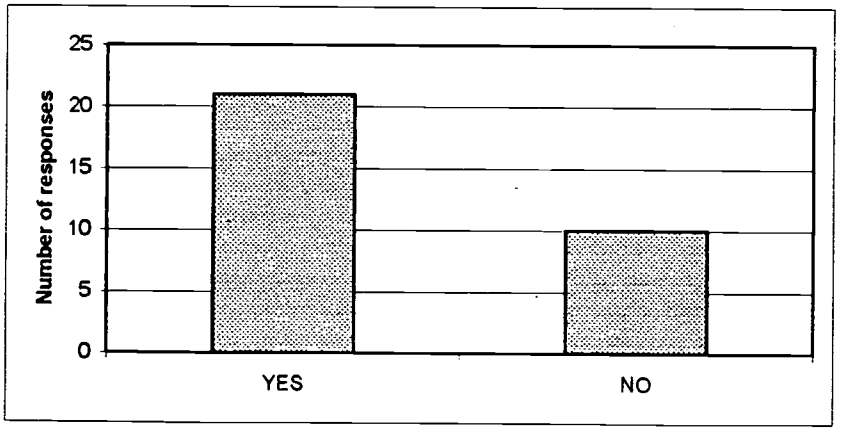

Figure 2. Response to the question, "Does your child communicate to you his desire for music? or seek it out himself?"

Results indicate that all parents incorporated music into their daily schedules (Figure 3).

Of the total responses, most indicated that average listening time was at least 1-2 hours daily.

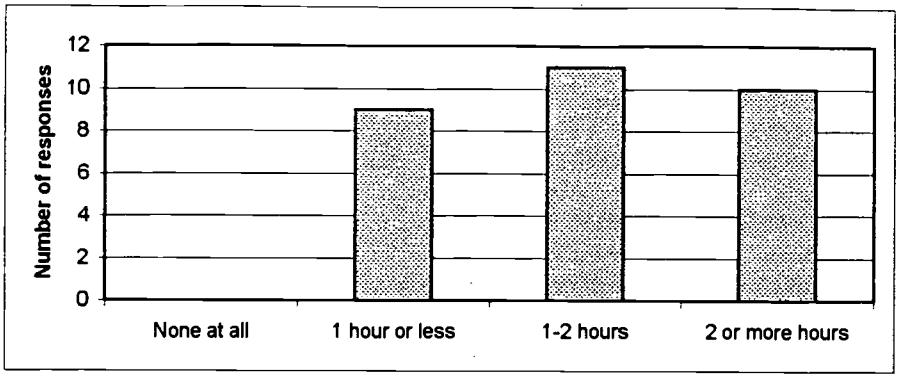

Figure 3. Response to the question, "How much time is spent daily listening to music?"

The most preferred musical selection was of the pop/rock variety, selected by nearly half of the respondents (Figure 4). Oldies, country, blues, and jazz were the least requested choices.

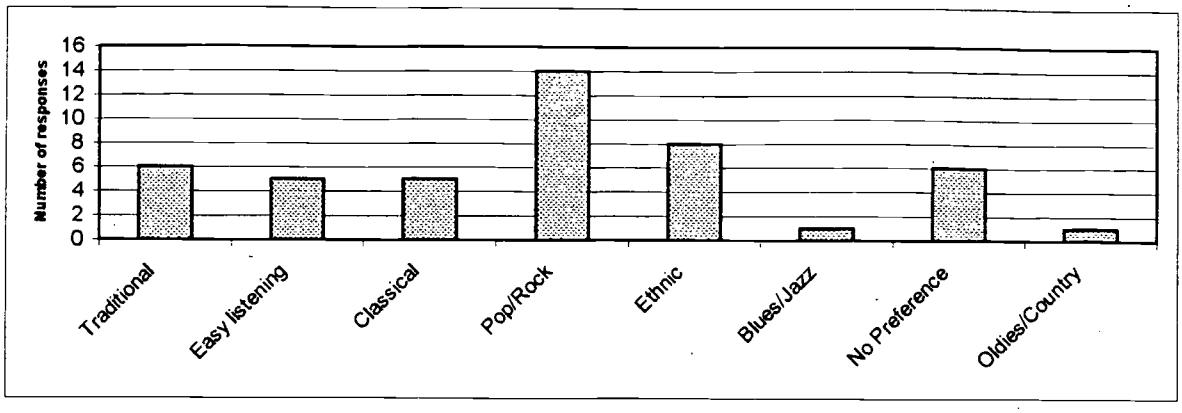

Figure 4. Parent response to the question, "What type of music does your child prefer?"

Parents were asked to examine the moods of their child (Figure 5). An overwhelming number of responses revealed that music effected a positive change in their child. Minimal responses indicated a negative change or lack of change in their child's attitude during the musical presentations. Many parents commented that playing music invited active participation by their child, such as song, dance, or movement. Expressions of happiness and contentment, as well as overall relaxation, were also noted by the parents during these periods.

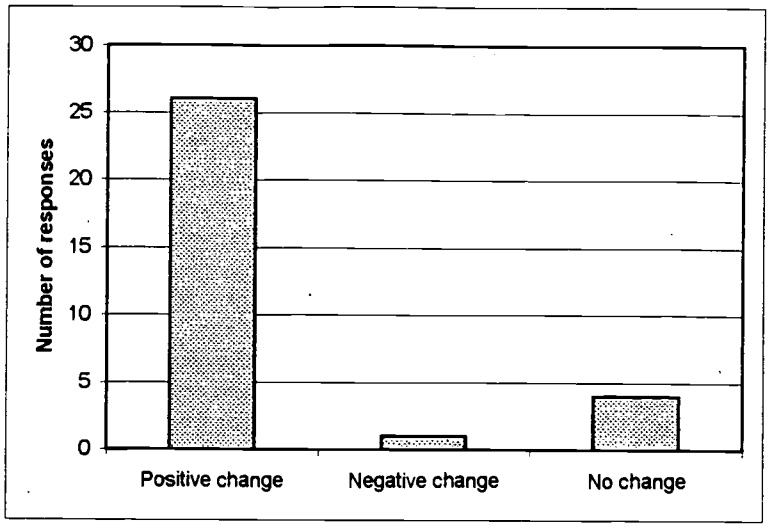

Figure 5. Parent response to the question, "Do you see a change in your child when music is played?"

Classroom A

Behavioral Records

Prior to the onset of this study, several student behaviors were targeted for observation: following directions, exhibition of self-stimulatory behaviors, and increased arousal in low-affect students. Direct observation of the targeted behaviors was completed by the teacher in Classroom A. These observations took place during structured activities: circle time, small fine motor groups, and small language groups.

Review of the data indicated some notable changes in response to the application of music. Self-stimulatory behaviors decreased for two students, with one change more dramatic than the other. Following directions within an activity did not reflect any critical improvement for the students. One student who often displays low affect did show positive response and an increase in arousal to music with a livelier, more upbeat tempo. It is important to note that

numerous external stimuli can negatively impact the targeted behaviors, including noise level of the classroom, unexpected schedule interruptions, and social-emotional factors, to name a few. The measurable benefits of music usually cannot compete with the presence of one or more of these factors.

Anecdotal Records

During the study, this researcher noted reactions of the students to music that had been incorporated into scheduled activities within the daily routine. Prior to the intervention, music played an important role in Classroom A. Music was discovered to be motivating for many students so it had already been incorporated into the daily schedule, being played during such times as morning arrival, lunch, rest time, and art activities. Musical presentations crossed a variety of genres including traditional children's music, classical, pop, and easy listening. It was not, however, typically played during structured, on-task periods where student behavior and performance were to be assessed. So this 16-week period was rather a departure. During the intervention, classical music was included in the work periods from which observational data was collected.

Anecdotal records reflected beneficial effects on the students. Students responded positively to the music. It appeared to the observer that it enhanced relaxation for some and increased arousal and energized others. Generally, music seemed to enhance, at some level, simple day-to-day functioning within the classroom.

The emphasis of classical music increased considerably during this study. It quickly became a favorite of the students and the staff as well. In fact, classroom staff began to request specific musical pieces or artists and on occasion, brought in personal selections to share. It

appeared that music evoked strong positive reactions from the classroom staff as well, which would positively affect the emotional timbre of the class.

One student in Classroom A displays a keen interest in all kinds of music. Although non-verbal, he vocalizes to musical selections while rhythmically keeping the tempo with his body through either tapping or rocking. He recognizes and can reproduce the melodies of countless songs. After the introduction of new songs, he was quickly able to assimilate them into his repertoire. At times, music of a livelier nature presented a drawback for this student. It became an interference to the student's concentration to task because he was too involved with "singing" to the music. Certain musical pieces seemed to have the power to draw individual students to it and affect some type of student involvement. This became a powerful and energizing tool when trying to increase the arousal of students with low affect. Because most of the students in Classroom A are nonverbal, the instructor had to look to outward manifestation of their behavior such as facial expression or body orientation to determine whether a musical piece had been well received or influential.

Personal Reflections

It is the personal belief of the researcher that music has a profound and powerful impact on mind and body and that the use of music within the classroom is a valuable tool. Observations and anecdotal records illustrated the simple yet positive and beneficial effects that music had on the students of Classroom A. A multisensorial approach to learning is paramount with this population, and music offers yet another opportunity to tap into their world. Music has a strong, personal connection for this researcher, and it is believed that the daily inclusion of music into the classroom can only enhance the personal and educational lives of these students.

Classroom B

Behavioral Records

Direct observation of specified behaviors was implemented by the teacher in Classroom B as well as the two program assistants employed in that classroom. Targeted behaviors included following directions, remaining in seat or designated location, and exhibiting self-stimulatory behavior. Students were observed during a structured activity comprised of three work stations, each conducted by a staff member. The work station activity included fine motor activities and pre-writing worksheet tasks. Students were placed in groups of two and traveled among the work stations in 12 minute intervals, denoted by the sound of a timer. The three staff members collected observations twice a week.

The observational records reflected a substantive change in only one behavior in response to the type of music or the absence of music. Following directions remained somewhat problematic for three of the students throughout the 16 week period. Out of seat behavior was a concern for one student at the beginning of the prescribed period, but the incidence decreased as time went on. Exhibition of self-stimulatory behavior was a major problem for two of the students throughout the 16 weeks and a very large obstacle for one student that did not decrease over time.

Many other factors impacted the targeted behaviors other than the implementation of music including the particular task assigned, the number of children in the classroom that day, the particular day and time of day being observed, the presence or absence of

one student's medication, the effect of the noise level of one or two students, the pairing of the students in the work group, disruption of the usual daily routine, and the presence of substitute program assistants. All of these factors have a marked effect on autistic individuals whose dependence on routine is a distinguishing hallmark of their disability.

Anecdotal Records

Anecdotal records began on the day of an all-school trip to the Ice Capades. The teacher approached the outing with trepidation due to its departure from the normal routine and the likelihood of behavioral difficulties with the students. The teacher was amazed to note the lack of self-stimulatory behaviors and the visual attentiveness on the part of the students to the musical production.

Prior to the data collection period, traditional children's music such as Raffi was played in Classroom B upon the students' arrival in the morning, soothing Gary Lamb music was offered during the students' rest time after lunch, and additional children's music was played during the students' recreation/leisure time. In addition, some simple songs were sung during the morning circle time, educational music was played once a week, and rhythmic music for instrument playing was proffered once weekly. There was no music offered during structured work activities or informal educational exercises.

Upon implementation of the 16-week intervention, classical music was played during dressing periods before and after gym class, during snack time, during speech group, and during informal work sessions, in addition to the structured work activity from which observational data were collected. Anecdotal records consistently reflected a calming and soothing effect on the students and tranquil, peaceful emotions for the staff in Classroom B when classical music was being played. Certainly, serenity on the part of staff members has a markedly beneficial effect

on the students. Traditional children's music did not appear to evoke the same conciliatory feeling but had more of a stimulating outcome.

One parent took the initiative of sending in a tape by a regional artist that her child especially enjoyed, and it was noted that the music did have a calming effect on the student. One program assistant brought in her favorite tape of instrumental music with the promise to bring in additional tapes when supplied with blank cassettes. Many visiting staff members responded favorably to the classical musical tapes while commenting on the positive effects they observed among the students. Other staff members expressed marked interest and enthusiasm when informed about the participating educators' action research project. One support staff member mentioned her general dislike of music when working with children yet reacted favorably when classical tapes were played during her time in the classroom. A substitute program assistant related a story about his 4-year-old autistic nephew. With no mention of the research project by this educator, the visitor reported that the child was only calmed by music.

Certainly, the self-stimulatory behaviors that in large part define autism do not completely disappear when classical music is present. One day, the anecdotal record reported, "Today, nothing would have helped!" Yet, the teacher in Classroom B was absent one day and, upon her return, the program assistants disclosed that putting on classical music markedly transformed one student's behavior on that disrupted day. It was heartening to this researcher that the support staff would take it upon themselves to initiate playing music if they arrived earlier than then teacher.

When the teacher in Classroom B attended a symposium of a personal nature, she purchased an inspiring musical cassette tape, out of character for the educator and a testimony to the enthusiasm generated by the research project. That tape became a favorite in Classroom B

and one that all the program assistants put on with vitality at various times throughout the day. One entry in the anecdotal records had this researcher questioning, "Why haven't I done music all along?" And at another point noting, "Mozart's great! I love the music and will continue in the future!"

Personal Reflections

The students in Classroom B will continue to be affected by severe autism, marked communication and social delays, and intense behavioral concerns. There is no magic formula that will eradicate self-stimulatory behaviors, bring about language, or establish social normalcy. Many factors have an effect on an autistic individual's mood, behavior, and ability to attend to a task. When there were fewer children in the classroom due to absence or therapy pullouts, there was a dramatic effect on the students remaining in the classroom. The emotional upset and loud verbiage of one student usually has a significant effect on the other children as the noise level rises.

Another mitigating factor for an autistic individual's actions and behavior is the disruption of the usual routine. A fire drill, for example, had an upsetting effect on the students in Classroom B, and the subsequent introduction of music did little to assuage the damage. The presence of an unfamiliar substitute program assistant often causes autistic students great distress, and the same activity on a Monday, after the weekend, runs quite differently than the same activity on a Thursday. Similarly, activities in the morning generally produce better results than the same activities in the afternoon. The effects of one student's medication peaks at a certain time and, if an activity is delayed or if his medication was not administered on a certain day, his task performance and behavior is markedly altered. The group with whom he works also affects an autistic student. Pairing of students was consistent to some degree, but when

grouping varied or when one student's behavior was disruptive, other students in the classroom experienced some effects.

Although not necessarily substantiated by observational data, the anecdotal records reflect the substantive positive results of classical music on the behavior and demeanor of the students in Classroom B. There were many instances of students whose crying decreased and for whom calmness developed in response to the music. This beneficial effect on the nonverbal students in Classroom B, as well as the positive reactions reported by support staff, convinces this educator that music will continue to be an indispensable component of Classroom B's instructional program.

Classroom C

Behavioral Records

To determine the effect of background music on students' on-task performance, following directions, using a 6" voice, and remaining in their seat, six male pupils in a Trainable Mentally Handicapped class were observed over a period of 16 weeks. Recordings were made every 10 minutes during each observation, and the teacher in Classroom C conducted the observations two times per week. The initial observation during the first week was conducted without background music to determine data. The results determined that students needed several verbal prompts, follow directions, and remain in their seats. The most problematic behavior was the participants' use of a 6" voice, which was used slightly more than half of the time.

Music was introduced to the students from week 2 through week 15. During weeks two through five, classical music was introduced and played in the background. The special educator in Classroom C played Gary Lamb selections during structured educational activities.

During week 6 and week 11, the researcher selected an alternative music style. The music selection chosen was pop/rock. The classroom teacher notably observed an arousal yet distracting effect on the participants.

Classical music was played during weeks 7 through 10, and 12 through 15. The music that was played during structured activities and recreation/leisure time had a calming effect on the class.

The observational records indicated that use of classical music was effective in increasing on-task performance of the students in Classroom C. There was not a significant change in results in following directions; however, verbal prompts were required. Throughout the course of collecting data, it was apparent that while playing classical music, the most dramatic change was in the students' use of a 6" voice, which increased substantially. The class remained in their seats approximately the same amount of time.

Anecdotal Records

The researcher in their classroom interviewed six of the students individually. The interview was semi structured consisting of four questions planned by the teacher. A relaxed and informal atmosphere was provided. The researcher's intent was to deliver a message to the students that there was no right answer. The questions and answers were: a) "Do you like music"? b) "What is your favorite kind"? c) "Do you listen to music often"? d) "How does music make you feel"? All the students responded affirmatively to the first question. Responses to the second question were as follows: most students stated that they favored pop/rock while only a few chose gospel as their preference. All indicated that they often listened to music. All the students responded positively to the last question, claiming it made them happy.

The first day that the teacher in Classroom C played a classical music selection, the students asked the teacher, "What is this music?" One student asked if the teacher could put on a different type of music. As the weeks progressed, the students asked if the teacher could turn on the "slow" classical music. The teacher noted a significant change in the students' mood as well as a calming effect.

When the classical music was played during recreation/leisure times, the students were playing a game of Uno. The students used their 6" voices and worked together cooperatively during the classical selections. This was an important alteration on their part.

The classroom teacher turned on a pop/rock selection during a structured activity. The students were distracted by the music and were unable to attend to the task. The students were tapping their hands and feet, and some were even singing the tune. The teacher was also distracted by the music and found it difficult to complete the activity.

When pop/rock music was played during recreation/leisure, three of the students got up and danced to the music. The music energized the class and created a happy environment.

Personal Reflections

Prior to the onset of the study, the teacher in Classroom C did not play music on a regular basis. After seeing the positive results of the classical music intervention, the researcher will definitely play classical music during structured activities. It is clear to the teacher that music had a profound effect on the students. Music was found to be an effective component in the program and will be continued on a regular basis. Alternate music such as pop/rock will be played during unstructured times to promote intrinsic and extrinsic benefits to all of the class.

Classroom D

Behavioral Records

Upon presentation of classical and easy listening, new age music as an intervention in Classroom D, this researcher observed a major reduction in the volume of the participants' voices. During the initial observation week, when no music was employed, the students used 6" voices as desired by the teacher a majority of the time. Easy listening and classical music implemented as background stimuli proved to have mild to moderate positive effects on some of the students' behavior. While classical music was utilized, the students used 6" voices the great majority of the time.

Another change in target behavior observed by the researcher was that on any given day in the 16-week period, three students remained in their seats for longer periods of time. Initially, verbal reminders were given to stay seated and then, these prompts were gradually faded and extinguished. A slight increase in the target behavior was documented. These notable modifications in behavior were detected during structured seatwork time such as reading and math lessons in the morning, and free time in the afternoon. Six out of eight students engaged themselves more actively in listening as well as question and answer dialogue activities.

The music itself did not seem to distract the participants but rather appeared to accentuate the positive aspects of the learning environment. There was no apparent change in the student participants' attention span or duration of visual and auditory focal engagement on a task. The tendency to become distracted by environmental, external stimuli remained virtually the same.

Anecdotal Records

This educator recorded individual accounts of student reaction to the music applied to the daily classroom routine two to four times a week. The results and comments the students made

were mostly affirming. They conclusively determine that music was positively received, appreciated, and beneficial to the participants.

As the weeks progressed, students requested to put on the music or asked if they could play a particular cassette or CD. One boy asked if he could bring a compact disc home to listen to, and another inquired about the name of the composer and title of the overture. Several of the participating recipients stated that they liked the classical selections as well as the easy listening instrumental pieces. Another musically inclined pupil hummed and attempted to rhythmically sing along. He was capable of memorizing melodies and imitated some of the tunes quite accurately. One other young male requested Mozart's Allegro and identified the piece by saying, "the one that goes Da Da Da Da Da Da Dum Dum Dum Dum."

To further emphasize the plausible enhancing influence music had on the study group, this researcher shares the factual account of a student who offered to bring her keyboard and microphone to school in order to entertain the young children in another classroom. Music helped supply a comfortable climate in which positive actions occurred.

All the participants expressed their preference for rap and alternative hip-hop or pop music (gospel music was included in this group). When the students were given a choice at recreation and leisure time, inevitably one of these types of music was selected. It was evident that volume of voices increased as well as bodily movement. Musically related responses such as singing, dancing, shaking of body parts, and foot and hand tapping were all elevated.

However, during this unstructured period, the students were still able to sustain attention on a table game, computer activity, or homework. Several of the students demonstrated difficulty remaining in their seats. Socially acceptable behaviors, manners, and communication

were observed. The students' emotional quotient and mood radiated happiness, camaraderie, and well-being.

The interviews administered to the participants in a verbal style were simple and concise to avoid confusion about data interpretation. The questions asked were: a) "Do you like music"? b) "What is your favorite kind"? c) "Do you listen to music often"? d) "How does music make you feel"? All of the participants responded in the affirmative to the first question. The entire group favored rap. The vast majority preferred hip-hop and pop. Two-thirds of the respondents enjoyed gospel music. Six of the eight participants stated that they listened to music before and after school, and predominantly on weekends. Most of them said that they had personal access to stereo equipment, compact discs, and tapes. In response to the last question, all the participants confirmed that music made them feel happy. They also stated that they had more energy as displayed in the classroom when these preferred types of music were played.

Personal Reflections

These responses verify the strong, favorable connections the students established with the music. The outcome of the study proves to be advantageous to the classroom unit.

Overall, music of the softer, gentler, orchestrational type, especially the 60 beats per minute of the classical variety, had a positive impact on the participants in Classroom D. The researchers' observations and anecdotal records illustrated evidence of the profound yet simplistic influence music generated within the setting.

Music helped alter some target behaviors warranted for change. However, it is recognized that other variables such as environmental, social-emotional, and instructional factors or conditions could have simultaneously affected the participants. This result, in particular, substantiates the claim that music can be a powerful tool when applied to an instructional format.

Even the livelier, more fast-paced musical selections affected the students in a positive way. Their moods became upbeat and festive. The energy levels increased, and this researcher concludes that enthusiasm and self-esteem ultimately became by-products of the listening and feeling experience that the music provided the participants.

Upon reflection, the researcher in Classroom D will continue to play music on a daily basis and integrate it into the regular schedule. Due to the outcome of this investigation, it is the researcher's heartfelt conviction that music will only improve and enhance classroom atmosphere, learning attitudes, and endeavors for the students in Classroom D.

Conclusions and Recommendations

Music crosses all diverse cultures, religions, intellects, and racial groups. It does not discriminate. Music encompasses all human conditions and most important, for these researchers, the special needs population. Ideally, it was the hope of the researchers that there would be significant changes in adaptive behavior. Although the changes as evidenced in this study may appear incremental to the casual observer, these researchers view them as monumental accomplishments when taking into account the multiple challenges and disabilities of this particular population.

The teachers concur that music will continue to be a vital component of our instructional programs. Music has proven itself to be a powerful force in the students' educational and personal pursuits. Due to the remarkable success of this action research project, the teachers of Classrooms A, B, C, and D have proposed the inclusion of classical music as background stimulation during all-school lunch periods in hopes of reducing noise levels and calming student behaviors (See Appendix C)

In retrospect, these researchers would offer the participants the opportunity to choose between various 60 beat per minute musical selections to play during classroom activities. Participating in the decision-making processes allows students to declare ownership in the classroom agenda.

Feedback from the parent survey could be utilized as an invaluable classroom tool in the determination of musical selections that have proven to be successful in the home environment. Parents could be encouraged to share musical pieces for use within the classroom. Reciprocally, individual teachers could lend effective music to parents for use in the home. This exchange program might be expanded in hopes that educators could establish a school-wide musical lending library.

As an adjunct to this proactive research project, staff development opportunities should be made available to provide a forum for professional exchange of current ideas in order to maximize more effective teaching practices. Ongoing assessment and evaluation is key to the assurance that the musical program remains not only motivating but successful. The quest of these educators is to be profoundly committed to the continual promotion of music as a viable instructional tool that enhances the mind, body, and spirit.

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Appendixes

Appendix A

Observational Record for Classroom B

Week of _____

	Student #1	Student #2	Student #3	Student #4	Student #5	Student #6
Doesn't follow directions first 3 opportunities, given 2 or less prompts						
Doesn't remain in seat/ designated location						
Exhibits self-stimulatory behavior						

Comments: _____

_____

Observational Record for Classrooms C and D

Week of_____

	Student #1	Student #2	Student #3	Student #4	Student #5	Student #6
Doesn't follow directions first 3 opportunities, given 2 or less prompts						
Doesn't remain in seat/ remains focused on task						
Uses 6 " voices						

Comments: _____

_____

Appendix B

Parent Survey

Please circle the appropriate response.

1. Does your child enjoy music? Yes or No

2. Does your child communicate to you his desire for music or seek it out himself? Yes or No

3. What type of music does your child prefer? Circle 1 or 2

Traditional children's songs, sing-alongs, Barney, etc.
Easy listening
Classical
Pop/rock
Ethnic music _____
Blues/jazz
No preference

4. How much time is spent daily listening to music? Circle 1

None at all
1 hour or less
1 – 2 hours
2 or more hours

5. Do you see a change in your child while music is being played? Circle 1

Positive change
Negative change
No change

6. What else would you like me to know about your child and music?

_____
_____
_____

Please fill out this survey and return by Thursday, February 3, 2000. Thank you for your cooperation.

Appendix C

Proposal for Music During Lunchtime

September 28, 2000

Dear Staff,

Educational literature states that music, particularly some kinds of classical and easy listening, calms and relaxes individuals with hyperactive and irritable tendencies. The 60-beat rhythm soothes as it affects the central nervous system and physiological well being of the body.

Other school facilities have instituted the presentation of background music at lunchtime in the cafeteria and throughout the halls during the changing of classrooms. Reduction of excess student movement and volume of noise was observed.

Therefore, several teachers would like to recommend that we play non-disruptive, easy listening music during the half hour lunch period in the gym. It would be conducted on a trial basis. We would appreciate any kind of personal input regarding this exploratory endeavor.

Please answer one question below and return to me ASAP.

____ I would like to have the addition of music during lunchtime in the gym.

____ I do not want music to be played at lunchtime.

Thanking you in advance,
Nancy Coyne, Mary Lou Dwyer,
Marianne Kennedy, Nancy Petter

Comments:

_____

_____

_____

_____

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Organization/Address: Saint Xavier University E. Mosak 3700 W. 103rd St. Chgo, IL 60655	Telephone: 708-802-6214	FAX: 708-802-6208	
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