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THE EFFECT OF IMPROVISATIONAL MUSIC THERAPY ON THE COMMUNICATIVE BEHAVIORS OF AUTISTIC CHILDREN

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ABSTRACT

THE EFFECT OF IMPROVISATIONAL MUSIC THERAPY ON THE COMMUNICATIVE BEHAVIORS OF AUTISTIC CHILDREN

By

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Clinicians, researchers, and educators have studied extensively the communication deficits of people diagnosed with autism and have commented frequently on their unusual responsiveness to music. The purpose of this study was to determine the effectiveness of improvisational music therapy, based on Nordoff and Robbins' (1977) Creative Music Therapy approach, on autistic children's communicative behaviors.

Eleven autistic children, ranging in age from 6 to 9 years, participated in individual improvisational music therapy sessions for a period of ten weeks. A reversal design was applied. The Checklist of Communicative Responses/Acts Score Sheet (CRASS), designed specifically for this study, was used to measure the subjects' musical and nonmusical communicative behaviors.

Results strongly suggest the efficacy of improvisational music therapy in increasing autistic children's communicative behaviors. Significant differences were found between the subjects' first session CRASS scores and those of their last sessions ($p < .01$). Also, abrupt and substantial decreases in scores were noted for all eleven subjects when reversal was applied.

Dedicated to the children

who participated in this study

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AN EXPERIMENTAL STUDY

Introduction

Communication problems of autistic children have been major areas of investigation in the field of autism. For many years there existed the assumption that nonverbal children and children with limited meaningful communication lacked the skills needed to understand their environments. Within the past several years this assumption has been challenged, with research beginning to demonstrate the potential for communicativeness in autistic children. Avenues which provide opportunities for autistic children to develop communication skills are desperately in need. Recent literature on facilitated communication (Biklen, 1990) has described autistic people's frustrations with their inabilities to communicate. Although this work is very controversial, the questions it raises cannot be overlooked. Research is needed to examine autistic people's communicative potentials.

Music therapy has been widely used with autistic children. Nordoff and Robbins (1977) reported many therapeutic values of Creative Music Therapy for autistic children, and this technique is becoming more widespread. Numerous case studies have demonstrated its effectiveness; however, to the experimenter's knowledge, controlled experimental studies of improvisational techniques which are based on Creative Music Therapy have not yet been implemented. If this technique truly allows for communicative behaviors to emerge and develop in autistic children, it could both provide some answers to

questions raised in the field of autism and generate further questions.

The Problem and Subproblems

The purpose of this study is to determine the effects of improvisational music therapy on the communicative behaviors of autistic children. The specific questions to be answered are as follows:

1. Is there a significant difference between the number of total communicative behaviors as measured by the Checklist of Communicative Responses/Acts Score Sheet (CRASS) demonstrated by autistic children in their first improvisational music therapy sessions and the number demonstrated in their last sessions?

2. Is there a significant difference between the number of Communicative Responses/Acts in the tempo modality demonstrated by autistic children in their first sessions and the number demonstrated in their last sessions?

3. Is there a significant difference between the number of Communicative Responses/Acts in the rhythm modality demonstrated by autistic children in their first sessions and the number demonstrated in their last sessions?

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in their last sessions?

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9. Is there a significant difference between the number of spontaneous and creative acts demonstrated by autistic children in their first sessions and the number demonstrated in their last sessions?

10. Is there a significant relationship between the subjects' musical vocal behavior score changes and their nonmusical speech production score changes as recorded on the CRASS?

11. Will any changes in the autistic children's communicative, social/emotional, and musical behaviors be observed by the parents outside of the music therapy setting at the conclusion of the 10 week period?

12. Will any changes in the autistic children's communicative, social/emotional, and musical behaviors be observed by the teachers outside of the music therapy setting at the conclusion of the 10 week

period?

13. Will any changes in the autistic children's communicative, social/emotional, and musical behaviors be observed by speech therapists outside of the music therapy setting at the conclusion of the 10 week period?

14. Is there a significant relationship between the autistic children's overall CRASS score changes and the parents' total ratings on the Behavior Change Survey?

15. Is there a significant relationship between the autistic children's overall CRASS score changes and the teachers' total ratings on the Behavior Change Survey?

16. Is there a significant relationship between the autistic children's overall CRASS score changes and the speech therapists' total ratings on the Behavior Change Survey?

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18. Is there a significant relationship between the autistic children's overall CRASS score changes and the teachers' communication ratings on the Behavior Change Survey?

19. Is there a significant relationship between the autistic children's overall CRASS score changes and the speech therapists' communication ratings on the Behavior Change Survey?

20. Is there a significant relationship between the autistic children's overall CRASS score changes and the parents' social/emotional ratings on the Behavior Change Survey?

21. Is there a significant relationship between the autistic

children's overall CRASS score changes and the teachers' social/emotional ratings on the Behavior Change Survey?

22. Is there a significant relationship between the autistic children's overall CRASS score changes and the speech therapists' social/emotional ratings on the Behavior Change Survey?

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25. Is there a significant relationship between the autistic children's overall CRASS score changes and the speech therapists' musical ratings on the Behavior Change Survey?

Definitions

Autism: The following definition and determination of autism given by the Michigan State Board of Education (1992) was utilized in this study:

> Rule 15.(1) "Autism" means a lifelong developmental disability which is typically manifested before 30 months of age. "Autism" is characterized by disturbances in the rates and sequences of cognitive, affective, psychomotor, language, and speech development.
>
> (2) The manifestation of the characteristics specified in subrule (1) of this rule and all of the following characteristics shall determine if a person is autistic:
>
> (a) Disturbance in the capacity to relate appropriately to people, events, and objects.
>
> (b) Absence, disorder, or delay of language, speech, or meaningful communication.
>
> (c) Unusual, or inconsistent response to sensory stimuli in 1 or more of the following:
>
> (i) Sight.
> (ii) Hearing.
> (iii) Touch.
> (iv) Pain.

(v) Balance.
(vi) Smell.
(vii) Taste.
(viii) The way a child holds his or her body.

(d) Insistence on sameness as shown by stereotyped play patterns, repetitive movements, abnormal preoccupation, or resistance to change.

(3) To be eligible under this rule, there shall be an absence of the characteristics associated with schizophrenia, such as delusions, hallucinations, loosening of associations, and incoherence.

(4) A determination of impairment shall be based upon a comprehensive evaluation by a multidisciplinary evaluation team. The team shall include, at a minimum, a psychologist or psychiatrist, a teacher of speech and language impaired, and a school social worker.

(5) A determination of impairment shall not be based solely on, [*sic*] behaviors relating to environmental, cultural, or economic differences. (pp. 11-12)

Improvisational music therapy: An active spontaneous approach to individual therapy based on Paul Nordoff and Clive Robbins' (1977) Creative Music Therapy technique, in which music is used as therapy. The music responds to, motivates, and supports the child in order to effect his/her therapeutic growth.

Improvisation: The process of spontaneously creating any combinations of sounds and silences in a musical setting with a specific therapeutic meaning and purpose.

Communicative behaviors: Verbal, vocal, gestural, or instrumental responses which a) demonstrate the ability for future communicativeness to occur, b) are influenced by the musical improvisation and/or the experimenter's behaviors, or c) attempt to influence the musical improvisation and/or the experimenter's behaviors.

Communicative Responses: Verbal, vocal, gestural, or instrumental behaviors demonstrated by the child which are influenced by the experimenter's improvisation.

Communicative Acts: Verbal, vocal, or instrumental behaviors

which serve as prerequisite skills necessary for musical communication, and verbal, vocal, or instrumental behaviors initiated by the child in an attempt to influence the experimenter's improvisation/behaviors or for the purpose of independent expression.

Communicative modalities: The following specific musical elements are identified as communicative modalities: tempo, rhythm, structure/form, and pitch.

Assumptions

This study is based upon the following assumptions:

1. Music can have a significant influence on autistic children.

2. Autistic children's musical responses have common characteristics.

3. The sample used in this study represents children who are diagnosed with autism.

4. Autistic children have common characteristics.

5. Change can be implemented within 10 half-hour sessions.

6. Ten half-hour sessions provide sufficient treatment time to show measurable change using a reversal design.

7. Improvisational music therapy represents a definable music therapy intervention.

Limitations

Both the small number of children in the sample and the use of a single-subject design may be regarded as limitations of this study. However, considerations must be given to the rarity of autism and the heterogeneity found within the autistic population. The prevalence of autism is approximately 4 per 10,000 (Lotter, 1966; Ritvo et al., 1989). Single-subject procedures allow for the analysis of

relationships between treatment and behavior changes in a small sample of heterogeneous subjects.

The male:female ratio in this study, which was 10:1, does limit the generalizability of the results. The male:female ratio in autism ranges from 1.4 to 4.8:1 (Gillberg, 1989). Only one female subject who fit the category specified for research was found in both of the counties searched. Another limitation is the various settings in which the study occurred. Attempts were made to match the rooms according to size, lighting, and content; however, one of the settings was a music room which contained numerous musical instruments. Even though a piano-drum area was set up in this room for the study, the experiment was affected to some degree by these distractions.

Due to practical and ethical considerations, the reversal phase was only one session in duration. It is possible that this limited the autistic children's responsiveness, since resistance to change is one of the characteristics associated with autism. However, the subjects in this study did not exhibit behaviors commonly associated with changes in routine, such as tantrums, perseveration, expressions of distress and/or rage, and self-abuse. One subject did attempt to stop the music by placing his/her hand over the experimenter's mouth and taking the experimenter's hands off of the piano. The experimenter continued singing and/or playing, and this subject eventually stopped these behaviors, remained seated on the piano bench, and appeared to listen to the music. Overall, the subjects did not seem to be resistant, just less responsive.

Ethical Considerations

Since this research study involved human subjects, it was necessary to secure approval from the Michigan State University Committee on Research Involving Human Subjects (UCRIHS). The application was completed and reviewed under expedited conditions by a member of the UCRIHS committee. Approval was granted (Appendix A).

Children were videotaped for purposes of data collection. The experimenter was responsible for the videotapes and erased them as soon as the study had taken its final written form and all data had been collected and analyzed. No other person viewed the videotapes apart from the experimenter, her advisor, and the two observers who collected the data. Identifiable data was also kept under the responsibility of the experimenter and destroyed once the study had taken its final written form. Parents were assured that no names would be used in the actual report of the study.

CHAPTER II

A REVIEW OF RELATED LITERATURE

Introduction

In the first description of children diagnosed with early infantile autism, Kanner (1943) devoted a large amount of attention to their communication deficits. Since then, research has continued to support Kanner's observations of the numerous problems related to autistic children's communication development. The National Society for Autistic Children (1978), the American Psychiatric Association (1987), and the Michigan State Board of Education (1992) all list deficits in language development as one of the necessary symptoms for the diagnosis of autism.

The importance of language in determining future adjustment was studied by Eisenberg and Kanner (1956) in a follow-up study of 63 children diagnosed with early infantile autism. When divided into speaking (children with useful speech at 5 years of age) and nonspeaking (unable to communicate verbally with others) groups, 16 of the 32 speaking children achieved a fair to good social development rating, and only 1 of the 31 nonspeaking children was rated the same. Rutter, Bartak, and Newman (1971) proposed that language problems may underlie the social difficulties of autistic people.

Within the past decade, there has been a change in emphasis concerning language intervention techniques. Rather than simply attemping to increase vocabularies, emphasis has been placed on the development of meaningful communication (Schopler & Mesibov, 1985).

Echolalia is now connected with communication, rather than seen as a self-stimulatory behavior to be eliminated (Schuler & Prizant, 1985). There has been an increase in research which compares the language of autistic children with that of nonhandicapped children at the same developmental levels. From this research, a more sophisticated understanding of the language processes in autistic children has emerged.

There is an increasing amount of literature describing music therapy programs and possible benefits for autistic children. The effectiveness of music therapy interventions with autistic children has been demonstrated through numerous case studies, with improvement in communication skills being one of the benefits frequently cited. The use of improvisation as a specific music therapy technique in improving communicative behaviors has been noted by Alvin and Warwick (1992), Hollander and Juhrs (1974), Nordoff and Robbins (1964, 1968a, 1971, 1977), and Saperston (1973).

One of the advantages of interactions in a musical context is that communication is possible without many of the prerequisite skills necessary for expressive language. Improvisation has been widely used in developing communication skills with a variety of handicapped children and adults, including those with autism. Since communication begins at the child's level, improvisation allows for the flexibility needed for enabling a child to feel supported and accepted as he/she is. This support and acceptance help provide the child with confidence and security, thus facilitating the development of communicativeness.

Nordoff and Robbins (1964, 1968a, 1971, 1977, 1983) have done extensive work using improvisation in working with autistic children.

Their technique, Creative Music Therapy, emphasizes the creation of musical improvisations which serve as a nonverbal means of communication between the therapist and the child. The music created is used to establish and maintain contact with the child and to provide opportunities for growth and development of musical communicative skills.

After presenting a historical overview of the relationship between autism and communication/language deficits, a review of the research that has substantiated the significance of autistic people's communication/language problems in their prognosis will be provided. Specific aspects of the pragmatic or functional communication of people with autism will be examined under the following two categories: prelinguistic and linguistic. Current language intervention techniques will then be reviewed.

The research and literature pertaining to autistic children's responses and abilities in relation to music and music therapy techniques utilized with the autistic population will be presented. The review of music therapy techniques will consist of both structured and improvisational treatment methods.

Autism and Communication/Language

Historical Overview

Kanner (1943) gave the name 'early infantile autism' to describe children he had encountered who had the following common characteristics: profound withdrawal, an obsessive desire for preservation of sameness, a skillful and affectionate relation to objects, an intelligent and pensive physiognomy, and either mutism or the kind of language that does not serve interpersonal communication.

A large portion of his writings elaborated on the communication deficits which he observed in autistic children. Even though research has changed parts of Kanner's theory on autism, his observations of the communication problems have never been disputed (Fay & Schuler, 1980). Kanner's language-oriented explanation of the autistic syndrome received support from research studies (Eisenberg & Kanner, 1956; Kanner, 1971); however, it was overlooked due to the predominance of psychodynamic theories which prevailed in the 1950s. Autism was generally viewed as an emotional and interpersonal problem, and the language symptoms were either overlooked or interpreted psychoanalytically.

During the 1960s, a large number of studies appeared in the literature which supported Kanner's (1943) language-oriented explanation. In 1964, Rimland's book, Infantile Autism, proposed a cognitive model for understanding autistic behaviors. Rimland stated that the basic dysfunction in autism was the inability to interpret stimuli meaningfully. A shift from viewing autism as an emotional disorder to a language and cognitive disorder occurred. Further research continued to support Rimland's theory (DeMyer et al., 1973; Hermelin & O'Connor, 1970; Lockyer & Rutter, 1970; Rutter, Greenfeld, & Lockyer, 1967).

Some researchers have asserted that impaired sociability is the core deficit of autism. Ungerer and Sigman (1981) proposed a model which theorized that autistic children's failure to engage in joint attention with others leads to deficits in social communicative interaction. Wing (1981) stated that the language and communication deficits of autistic children stem from deficits in social interaction

abilities. Paul (1987) stressed the importance of addressing the deficits in processing information about social situations in order to begin to improve communicative disorders.

The determination of whether autism is primarily a language, cognitive, or social disorder is unresolved and perhaps futile due to the interplay that exists between them. The most current view suggests that emphasis should be placed on the interrelationship between these three developmental areas.

Importance of Communication/Language in the Prognosis for Autism

The acquisition of language has been shown to be crucial to the prognosis of autistic children. The presence of useful speech by 5 years of age was one of the most significant distinguishing characteristics between autistic children rated as making poor adjustment and those who made good adjustment (Eisenberg & Kanner, 1956). This finding, that the degree of language development by the age of 5 years is predictive of later development, was confirmed by Schachter (1986), who continued follow-up on two autistic people for 22 to 30 years. The subject who had acquired skills in language by 5 years of age achieved reasonably competent skills as an adult as compared to the other subject, who continued to be dependent on parental and institutional care. Brown (1963) also cited severely impaired language as being predictive of poor later adjustment and suggested a cutoff age of 3 years.

DeMyer et al. (1973) conducted a follow-up study of 85 autistic boys and 35 autistic girls with a mean age of 5 1/2 years at the initial evaluation and a mean age of 12 years at follow-up. Forty-three percent of the children who demonstrated communicative words

during the initial evaluation developed conversational speech beyond expressing immediate needs, as compared to twenty-nine percent of the children who demonstrated echolalia without communicative value and eleven percent of the mute children. In another follow-up study, Bagley and McGeein (1989) found that autistic children, with a mean age of 8 years, who were mute and socially unresponsive at the time of their admission to a residential center for the treatment of autism had poor outcomes four years later.

Functional language skills by early school age was shown to be as powerful as intelligence in predicting autistic children's later skills (Rutter, 1978). Gillberg and Steffenburg (1987) followed 46 autistic children up to 16-23 years of age. The most important prognostic factors found were IQ greater than 50 at diagnosis and communicative speech development before 6 years of age. Ninety-seven autistic children with speech loss before the age of 30 months and 164 autistic children without speech loss were compared by Kurita (1985) several years after the speech loss had occurred. Speech loss was defined as total loss of the articulation of meaningful words or complete loss of gestural expressions. Prior to the speech loss, these children were able to meaningfully use a range of 1 to 30 words and varied from showing fairly normal development to showing abnormalities in their development. The subjects with speech loss demonstrated more retarded mental development than the subjects without speech loss. Also, Mesibov's (1983) follow-up study demonstrated that social and communication problems were the major obstacles to adult adjustment. As a result of all of these studies, speech and language skills of autistic children became of paramount concern for researchers and

clinicians studying and treating the syndrome.

Communication/Language Characteristics of Autistic Children

The range of communication skills in autistic children is extremely wide. Low functioning children may throw temper tantrums, make vocalizations, or use physical actions in expressing discomfort, pleasure, or desire, or in initiating an interaction (McLean & Snyder-McLean, 1978). Higher functioning communicative skills include the use of physical guidance, gestures, pictures, signs, typing, or speech. There is not any one pattern of autistic communication problems. These problems are variable and must be examined individually.

In Kanner's (1946) description of autistic children, he noted the following specific characteristics of their language deficits: muteness, immediate and delayed echolalia, metaphorical substitution, literalness, simple verbal negation, repetitions, and pronoun reversals. He concluded that both the mute and the verbal children were the same as far as meaningful communication was concerned. Cunningham and Dixon (1961) studied the language of a 7-year-old autistic boy, analyzing it both quantitatively and qualitatively. Quantitatively, it resembled that of a normal child ranging in age from 24 to 30 months, and qualitatively, it was at a lower level of development. Characteristics included monotony, low rates of questions asked, low frequency of information given, frequent use of incomplete sentences, and a lower frequency of egocentric speech as compared to a normal child ranging in age from 24 to 30 months.

A current view of these characteristics is offered by Frith (1989). Difficulties in pragmatics is now seen as a universal feature of autism. Varying levels of skills in syntactic and semantic aspects

of language are demonstrated by autistic people. There are many autistic children who are mute, but it is not yet known if they suffer from phonological, syntactic, and/or semantic impairments. At least three-quarters of all speaking autistic children demonstrate echolalia, but it is not yet known why. Autistic children use bizarre idiosyncratic phrases and frequently demonstrate difficulty with pronouns and tenses. Their use of prosodic features for conversational purposes is also impaired. Frith points out that even though more has been written on the language impairments of autistic people than on any other of their deficit areas, numerous questions remain unanswered.

In the area of communication development, Austin (1962) and Searle (1969) laid the foundation for studying the pragmatic aspects of language, or how language is used for various purposes. Descriptions of language deficits in autistic children changed their emphasis in the 197Øs, focusing on a pragmatic or functional viewpoint (Bates, 1976; Bates & MacWhinney, 1982). It has been found that autistic children's communicativeness involves a primary deficit in pragmatics (Baltaxe & Simmons, 1981; Rutter, 1978; Tager-Flusberg, 1981). Specific aspects of pragmatic or functional communication will be examined under two categories. The prelinguistic category will cover prerequisites of communicative intent, imitation skills, aberrant behavior as functional communication, and early skills in social communication. Communicative intent and functions, along with social-interactive communication will be examined in the linguistic category. Literature related to echolalia and speech prosody will also be reviewed. It is important to keep in mind the following two points: (a) No autistic children individually exhibit all of the following deficits, and (b) the

majority of autistic children's communication deficits are multi-dimensional.

Prelinguistic

The functional viewpoint of communication led to an increasing amount of research on prelinguistic issues. This research is valuable not only to younger autistic children, but also to some of those who are mute. Incidences of muteness in the autistic population range from 28 to 61% (Fish, Shapiro, & Campbell, 1966; Lotter, 1967; Wolff & Chess, 1965).

Curcio (1978) studied nonverbal communicative acts of twelve mute autistic children ranging in age from 4 to 12 years. Protodeclarative acts, or those that served as statements, were absent. These children used only protoimperative acts, or those that met their own needs or goals. The manners in which protoimperative acts were communicated varied between the autistic children and included demonstrating eye contact, offering an object to solicit the teacher's help, using the teacher's hand as a tool, and banging the object. Based on her investigation of the relationships between sensorimotor functioning and communicative development, Curcio suggested that imitation skills and the understanding of causality and means-end relationships are prerequisites to intentional communication.

This finding was substantiated by Abrahamsen and Mitchell (1990) in their study of ten autistic children ranging in age from 3 to 7 years. The means-end function was found to be significantly related to both the number and the diversity of pragmatic functions expressed. Pragmatic functions included requesting, getting attention, rejecting, seeking information, commenting, giving information, and participating

in social routines. Also, vocal imitation was significantly related to the number of pragmatic functions expressed. The ability to imitate differentiated the verbal from the nonverbal children. The achievement of communicative intent correlated significantly with performance on the means-end scale, which suggests means-end is one of the prerequisites of intentional communication. Many autistic children lack purpose-oriented, means-end behaviors. Fay and Schuler (1980) discuss behavioral anomalies, such as stereotyped repetitive play, self-stimulatory behaviors, and nonfunctional stereotyped speech, as a reflection of means-end limitations in autistic children.

Imitation plays an invaluable role in the development of communication and social skills. A child must be able to imitate in order to learn words and certain prerequisite social skills (Schopler & Reichler, 1979). Imitating ongoing actions is one of the three major strategies infants use in responding to language (Lord, 1985). Serious deficits in verbal and gestural imitative skills in autistic children have been noted by Curcio (1978), DeMeyer et al. (1972), and Sigman and Ungerer (1981). Stone and Lemanek (1990) also noted these deficits when comparing autistic children, ranging in age from 3 to 6 years, and mentally retarded children. A parent report measure was utilized and resulted in significant differences between the two groups in imitating the movements of another child at play. Carr, Pridal, and Dores (1984) suggested a predictive relationship between vocal imitation skills and receptive language after finding children who imitated sounds were more likely to acquire label recognition skills than children who did not have the ability to imitate. Studies have shown that autistic children have limited motor imitation skills, and those with the most impairment

in this area are the most socially withdrawn (Dawson & Adams, 1984; DeMyer et al., 1972). Failure to develop social imitation skills, as noted in autistic children by Rutter (1978), may be related to their deficits in social communication.

One often overlooked form of communication is behavior problems. Research has shown that both normal (Bruner, 1979) and developmentally delayed children (Carr, 1977; Wolf, Risley, Johnston, Harris, & Allen, 1967) display behavior problems for attention-seeking or avoidance purposes. A pragmatic viewpoint does not look at these behavior problems as problems to be eliminated. Rather, they need to be analyzed as possible communicative functions. Durand and Carr (1985) list the following four basic motivators for aggressive or self-injurious behaviors: social attention, tangible consequences, escape, and sensory consequences. Teaching alternative socially appropriate forms of communication has been shown to be effective in replacing those behavior problems motivated by social attention, tangible consequences, or escape needs (Carr, 1985).

The emphasis on pragmatics has led to an increasing amount of literature dealing with the social aspects of communication and language problems. Impairments in social communication by nonverbal autistic children can range from an overall absence of desire to communicate with others to lacking the ability to use nonspoken means of socialization. Social communication involves giving and receiving social signals, which can be nonverbal and verbal. In normal children social communication begins as early as 2 months of age when conversational give-and-takes first appear through vocalizations, facial expressions, and body movements (Bullowa, 1979; Schaffer, 1974;

Trevarthen, 1974). According to Bruner (1975) this development of reciprocal activity is a prerequisite of intentional communication. Ricks and Wing (1975) state that babies of this age also begin to express feelings by using a variety of intonations in their sounds.

The analysis of twin boys at 16 weeks of age, one of which was diagnosed with autism at 30 months of age, showed differences in their interactions with their mother (Kubicek, 1980). A cyclical patterned interaction occurred between the normal boy and his mother and was characterized by repeated cycles of the mother nodding her head, pausing, and the baby smiling, moving his arms up and out, and then looking away. In comparison, the autistic twin turned away from his mother and cut off the approach with an abrupt arm movement. Another difference noted was that the autistic twin showed only a neutral face, and the normal twin showed smiles, frowns, and a neutral face.

Attwood (1984) compared autistic, normal, and Downs' syndrome subjects and found that the Downs' syndrome children made contact with others to a greater extent and the autistic children to a lesser extent than the normal children. Also, 0% of the gestures produced by the autistic children were expressive, as compared to 50% of the Downs' syndrome children's gestures and 26% of the normal children's gestures. Ricks and Wing (1976) studied spontaneous facial expressions in autistic children and found that they used expressions of pleasure, distress, fear, and anger only in extreme forms.

Linguistic

Communicative intent has been researched by examining spontaneous speech, the initiation of conversations, and speech acts. Shapiro, Chiarandini, and Fish (1974) studied the spontaneous speech of children

with autism and described it as being rigid and contextually inappropriate. Watson (1985) noted deficits in the infrequent number of attempts made by autistic children in initiating contact with others. Speech acts, or intentional communicative behaviors/vocalizations, of autistic children were compared to those of language impaired and normal children by Ball (1978). She found that autistic children used both informing acts (those which direct other's attention to the child or an object as an end in itself) and regulating acts (those which regulate others' behaviors to obtain an environmental end) significantly less frequently and inappropriate utterances significantly more frequently than both the language impaired and normal groups of children. The finding of the limited use of regulating acts in autistic children has been challenged by several researchers examining functional communication (Curcio, 1978; Watson & Lord, 1982; Wetherby & Prutting, 1984); however, further research has supported her conclusion that autistic children functioned at a lower level of pragmatic development.

Functions of autistic children's communication directed toward others have been studied by numerous researchers. Cantwell, Baker, and Rutter (1978) analyzed functional language usage at both individual and group levels of autistic and aphasic children. They found that autistic children used more abnormal and egocentric speech and less socialized speech. Abnormal and egocentric speech included inappropriate echoes, thinking aloud, and metaphorical speech. Socialized speech included spontaneous statements, appropriate echoes, and directions.

Consistent differences between the communicative functions of four

autistic and four normal children were found by Wetherby and Prutting (1984). The children were matched for expressive language stages, which ranged from pre-verbal to three-word combinations. The autistic children demonstrated a more narrow range of functions than the normal children. They showed a high frequency of requesting objects and actions, protesting, and non-communicative vocalizations. The functions of requesting information, acknowledging others, showing off, and commenting were demonstrated by the normal children, but not by the autistic children. Watson and Lord (1982) also found a high frequency of requesting objects and actions, along with requesting permission, in the spontaneous communication samples collected from 11 autistic students. Rarely did these students request attention during these samples.

Similar results were reported by Landry and Loveland (1989), who investigated attention-directing gestures and language in the following three communicative situations: adult-directed, requesting, and spontaneous. Fifteen autistic children, ranging in age from 5 to 13 years, were compared to fourteen developmentally language-delayed children, ages 3 to 10 years, and thirteen normally developing children, ages 2 to 3 years. Attention-directing behaviors were used less frequently by the autistic children, and they differed most from the other two groups in the spontaneous communicative context. Attention-directing behaviors also varied less with the communicative context than that of the other two groups.

Echolalia is one of the characteristics of autism frequently cited. In normal children, it exists from about 9 months of age to 2 or 3 years of age. As the child's language skills increase in

complexity, echolalia decreases in frequency (Menyuk, 1977; Prutting & Connolly, 1976). This decrease in frequency has also been found in autistic children as their language skills become more complex (Howlin, 1982).

The belief that echolalic behaviors serve no significant communicative purposes has been challenged. Echolalia and stereotypical language of autistic children can be analyzed according to communicative intent, comprehension, and structural changes. Since most autistic children seem to be unable to break down components of speech, it is possible that echolalia is an alternative strategy used in an attempt to communicate. Paul (1987) states that some autistic people use echolalia to engage in conversations. The results of two major studies indicated that four of the seven types of immediate echolalia (Prizant & Duchan, 1981) and nine of the twenty categories of delayed echolalia (Prizant & Rydell, 1984) are interactive. Tager-Flusberg (1985) stated, "Echolalia and stereotyped language are now seen as primitive strategies for communicating, especially in the context of poor comprehension" (p. 72).

Another area concerning the pragmatic skills of verbal autistic children is discourse, or how autistic children's communication relates to communication directed towards them. Various social impairments have been noted in autistic children's speech. Tager-Flusberg (1981) observed difficulties in the ability to maintain a topic in a conversation. Baltaxe (1977) analyzed pragmatic impairments in the give-and-take of speaker-listener relationships and in the flow of conversations. Autistic children repeated questions over and over, did not allow for differentiated responses, did not ensure their listener's

attention, and failed to maintain social rapport while speaking. Another deficit area noted was the limited use of the nonverbal accompaniments of speech, such as displays of affect through facial expressions and intonations (Ricks & Wing, 1975) and the understanding and use of gestures (Bartak, Rutter, & Cox, 1975).

Another area of pragmatics in communication skills is prosodic development. Prosody, or the melody of speech, consists of intonation, accent, and rhythmic pattern in language. Acoustically, it is a composite of frequency, amplitude, and duration. Prosody plays an important role in speech production and perception. Autistic children frequently demonstrate deficits in prosodic development, even when speech is significantly improved (DeMyer et al., 1973; Eisenberg & Kanner, 1956; Rutter, 1966; Rutter & Lockyer, 1967). Current research suggests that these deficits are not as globally abnormal in autism as once suspected, but they are more pervasive when compared to aphasic and normal subjects (Baltaxe & Simmons, 1985).

Baltaxe (1981) compared the prosodic production characteristics of autistic and normal children using an imitation task. The normal children synchronized their speech events using a regular rhythm and accenting syllables at equal intervals. The autistic children followed a chain or serial model, where no adjustments in duration were made when connecting words or syllables together. Intonation contours of normal, aphasic, and autistic children were compared in a study by Baltaxe, Simmons, and Zee (1984). Autistic children demonstrated either a highly exaggerated or a narrow fundamental frequency range. In analyzing terminal fall, overall intonation contour, and covariation of frequency and intensity over the entire intonation contour, results

showed variability both between and within subject groups. Both the autistic and aphasic groups demonstrated greater variation than the normal group.

Communication/Language Interventions with Autistic Children

Throughout the research and literature pertaining to autistic children, structured intervention approaches are frequently recommended. A high degree of structure is seen as an essential element in autistic children's treatment plans (Thaut, 1980). Having a planned time-table, succession of activities, and micro-organization within activities are among numerous structural components which are generally accepted as the most useful approaches for working with autistic children. In reviewing the research of educational approaches, Clarizio (1983) found general agreement that autistic children learn best in structured environments, where both the stimuli and the child's responses are determined by the adult.

Current trends in language intervention programs with autistic children are numerous. There has been a change in emphasis from teaching language skills to teaching communication skills due to the importance place on functional communication. This shift focuses on accepting each child's language impairment and working toward his/her optimum potential in communication development (Schopler & Mesibov, 1985).

Most language development interventions fall into one of three major schools of thought: behaviorism, nativism, and constructivism (Snyder & Lindstedt, 1985). Behaviorism stresses the learning environment providing stimuli to elicit responses, the need for generalization, the role of imitation, and the need of reinforcement.

Nativists are concerned with children discovering the rules of a language system. Specific techniques which emerged from nativist language models include expansion (Brown & Bellugi, 1964), or taking the child's responses and adding elements to them for further development; modeling (Leonard, 1981), or observing someone produce the intervention target; and focused stimulation (Leonard, 1981), where language-specific rules are embedded in a story. Constructivists, influenced by the work of Jean Piaget (1963), stress the role of cognition in language development. Materials, activities, and discussions designed to facilitate cognitive development are provided for the children. The assumption is that cognitive development will have a positive effect on a child's language development. All three of these models, both individually and interactively, have been used with autistic children.

Behavioral interventions have demonstrated effectiveness with young autistic children. However, follow-up data have been discouraging. One exception was a two-year study conducted by Lovaas and Smith (1988), who stressed the importance of early intensive intervention. Their study included 38 autistic children under the age of four years. The experimental group consisted of 19 children who received forty hours of one-to-one behavioral treatment per week. The control group consisted of 19 children who received ten hours a week or less of one-to-one treatment. Results indicated that out of the 19 children in the experimental group, 9 of them achieved a normal IQ and were able to enter first grade, and 8 of them achieved an IQ within the mildly retarded to low normal range and entered into first grade in aphasia classes. Overall, the experimental group achieved

significantly higher IQ scores and had significantly higher educational placements than the control group. Follow-up data on these children was encouraging. Gains were maintained, and none of the 9 experimental group children who achieved a normal IQ were classified as autistic in adolescence. They scored in the normal range on all assessments utilized.

Division TEACCH is the North Carolina state program for autistic children which consists of thorough diagnostic evaluation, planned collaboration between the home and school, consultants who work with teachers, and attention to the child's developmental level (Watson, 1985). The communication curriculum stresses the autistic student's ability to communicate as opposed to his/her ability to learn language skills. The criterion for success is the spontaneous use of newly developed communication skills.

In their functionalist approach to intervention procedures, Prizant and Schuler (1987) and Schuler and Prizant (1987) suggest responding to the child's intentions, offering more appropriate means for expression, and creating contexts which encourage increased amounts of expression and an increased variety of intents. Rogers and Lewis (1989) noted significant treatment effects in autistic children who received a pragmatics-based language therapy model along with other intervention strategies for a period of six months. In this language therapy model, teachers were taught to interpret all potentially communicative verbal and nonverbal behaviors and to respond at corresponding levels. Significant improvements were noted in language skills and in social/communicative play, and a reduction of autistic symptoms occurred.

Functional consequences, or those that are logically related to certain actions, have been stressed in intervention programs for children diagnosed with autism. Koegel and Williams (1980) conducted a study in which autistic children learned communicative acts faster when they led to functional as opposed to indirect consequences.

Fay and Schuler (1980) suggest teaching verbal imitation skills along with communicative intent and linking speech to rhythmic activities, which may improve overall intelligibility and intonational quality of speech. In choosing alternative systems of communication, they state, "It may, for instance, be found that a particular system allows a child to respond errorlessly, which may reduce the likelihood of off-task behaviors and thereby reduce the occurrence of behavioral problems" (p. 180). Another advocate of teaching alternative modes of communication is Wetherby (1984). She suggests using gestural modes of communication with severely autistic people since this technique uses and enhances their existing strengths. The use of communicative gestures is seen as a foundation upon which further skills can be built. Nonspeech modes are also described as quicker and easier means of communication for children who do not have speech or have limited speech skills (Schuler & Baldwin, 1981).

The most recent intervention technique for people with autism is facilitated communication, a method developed by Rosemary Crossley (Biklen, 1990). This method is based upon a praxis theory, which presumes that autistic people have a neurologically based deficit, not in comprehension, but in expression. In her own autobiography, Emergence Labeled Autistic (Grandin & Scariano, 1986), Temple Grandin, a person with autism, describes her previous communication problems as

a 'one-way street'. She was able to comprehend what was being said, but she was unable to respond other than by screaming and flapping her hands. Facilitated communication utilizes an electronic typing device and allows for education through dialogue and personal expression. Respect for the students is highly emphasized, and many of the outlined procedures are concerned with the teachers' attitudes and beliefs. Due to the need for physical support, the inconsistency of results from one situation to another, and the challenge this presents upon the widely held assumptions about capabilities of autistic people, much controversy has been raised. Only one research study on facilitated communication, conducted by the Intellectual Disability Review Panel (1989) in Melbourne, Australia, has been published to date. This study produced support both for people who claimed facilitated communication was valid and for those who doubted its validity.

Intervention programs have demonstrated success in autistic children's socialization and communication achievements. However, treatment appears to have only a modest effect on long-term language adjustment.

Music Therapy and Autism

Musical Responsiveness and Abilities of Autistic Children

Many reports from clinical observations and experiments with autistic children emphasize their special responsiveness toward and unusual interest in musical stimuli. Various authors have noted musical talents in autistic people, including Rimland (1964) who concluded that interest in music and musical ability are almost universal in autistic children.

DeMyer (1979) interviewed parents of autistic children and found

that music elicited some interest and response in 90% of these children, which he noted as being remarkable due to their general lack of positive response to the environment. Sherwin (1953) found that autistic children tend to show a special ability for and preoccupation with music. Three autistic children were studied and demonstrated the following common musical responses: an interest in singing and listening to music, the ability to remember melodies, the ability to identify known melodies, a preference for familiar songs, and a preference for rhythmic pieces. Sherwin suggests that music may be a vehicle for communication for autistic children since it does not require the use of speech. Oppenheim (1974) states that not only do most autistic children enjoy music, but many of them also are able to accurately sing alone at an early age and have a good sense of rhythm.

Applebaum, Egel, Koegel, and Imkoff (1979) conducted an experiment in which autistic children performed as well as or better than age-matched normal children in the ability to imitate individual tones and series of tones delivered by voice, piano, and synthesizer. Thaut (1980) found that improvised tetrachordic tone sequences of autistic children in his study approached those of normal children and received significantly higher scores than mentally impaired children when analyzed according to complexity, originality, rhythm, rule adherence, and restriction. Applebaum et al. (1979) reported that autistic children are better able to imitate a pitch than to improvise.

Studies have produced various results in determining auditory versus visual modality preferences in autistic children. One study conducted by Hermelin and O'Connor (1970) indicated visual stimuli preferences. Kolko, Anderson, and Campbell (1980) state that autistic

children's preference is auditory when the auditory stimulus is musical as opposed to a pure tone or white noise. Thaut (1980) found similar results, reporting that autistic children preferred musical stimulus conditions over other auditory and visual conditions. He also noted that the autistic children listened to the preferred musical stimulus significantly longer than the normal children in the control groups. Akogiounoglou (1990) studied the ability of autistic children to orient themselves and respond overtly to various familiar and novel auditory stimuli and found a slight preference toward the musical excerpts as compared to the environmental and vocal sounds.

Although several authors have found that many autistic children have strong positive responses to certain types of musical stimuli, others have also noted the individual differences that exist. Some children respond negatively and others positively to the same musical stimuli (Alvin & Warwick, 1992; Nordoff & Robbins, 1971).

Nordoff and Robbins (1971) analyzed the rhythmic responses of 145 developmentally disabled children. They found that separate categories of activity and sensitivity began to emerge from the children's responses and defined 13 categories of response. One of these categories, compulsive beating, was almost always associated with autistic children. Usually, this response was totally unrelated to the environment and appeared meaningless. Most children tended to beat a fixed regular tempo without any variations in accents or dynamics. Sometimes, they seemed to be aware of the ongoing musical improvisation, but were not able or willing to relate their beating to that of the music. Toigo (1992) states that a connection can frequently be made between the child's rhythmic responses and his/her

relationship with the environment. For example, one's inability to match the tempo of an ongoing improvisation can mirror his/her inability to meaningfully communicate within his/her environment.

Structured Music Therapy Techniques and Autism

The literature regarding the therapeutic uses of music with autistic children yields studies supporting its value in many different areas. Stevens and Clark (1969) found that music therapy techniques can be significantly effective in improving some prosocial behaviors of 5- to 7-year-old autistic children. Prosocial behaviors were defined as those which are adaptive, adjustive, and socially acceptable. Action songs, rhythmic imitation activities, a chord organ, and an autoharp were utilized in eighteen music therapy sessions. Other noted changes included improved bodily image and coordination. Positive attributes of music therapy in the treatment of autism were found by Mahlberg (1973) in four areas: increase attention span, developed nonverbal communication techniques, reduced autistic behaviors, and increased self-expression.

Goldstein (1964) reported on an 8-year-old autistic girl who received music and creative arts therapy for a period of six months. Specific techniques used included vocal exercises designed to aid in verbalizing aggressions, singing activities for the purpose of increasing her vocabulary, action songs emphasizing body awareness, and movement to music improvisations designed to aid in rhythm and coordination. Psychological testing prior to and after the music therapy sessions indicated a 10-month improvement in mental age, increased ability to concentrate, and an increased attention span. Other improvements noted by the author included progress in

interpersonal relationships, decreased frequency of tantrums, and an increased verbal expression with a decreased physical expression of frustration.

Music therapy sessions were used as reinforcement for autistic students' frequency of spontaneous speech by Watson (1979). Tokens were given to students in one group who could exchange them for music therapy sessions, and in the other group, tokens alone were used for reinforcement. Both groups exhibited an increase in spontaneous speech; however, the music therapy reward produced a greater frequency of spontaneous speech responses.

Saperston (1982) worked with a thirteen-year-old autistic boy for 24 months on the long-term goal of imitating vocalizations. At first, rapport was established with the boy by engaging him in a musical interaction with the therapist. This music interactional activity was then used as reinforcement for in-seat behavior, which further lead to the use of a body-image song and a hand-clapping activity in order to get the child to respond to auditory and visual cues. Vocal imitation activities were then added, which consisted of the therapist singing a short melody comprised only of the vocalization to be imitated and presenting the vocalization in isolation. Progress was noted in learning to respond appropriately to specific cues, imitating vocalizations, increasing attention span, enjoying physical contact, approaching others, and decreasing stereotypical and self-abusive behaviors.

Farmer (1963) reported on the use of songs, dances, and musical games with autistic girls ranging in age from 6 to 8 years. Attention spans were increased, physical contact was increasingly tolerated, and

responsibility and group awareness were developed. In 1966, North described music therapy activities which can build self-esteem, increase interpersonal relationships, and increase appropriate verbal interactions in autistic children.

Euper (1968) found the use of rhythm band activities effective in helping a 6-year-old autistic boy to purposefully relate to his environment. Difficulty was noted in the child's ability to synchronize his own rhythmic activities to the rhythm of the music. He eventually was able to alter his tempo in the same direction as the changes in the music and increase his rhythmicity.

Cecchi (1990) presented a case study on a 28-month-old girl who developed an autistic syndrome as a result of the violent abduction of her parents. During her sixteenth session, the girl uttered her first sound, a musical tone. The tone was imitated by the therapist, and gradually, the child began using this tone as a means of communication. As the sessions progressed, soft melodies without and with lyrics and new songs were introduced. Progress was first noted in the child's communication and production of new spontaneous sounds. Over a four-year period, she was able to use songs to reconstruct her history, express her confusion and her feelings, and finally, accept the death of her parents.

The use of a simultaneous communication method with a 3-year-old nonverbal autistic boy was unsuccessful until an adaptation of melodic intonation therapy was introduced (Miller & Toca, 1979). This adaptation consisted of signing plus an intoned rather than a spoken verbal stimulus. The boy began responding first by signing and later by singing his responses. Trained, imitative, and spontaneous intoned

verbalizations resulted and generalized to a variety of settings.

Hairston (1990) compared mentally retarded autistic and mentally retarded nonautistic children's responses to music and art therapy and found no significant differences between the two groups in developmental gains. Significant increases in acceptance of physical contact, time spent observing the teacher, and time spent in appropriate play were made by the nonautistic students, but not by the autistic students. The only specific music therapy activity reported in the study was an introductory chant. Other music therapy activities, unspecified by the authors, were used to stimulate nonmusical communicative responses. Some verbal approximations did appear in the autistic children; however, they were not consistent.

Burleson, Center, and Reeves (1989) reported that background music reduced off-task responses and increased task accuracy in four psychotic children, including both diagnoses of autism and schizophrenia.

Improvisational Music Therapy and Autism

Improvised music has been found to be effective when working with autistic children. Nordoff and Robbins (1964) noted several benefits of the use of improvisation. Vocal and instrumental improvisation aided in establishing communication, eliciting speech, improving interpersonal relationships, and decreasing pathological behaviors. In another report, Nordoff and Robbins (1968a) used improvised music to inspire and accompany various responses of clients. These responses were then sustained in order to give clients the opportunities to experience a shared musical activity. Working with a 6-year-old autistic girl, they used improvised music to improve her vocabulary.

The music used in the improvisations consisted of various tempi and dynamics. Songs were improvised for the girl, who eventually began expressing herself through these songs. Her vocabulary increased, and she began to spontaneously use personal pronouns while singing. Other progress was noted in her behavior and in her responsiveness at home.

Observations made by Nordoff and Robbins (1971) after continuing this technique with numerous autistic children illustrate and corroborate the many values of improvisational music therapy. Some of their conclusions are as follows: (a) Communication begins with some autistic children by musically matching their apparent behavioral and emotional levels, (b) musical communication by-passes children's speech and language barriers, (c) music can be used to relax autistic children in order to allow for controlled and ordered responses, (d) musical improvisations which create an emotional environment can stimulate responses from a child, and (e) music as a nonverbal means of communication allows for a vast range of expression. Nordoff and Robbins report on their success in using various improvisational music therapy techniques to lead children away from the restricted categories of responses and into freer, more communicative categories.

In establishing a therapist-client relationship with a 5-year-old boy who exhibited autistic features, Nordoff and Robbins (1977) utilized improvisational techniques through both drum/cymbal-piano and vocal interaction activities. Improvisations were used to accomplish the following: match the boy's emotional intensity while accepting his expressions, accompany the boy's movements and sounds to gain an initial contact, reach and activate the child, develop and sustain his communicative vocal responses, musically organize his vocalizations,

lead into intercommunicative singing, and actively involve him in instrumental activities. Progress was noted in several areas, including an increase in his vocabulary, development of spontaneous and communicative speech, development of conversational jargon, acceptance of learning situations, increased interaction with other children, and acceptance of change and novel situations.

Saperston (1973) used improvised music to establish communication with an autistic child who had not previously appeared to experience any type of communication. His technique consisted of the improvisation of a specific motif to match each of the child's basic movements. The child eventually learned that he was able to control the therapist's responses and that by communicating, he could influence his own environment. Saperston noted improvements in the child's relationships with others, communicativeness towards him, increased frequency of vocalizations, and increased eye contact.

Alvin and Warwick (1992) reported on a research project which consisted of approximately 20 music therapy sessions for each of 10 autistic children and their mothers. Out of the 20 sessions, 10 of them were one-on-one with the child, and the other 10 involved the therapist, the child, and his/her mother. The project was designed to investigate whether music therapy would show positive effects in autistic children, whether the effects would generalize, whether the mothers' involvement would help the generalization, and whether communication would develop between the mother and child. Results of this project are still under analysis; however, Alvin and Warwick reported on two case studies taken from the project.

In the first case study, improvisation was utilized to facilitate

interaction between the child, her mother, and the therapist and to provide for appropriate expression of anger and frustrations by both the child and her mother. Progress was noted in the child's learning to share musical experiences with her mother, becoming more aware of her feelings, and learning appropriate ways to express these feelings. Communication and understanding was developed between the child and her mother, and a stronger relationship between the two developed.

In the second case study, improvisation between the child and therapist helped develop a relationship of trust and enjoyment. The improvisation continued to be unintrusive and nondirective when the mother joined the sessions. Musical communication developed between the mother and the child, and interactive music activities gradually succeeded. The mother reported that her son had developed awareness of others, awareness of his environment, and an affectionate relationship with her.

Hollander and Juhrs (1974) used Orff-Schulwerk activities to help severely autistic children, ranging in age from 4 to 16 years, invest in a meaningful group experience. Activities were designed to develop body awareness, laterality, gross and fine motor skills, spatial relationships, and receptive language. Improvements were noted in all of these areas. Rondo arrangements were used to allow for both repetition and innovation. Other Orff activities provided opportunities for the children to initiate and become involved in reciprocity and interchange.

Several authors have recommended improvisational music therapy approaches for autistic children. Bruscia (1987) reported on one approach, Developmental Therapeutic Process, which was developed by

Barbara Grinnell and consists of a combination of music therapy, play therapy, and verbal psychotherapy. The music therapy is used to establish nonverbal contact and communication with the child during the initial stages of therapy. In these stages, the therapist improvises songs at the piano which reflect the child's feelings and/or evoke responses from the child. The child either listens or plays a percussion instrument along with the therapist.

Integrative Improvisational Therapy was originally designed by Peter Simpkins for use with atypical children, including those with autism (cited in Bruscia, 1987). Piano and voice improvisations are used by the therapist to encourage verbal and musical interactions. The child is encouraged to play percussion instruments, vocalize, sing, and/or verbalize. Improvisation is used to reflect what the child discloses through his/her movements and musical responses, to engage the child in a purposeful response/expression, and to contain, clarify, and confront emotional and interpersonal struggles. Emphasis is placed on eliciting a transference reaction within the improvisation in order for the child to reveal and resolve his/her conflicts.

Nordoff and Robbins' (1977) Creative Music Therapy approach allows for nonverbal communication, in which music is used to enter gently into the child's world before placing demands on the child to enter into the therapist's world. Temple Grandin (Grandin & Scariano, 1986) recommended joining in autistic children's stereotypical behaviors and then broadening them into an activity. This approach has been used with success by Toigo (1992). Grandin also discusses the importance of conveying acceptance and understanding to autistic people, which is another aspect of Creative Music Therapy. In matching the child

through the music, the child is given control over his/her environment.

Saperston (1979) developed a hierarchy for music therapists to establish communication with low-functioning autistic children. The three phases which constitute Saperston's approach are entering reality at the child's level, sharing reality at the child's level, and manipulating reality at the child's level. Benenzon (1976) suggests a four-stage music therapy technique for establishing communication with autistic children. This technique consists of finding sounds to which the child will respond, using instruments to reproduce the sound or some parameter of the sound, using instruments to establish direct contact with the child, and imitating the child's responses. This technique is used by both the music therapist and the families of the autistic children.

Nelson, Anderson, and Gonzales (1984) discuss methods of synthesizing music activities in accordance with specific areas of deficits in autistic children. Some of their suggestions include balancing repetition and variation since many autistic children exhibit insistence on environmental sameness, making a conscious effort to synchronize one's own body and speech rhythm to that of the child's in order to help with autistic children's problems in temporal perception, structuring activities to ensure a high rate of success, and showing the child that he/she can have predictable control over his/her own environment. In their discussion of indirect and direct strategies, they state "...an overly directive strategy could result in mere compliance on the child's part (e.g., the imitation of vocal or instrumental music) rather than in creative exploration (e.g., improvisation)" (p. 104). Thaut (1984) suggests a variety of both

improvisational and structured techniques in evoking and developing autistic children's communication skills, along with numerous other skills. Some of the communication/language activities include improvising musical accompaniments of the child's expressions, combining words or phrases with a rhythmic or melodic pattern and a body movement, using verbal instructions that consist of strong melodic/rhythmic patterns, using imitation techniques, melodically shaping vocal expressions, and learning to play wind instruments.

Improvised music therapy techniques have been widely utilized as part of the overall treatment provided for autistic children. The immediate acceptance of and respect for a child can be directly conveyed to that child through the music. The unlimited number of idioms and styles utilized, along with the numerous variations of each of the components within the musical elements, allow for individualized support, reflection, stimulation, activation, control, organization, relaxation, continuation, interruption, predictability, exaggeration, interjection, and expression. In working to develop communication skills, these techniques can be nonthreatening and success-oriented. The suprasegmentals, or the basic preverbal fundamentals of human communication, which include timing, phrasing, rhythm, pitch, and timbre, are all parts of music. Communication, in both musical and non-musical forms, involves the ability to listen and to respond appropriately to sound.

Meaningful communication and communicative intent are considered of primary importance in language programs for autistic children. Consequences of communicating musically can be both meaningful and immediately reinforcing. Children are exposed to continuous cause-and-

effect relationships in music experiences which may give them a sense of control over their environments and may provide a framework for spontaneous and intimate nonverbal interactions. Musical improvisation allows for creativity, initiative, decision making, frustration tolerance, and emotional release. Improvisational music therapy may be one intervention in which autistic children can not only learn how to communicate, but can also experience the joy of communication.

CHAPTER III

METHOD

The purpose of this study was to evaluate the effects of improvisational music therapy on the communicative behaviors of autistic impaired children.

Subjects

Twelve autistic impaired students were selected for this study. Selection was made by contacting school districts in Ingham and Eaton counties and the Lansing Society for Autistic Citizens. The parents of the students who fit the category specified for research were willing to allow their children to participate in the study. Out of the total fifteen students found, three had no facility available to them for the music therapy sessions. One of the subjects initially demonstrated the musical and nonmusical abilities beyond the scope of the measurement device utilized. Consequently, eleven was the total number of participants in the study.

All of the subjects were diagnosed "autistic impaired" according to the provisions set forth in the Michigan State Board of Education's Revised Administrative Rules for Special Education (1992) and ranged from severely to mildly impaired. There were ten males and one female, and they ranged in age from six to nine years. Nine of the subjects were Caucasian, two were Hispanic, and one was African-American.

Deficits in communication skills were common to all of the subjects. Three of the subjects were nonverbal, and three had very minimal speech. Five of the subjects were verbal, three of whom

demonstrated limited spontaneous speech. Language ages, measured by standardized tests and/or observation and reported by speech therapists and/or teachers, ranged from "no formal means of intentional communication" to five years. IQ scores were not available for all of the subjects. Additionally, the reliability of the IQ scores that were reported was stated as low due to the children's apparent inability to convey their intellectual capacity.

Six of the eleven subjects were integrated into regular education classes, ranging from 1 to 30 hours each week. Speech therapy was provided for all of the subjects, and seven subjects also received occupational therapy services. The amount of music education opportunities for these children varied from very rarely (once a year) to twice a week.

Consent and Approval

Following approval by the thesis committee, approval to implement the research study was secured from the Michigan State University Committee on Research Involving Human Subjects (Appendix A). The academic research proposal was then sent to the Office of Research and Evaluation of Lansing Public Schools and the Director of Special Education of Charlotte Public Schools. The proposal was approved by both of the school districts, and the experimenter was notified of these decisions through a formal interview and by mail (Appendix A).

Once approval was granted to begin research, the subjects were selected, and the procedure to gather informed consent from the subjects' parents was implemented. Two forms, Description and Purpose of Study and Consent for Participation in Improvisational Music Therapy Study (Appendix B), were distributed to the subjects' parents. All of

the parents agreed to have their children participate.

Materials

The following musical materials were utilized in the treatment procedure: a piano, a snare drum with the snare removed, and a 16-inch cymbal. The snare drum and the cymbal were mounted on adjustable stands. The height and tilt of the snare drum and of the cymbal were adapted for each child to allow for successful attempts at beating. A chair was available for the subjects, and the therapist was seated on a piano bench. The instruments and the chair were positioned near the treble end of the piano next to the piano bench. A variety of beaters were also available, including regular medium-weight drumsticks, both heavy and light tympani mallets, and one pair of brushes.

A videocamera was also in the room. Other equipment in the room was moved away from the piano area to avoid distracting the child. Also, any of the instruments/beaters that interfered with the child's ability to listen and/or participate were removed from the room for that child's future sessions.

The study was conducted at three different settings: two elementary schools and the music therapy clinic at Michigan State University. Two of the rooms in which the experiment took place were similar in size and content. The other room was a music education room and was larger in size and contained a large variety of musical materials/instruments. An area within this room which resembled the other two rooms was set up for the experiment. The experimenter and each child were alone in the room with the exception of a few unanticipated interruptions.

Experimental Design

A reversal design was utilized and consisted of the following phases: (a) the intervention was implemented, (b) a one-session withdrawal of intervention was applied after a level of consistency in responses was achieved, and (c) the intervention was then reintroduced for the remaining sessions. Data analysis consisted of graphic analysis and nonparametric statistical techniques.

Measurement

The dependent variable in this study was communicative behaviors. Through consultations with speech therapists and through researching literature, a standardized test which evaluates musical and nonmusical communicative behaviors for autistic children was not found. Nonmusical communicative responses of autistic children are evaluated utilizing a large variety of standardized tests. Nordoff and Robbins (1977) developed a musical communicativeness scale in which reliability was established. However, this reliability was established using music therapists who were specifically trained in the Creative Music Therapy technique (C. Robbins, personal communication, May 26, 1992). Therefore, an original checklist, Checklist of Communicative Responses/Acts Score Sheet (CRASS, Appendix C), was constructed by the experimenter. The Communicative Responses/Acts Definitions form (Appendix C) operationally defined the behaviors listed on the score sheet. The CRASS was based on items from numerous rating scales and assessments for musical communicativeness, autism, and communication skills (Brigance, 1978; Bzoch & League, 197Ø; Krug, Arick, & Almond, 1979; Nordoff & Robbins, 1977; Ruttenberg, Dratmann, Fraknoi, & Wemar, 1966; Stillman, 1978; Uzgiris & Hunt, 1975; Wetherby & Prutting, 1984).

The CRASS was divided into two categories: musical and nonmusical. Communicative Responses were defined as verbal, vocal, gestural, or instrumental behaviors demonstrated by the child which are influenced by the experimenter's improvisation. Verbal, vocal, or instrumental behaviors initiated by the child in an attempt to influence the experimenter's improvisation/behaviors or for the purpose of independent expression were categorized as Communicative Acts. Behaviors which served as prerequisite skills necessary for musical communication were also categorized as Communicative Acts, e.g., beats within a tempo range, vocalizes, etc.

Within the musical category, operationally defined Communicative Responses and Acts were listed under four subcategories: tempo, rhythm, structure/form, and pitch. In the section titled nonmusical, operationally defined behaviors were categorized according to speech production skills, communicative-interactive skills, and communicative intent skills.

The CRASS contained a total of 107 items. There were 91 items under the musical category and 16 items under the nonmusical category. Sixty-nine items were categorized as Communicative Responses, and thirty-eight items were categorized as Communicative Acts.

Time interval sampling was used, with one 10-minute interval randomly selected prior to each 30-minute session. The sessions were videotaped for data collecting purposes. During the one 10-minute interval, two observers independently recorded the communicative behaviors of each child using the CRASS. The observers were senior undergraduate music therapy students. A check was given for each of the behaviors that was observed. A maximum of one check was recorded

for each behavior, even if that particular behavior was repeated. All of the checks were then totalled, resulting in one total Communicative Responses/Acts score per subject per session. The second observer served to check reliability throughout the study. During the first week of sessions, reliability checks were completed on all 11 subjects. After the first week, these checks were made on a range of two to five subjects per week. The subjects who were checked were alternated in order to allow a minimum of three reliability checks per subject during the 10-week period.

Interobserver agreement was calculated for both occurrences and nonoccurrences using the following formula: agreements divided by the sum of agreements and disagreements. Interobserver reliability for occurrences ranged from 75% to 100%, with a mean of 86.2%. For nonoccurrences, interobserver agreement ranged from 77% to 100%, with a mean of 94.8%.

The observers also subjectively rated both the quantity and the creative quality of the overall level of musical communicativeness for each of the 10-minute intervals. A scale of 1 (indicating a low level) to 7 (indicating a high level) was utilized for both quantity and creativeness. The observers circled the number that best described the overall level of musical communicativeness demonstrated by the subject.

Behavior Change Surveys (Appendix C) were given to parents, teachers, and speech therapists for each subject immediately following the conclusion of the study. This survey utilized a 7-point rating scale to indicate the number of changes seen in the subject's communicative, social/emotional, and musical behaviors. The numbers, in sequence from 1 to 7, represented the following descriptions: much

less, somewhat less, slightly less, same, slightly more, somewhat more, and much more.

Independent Variable

Improvisational music therapy, based on Nordoff and Robbins' (1977) Creative Music Therapy approach, was the independent variable used in this study. It consisted of improvised music with the experimenter creating music to establish contact with the child, to enable the child to respond, and to facilitate development of the child's musical communicativeness. The experimenter played the piano and/or sang, and each child had opportunities to play instruments and to sing. There were two basic principles which were followed with all of the subjects. Each child was treated as competent, and it was assumed that he/she understood all that was said and was capable of musically expressing him/herself. Also, total emotional support was provided for each subject, with the experimenter remaining as responsive as possible to each child and conveying acceptance of him/her.

A hierarchy of musical experiences/activities was provided as a guiding reference for ongoing decisions made by the experimenter throughout the intervention sessions. Specific techniques used were decided in the course of the music therapy sessions, dependent upon the child's responses, capacities, and needs. The large number of techniques described below were available to the experimenter in order to allow for flexibility within each session in creating an atmosphere for the child in which optimal growth and development could occur. The experimenter worked freely within the hierarchy of musical experiences/activities listed below. Many of these techniques were

taken from the book entitled Creative Music Therapy by Nordoff and Robbins (1977).

Hierarchy of Musical Experiences/Activities

Create a Musical Environment at the Child's Current Affective and Behavioral Level of Overall Functioning

The goals for these experiences were to get the child to react to the improvisations and to establish initial contact with the child. This phase was based on the iso-principle, meeting the child at his/her own behavioral and emotional levels. The following techniques were used during this phase:

1. Observe the child's attitudes, moods, and feelings, and reflect them in the improvisation.

2. Pair musical motifs to selected responses, and repeat them every time the child emits those responses.

3. Imitate the child's responses/behaviors successively.

4. Synchronize through simultaneous imitation of the child's responses/behaviors.

5. Use the child's requested musical activities and/or songs.

Create a Mood through the Improvisation that might Facilitate the Child's Response

The goal of these experiences was to get the child to begin to feel comfortable in the musical setting in order for future responsiveness to occur. The child demonstrated this by calming down, beginning to show brief responses, becoming more active, approaching the instruments and/or the experimenter, changing the nature of his/her crying or vocalizations to show a musical influence, and/or verbalizing his/her own needs. In this phase, the child's reality was manipulated.

One or more of the following techniques were utilized to help the child reach his/her goal:

1. Improvise calm subtle music for a hyperactive or anxious child.

2. Improvise stimulating rhythmic music for a passive, listless, or obstinate child.

3. Improvise supporting expressive music for an evasive, scared, nervous, or delicate child.

4. Sing "hello", the child's name, about the child's actions, about the child's appearance, and/or improvise vocally with the opening music.

5. Match the child's habitual sounds, crying, or vocalizations in the improvisation.

6. Continue to use requested musical materials, and gradually begin improvising on them.

7. Contact the child in a nondirective manner by giving the child control over aspects of the improvisation.

8. Exaggerate distinct characteristics of the child's responses and/or behaviors.

Lead into Singing Experiences

For some children, the music first began to influence their habitual sounds, vocalizations, and singing behaviors. For these children, the next step was to evoke musical sounds and/or to lead them into singing experiences. The goals of this phase were to evoke musical sounds, to provide structure within the child's singing, to develop musical communicativeness, to increase vocal responses, and to develop thematic material within the child's singing. Specific techniques for these goals are listed below.

1. Evoke musical sounds:

a. Play and sing an improvised motif or phrase, and repeat it several times, making spaces within the improvisation for the child to interject.

b. Use stimulating musical techniques in the improvisation, such as crescendos, accelerandos, harmonic tensions, parallel motion, expressive vocal phrases, rising pitches, and dramatic rhythmic and tempo changes.

c. Improvise using the "children's tune", which is the commonly recognized melodic configuration consisting of the following intervals: a descending minor third, an ascending perfect fourth, a descending major second, and a descending minor third.

d. Improvise using the pentatonic scale and harmonization, Mid-Eastern scale and harmonization, and/or organum chord forms.

e. Use the child's spoken words to create a song. Repeat this song, pausing before one or more of the child's words, and encourage the child to sing/say these words within the structure of the song.

f. If the child verbally expresses a request or a protest, improvise, singing about his/her statement.

g. Use a high vocal range to stimulate and a low range to support.

h. Work with instrumental activities.

i. Make parts of the improvisation contingent upon the child's vocal behaviors.

j. Vocally improvise while clapping the child's hands to the melodic or basic beat.

2. Provide structure within the child's singing:

a. Introduce clear motifs matching the child's mood, rhythm, inflection, approximate pitch range, tempo, and dynamics.

b. Sing along with the child using free improvisation.

c. Vary the vocal improvisation in the attempt to try to develop a musical question and answer form.

d. Provide a basic beat using harmonies/chords which contain the tones that the child is singing.

e. Sing back to the child any words he/she speaks or sings, placing these words within a rhythmic and/or melodic structure.

f. Begin working on vocal melodic and rhythmic give-and-takes.

3. Increase vocal responsiveness - help the child to increase his/her confidence, to expand his/her duration and frequency of responses, to extend his/her vocal range, and to develop his/her ability to place tones:

a. If the child sings a word repeatedly, add a related word or phrase to it.

b. Use inverted chords containing the tone or tones the child is singing.

c. Repeat the chords or chord progressions.

d. Once a technique begins to stimulate vocal responses, adapt it to support the child, fitting it to the child's rhythm, tempo, and mood.

e. Create a game-like activity out of the behavioral/vocal responses of the child, e.g., singing "Where is ____?" when the child hides behind the piano.

f. Improvise on songs suggested by the child, making them more significant to that particular child.

g. If a child sings a complete song, continue working on the song and begin to introduce some changes, e.g., modulations, specific pitches, tempi, dynamics, words, etc.

4. Develop thematic material from the child's responses:

a. Improvise a short song, phrase, or motif with simple forms and expressive melodies, based on the child's vocal capabilities. Repeat it, encouraging the child to sing along. Place the important tones of the melody on the child's comfortable tones.

b. Extend and/or transpose the song or song phrase.

c. Use upbeat songs with numerous repetitions of a rhythmic motif or phrase.

d. Work with instrumental activities. Have the child beat and/or chant/sing melodic rhythms to help define structure.

e. Use large exaggerated physical arm movements in instrumental activities, having the child play in the tempo of the song or phrase.

f. Any songs or song material must directly relate to that individual child so that it holds a special meaning to the child. Use a variety of the child's responses in improvising songs.

Lead into Instrumental Activity

In this phase, the purpose of the improvisation was to bring the child into a responsive position by creating a musical environment that may activate him/her. The goal in this phase was to get the child actively involved in instrumental improvisation. The following techniques were available for the experimenter's use during this phase:

1. Accompany the child's movements, and respond musically to any significant vocal, verbal, or behavioral response.

2. Be open and free in the improvisations, allowing for any

spontaneous adaptations to meet the child.

3. Use active silences, making spaces for the child to respond or to make decisions, to signal for the music to continue, and/or to realize a relationship exists between his/her instrumental responses and the improvisation.

4. Make music contingent upon the child's instrumental responses.

5. Create a transitional activity-experience, which may be a new song or a playful activity, to help create a relationship with the child and to help lead to instrumental responsiveness.

6. Intervene, interrupting or redirecting any habitual or obsessional tendencies that may block the child's communicative responsiveness.

7. Play the child's instrument.

8. Physically guide the child in playing his/her instrument, using the amount of guidance appropriate for that individual.

9. Use verbal prompts, both speaking and singing them.

1Ø. Repeatedly exchange the beaters the child is holding.

Lead into the Basic Beat

"The basic beat is the foundation of musical-rhythmic order, the underlying time base of coherent musical activity and experience" (Nordoff & Robbins, 1977, p.134). The goals of this phase were for the child to play and experience the basic beat and to develop rhythmic continuity. The experimenter chose those techniques from the list below that were appropriate for each child, which was determined by the frequency and duration of the child's beating responses and the type of basic beating the child demonstrated.

1. Allow the child to begin beating and improvise music

specifically suited to his/her beating.

2. Rhythmically imitate and/or synchronize with the child's beating using the same tempo, accents, and dynamics and matching the character of his/her beating.

3. Interject occasional brief stimulating ideas.

4. Sing freely to the child's beating, using rhythmic emphasis.

5. Use a variety of musical styles and idioms.

6. Create a harmonic or melodic idea to give tonal stability to the improvisation.

7. Develop a series of musical question and answer phrases.

8. Extend the child's response, supplementing it with one or more measures.

9. Repeat any part(s) of the improvisation to which the child responds rhythmically.

10. Follow any changes the child makes in his/her beating.

11. Incorporate, using any of the child's rhythmic motifs as a theme for the improvisation.

12. Use contrasting registers of the piano to stimulate responses from the child.

13. If a child's beating becomes overwhelming, play a contrasting mood, dynamic, and/or tempo. If this does not have an effect on his/her beating, stop the improvisation until the child changes his/her pattern of beating.

14. Use any of the following specific rhythmic techniques:

a. Use repetitions of rhythmic phrases in the improvisation.

b. When the child pauses, continue repeating the phrase or parts of it, pause with him/her while holding the last chord played,

and/or emphasize the interruption by repeating the last chord played or by playing a different chord and/or phrase.

c. Improvise phrases utilizing basic beats and a regularly recurring rest on the last beat of each measure.

d. Rhythmically ground by playing the basic beat or a rhythmic ostinato based on the child's improvisation.

e. Experiment with a variety of time signatures.

f. Introduce syncopations, rhythmic irregularities, and unpredictable changes when trying to interrupt a child's fixed repetitive beating.

g. Differentiate, improvising simultaneous music that is independent yet compatible with the child's music.

15. Use any of the following specific harmonic techniques:

a. Experiment with the different qualities of harmonic intervals and of chords.

b. Use dissonant intervals and chords to stimulate the child.

c. Use intervals and chords in parallel motion to increase or lessen the emotional drive.

d. Avoid the use of cadences when needing to keep the improvisation continuous.

e. Use authentic cadences to emphasize the basic beat.

f. If the child is playing the piano, create progressions using a large variety of chords which contain the note he/she is playing.

g. Connect the child's beating responses by creating a harmonic progression, playing one chord on each beat.

16. Use any of the following specific melodic techniques:

a. Improvise a melody in which each tone falls on a beat, and

play this melody alone (without an accompaniment).

b. Experiment with both similar and contrasting tonal movement while improvising question and answer phrases.

c. Relate the child's beating to a melody by playing and singing the melody.

d. When singing words, place the child's beats on the stressed syllables.

e. Develop short phrases or motifs to the child's beating.

f. Repeat predictable tonal phrases set to the child's beating.

g. Develop a song to the child's beating.

Directed Responsiveness

The purpose of this phase was to work on rhythmic and melodic control, perception, and structure. Goals included increasing the ability to control and direct beating and the ability to organize and structure responses. Techniques listed below were utilized along with some of the techniques already mentioned.

1. Create a simple structured activity with the drum and the cymbal, using a form and mood that is appropriate for the child.

2. Play in the high piano register for the cymbal and the low register for the drum.

3. Using previously established songs and/or phrases, accent the last note or chord and use clear cadences.

4. Provide as much assistance as needed to guide the child in cymbal punctuation - ending the song and/or phrases with a cymbal beat.

5. Use a drum-cymbal waltz form.

6. Work on rhythmic patterns, using chord progressions, cadences, and/or melodies.

7. Base rhythmic patterns on the rhythms of single words and/or speech phrases set to music.

8. Begin working together, playing the rhythmic patterns simultaneously, and then work antiphonally once the child gains confidence.

9. Intersperse free improvisation and rhythmic pattern activities within one improvisation.

10. Work with melodic rhythms of songs, physically guiding the child as needed, holding the child's finger and playing the rhythm on the piano, and/or encouraging the child to sing the rhythm.

11. Emphasize and exaggerate the melodic rhythm in the piano music.

12. Break down the melody into short phrases and motifs if necessary when working with melodic rhythms.

13. Continue to improvise on the child's suggested activities and songs, and begin to request that the child decide what elements to improvise on.

14. Stress the development (changing rhythmic patterns and melodic tones) of instrumental rhythmic give-and-takes.

Expressive Musical Mobility and Communicative Emotional Experience

This phase was designed to increase the child's involvement in communicating musically with the experimenter and to increase the child's self-expression. The goals were to increase the child's responsiveness and to develop the child's flexibility and control in the musical context. The following techniques were utilized in this phase:

1. Experiment with a variety of idioms.

2. Sing with the improvisations, allowing the child to choose the

topic of the improvisation and/or the words/vocalizations to be sung.

3. Introduce a wide variety of tempo and dynamic changes into the improvisations.

4. Introduce new material and mix it unpredictably with previously established materials.

5. Deliberately use a variety of expressive components, such as accelerando, ritardando, tempo contrast, fermata, rubato, crescendo, decrescendo, dynamic contrast, and accentuation.

6. Guide the child in using the free arm swing to loosen up tense postures and stiffness.

7. Continue working with melodic rhythms, introducing new songs that vary in time signature, rhythmic structure, tempo, and mood.

8. Introduce instrumental arrangements.

9. Introduce new material which is not adapted to the child's beating, but in its own tempo with careful rhythmic clarity.

10. Recede, taking a less controlling role and allowing the child to direct the improvisation.

11. Combine instrumental rhythmic, vocal rhythmic, and vocal melodic give-and-takes.

12. Help the child compose his/her own songs/improvisations, giving him/her control over as many aspects of the songs/improvisations as possible.

13. Help the child improvise on his/her suggested songs/activities.

14. When the child musically expresses himself/herself, improvise music that specifically matches as many elements of these expressions as possible. Give the child total musical support.

Pilot Procedure

A pilot of this study was implemented prior to the actual experiment. Two children, one diagnosed with autism and the other diagnosed with fragile-X, participated in 5 one-half hour sessions. The child diagnosed with fragile-X demonstrated numerous autistic features. Both children were chosen from clients seen at the Music Therapy Clinic at Michigan State University. These children were not included as subjects in the actual study. Videotapes of these sessions were used to train the two observers for the experimental study. The observers viewed and rated these two subjects a number of times until they achieved 75% or greater interobserver agreement on both occurrences and nonoccurrences of the measured behaviors. Actual results of their last observation training trial were 80% and 93% agreement on occurrences and 98% and 92% agreement on nonoccurrences. All other conditions in the pilot study were used unaltered in the experimental process.

Procedure

Each subject was scheduled for one 30-minute session per week for a period of ten weeks. Due to illnesses and unforseen circumstances, including school closings, transportation problems, and the start of a new auditory intervention program, two of the subjects were not able to attend all 10 sessions. One of the subjects attended a total of 8 sessions, and the other subject attended a total of 9 sessions.

Intervention consisted of improvisational music therapy as described above. This phase continued until consistency in responses was noted. Due to the fact that all of the subjects' measured responses showed an ascending baseline by the sixth session, all of the

reversal sessions occurred in session 6. Reversal consisted of the experimenter playing and singing a variety of music therapy activity songs. During this phase, the experimenter continued to evoke, maintain, and/or develop the child's responses. In addition to the use of structured, pre-composed music as opposed to improvised music, the amount of eye contact was decreased and the amount of materials utilized increased. The amount of eye contact decreased due to the experimenter glancing at written music. The use of written music added additional materials to the reversal phase. During intervention, only two sheets of paper were on the piano. During reversal, this increased to five pieces of paper and a book of songs. Gestural invitations, verbal invitations, and reinforcements remained the same.

During the first 10 minutes of the reversal session, pre-selected songs were played and sung. The songs, chosen prior to the implementation of the study, provided opportunities for each child to respond in all of the areas listed in the Checklist of Communicative Responses/Acts Score Sheet. Songs utilized during reversal included "I Have a Song to Sing" (Cross, 1989), "Charlie Knows How to Beat the Drum" (Nordoff & Robbins, 1962), "Drum Talk" (Nordoff & Robbins, 1968b), "3/4 and Strong" (Dubesky, 1982), and "It's Music" (Dubesky, 1989). These songs were then repeated during the 10-minute data collection interval, which was randomly chosen prior to the session.

Following the reversal, intervention, as explained above, was continued for the remaining sessions.

CHAPTER IV

ANALYSIS OF DATA

Data were analyzed using graphic analysis and nonparametric statistical techniques. Justification for the use of nonparametric statistical tests was made for three reasons. The first reason was the small sample of subjects that participated in the study. The second reason was that the level of measurement used in data collection was ordinal. The third reason was that the subjects in this study could not be assumed to represent a normal population distribution.

The experimenter selected the .Ø5 level of significance as the criterion for this study. All nonparametric statistics were calculated using formulas and tables from Siegel's (1956) Nonparametric Statistics: For the Behavioral Sciences.

Results

Communicative Responses/Acts were scored using the Checklist of Communicative Responses/Acts Score Sheet (CRASS, Appendix C), which was constructed by the experimenter. The scores were plotted graphically across sessions for each subject, and means for each session were calculated for the group as a whole (N = 11). The initial intervention phase was five sessions in duration. The reversal design was applied during session six. Following the reversal, reinstatement of treatment procedures occurred. The duration of this second intervention phase varied, ranging from two to four sessions. Two of the subjects were not able to attend all 1Ø sessions due to illnesses and unforseen circumstances.

Figure 1 shows group mean Communicative Responses/Acts for each session. An overall increase in total scores was noted for the group as a whole, along with an abrupt decrease in the total group mean score during the reversal (session 6). Figures 2-12 show individual graphs for each subject. Table 1 shows individual CRASS scores across sessions, individual overall gains, and group means.

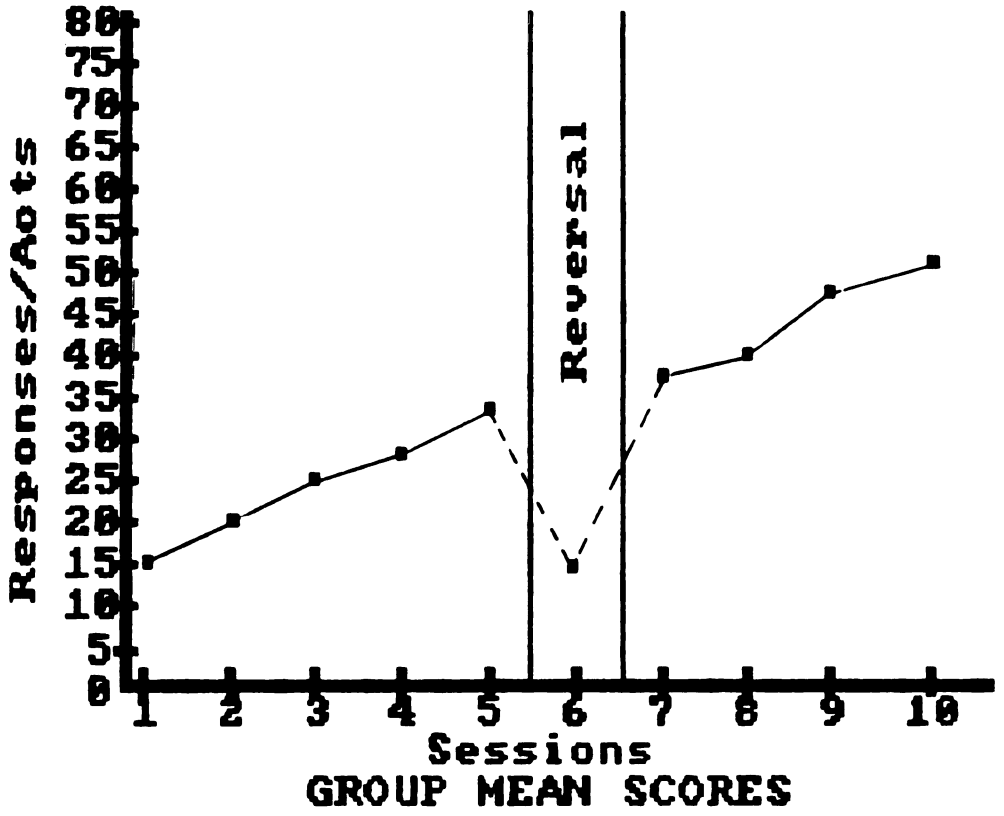

Figure 1. Group Mean Communicative Responses/Acts across 10 Sessions.

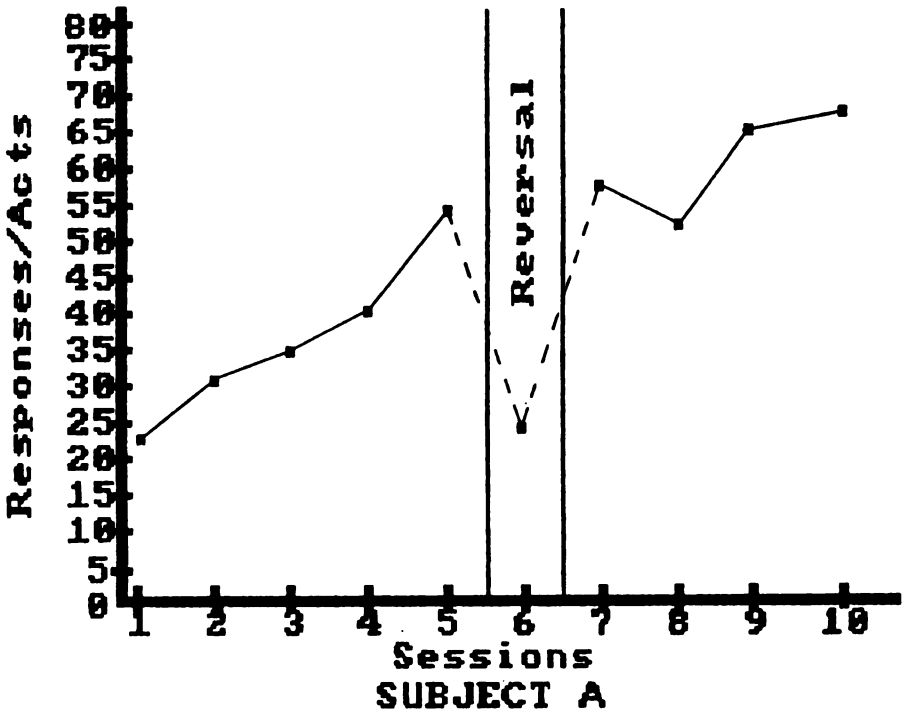

Figure 2. Communicative Responses/Acts of Subject A across 10 Sessions.

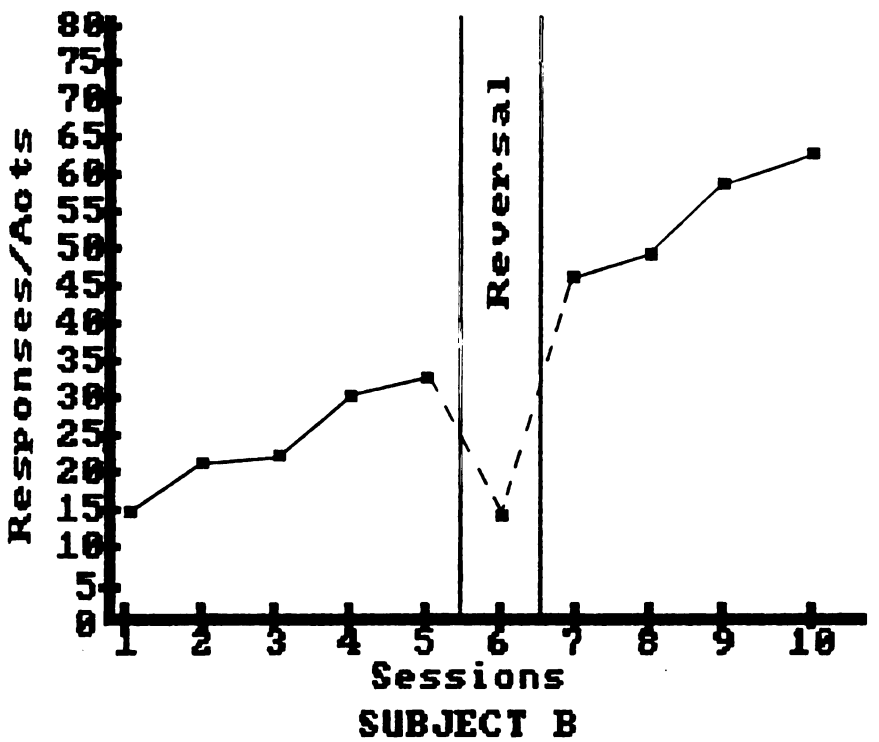

Figure 3. Communicative Responses/Acts of Subject B across 10 Sessions.

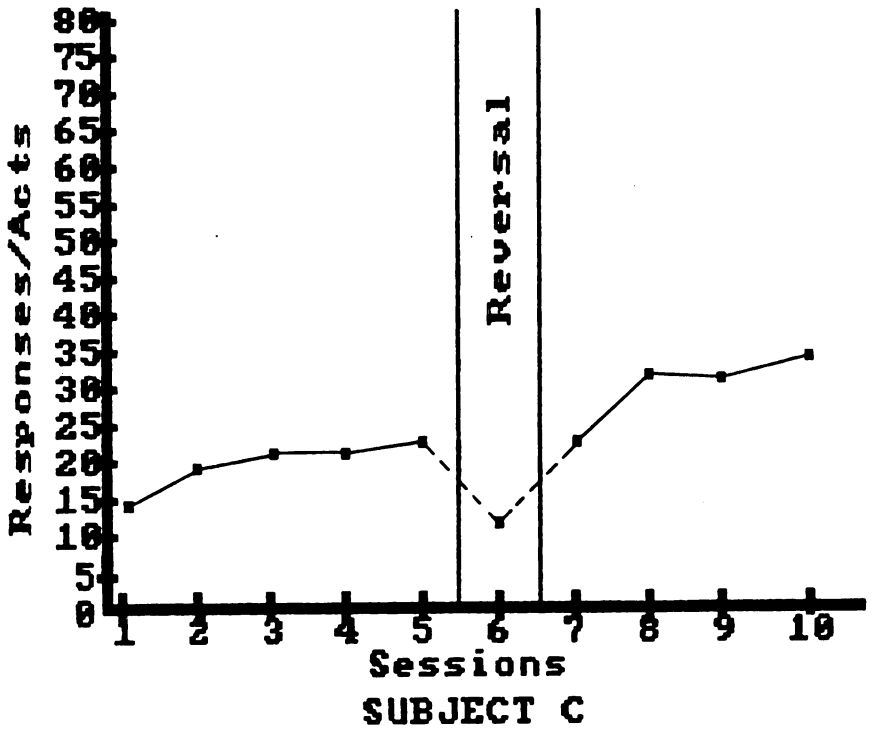

Figure 4. Communicative Responses/Acts of Subject C across 10 Sessions.

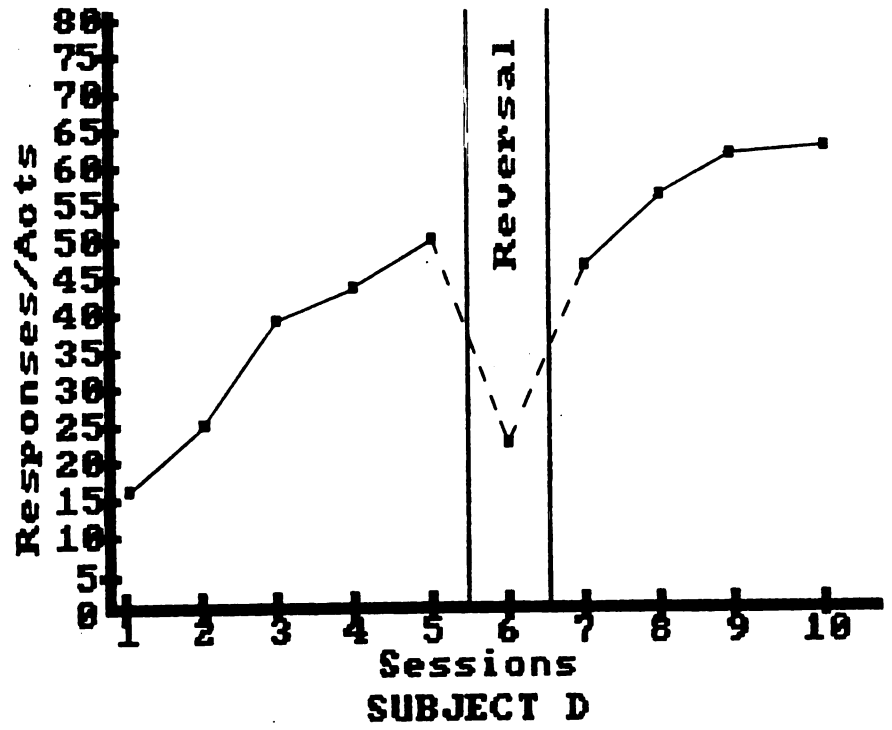

Figure 5. Communicative Responses/Acts of Subject D across 10 Sessions.

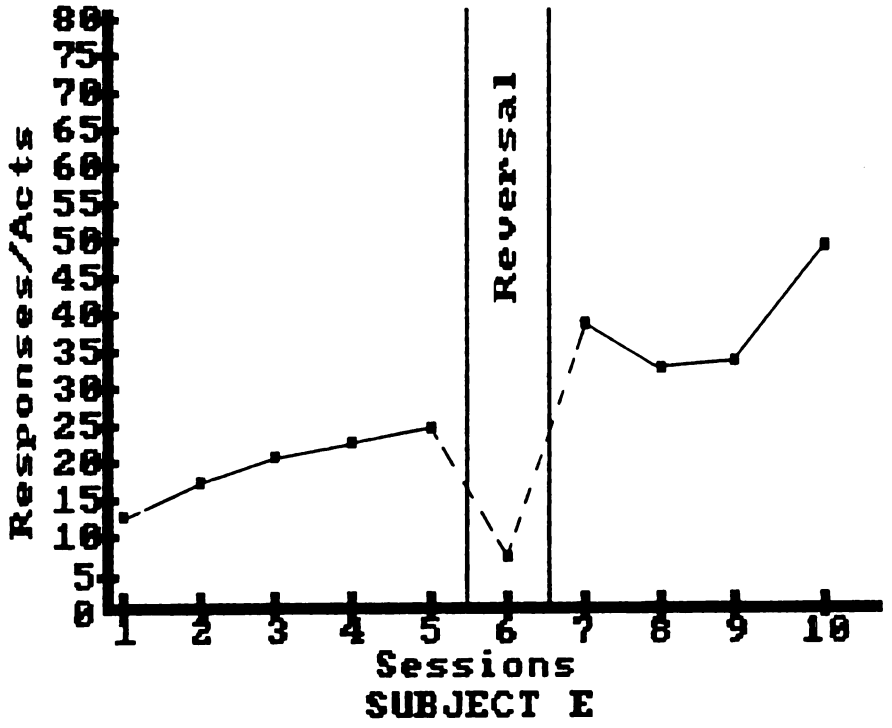

Figure 6. Communicative Responses/Acts of Subject E across 10 Sessions.

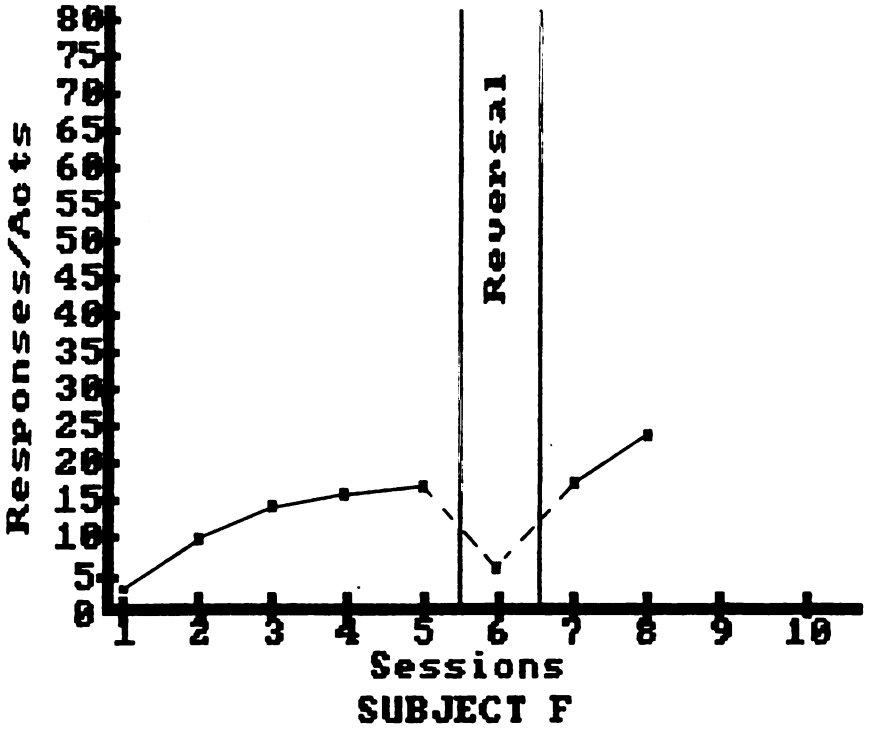

Figure 7. Communicative Responses/Acts of Subject F across 8 Sessions.

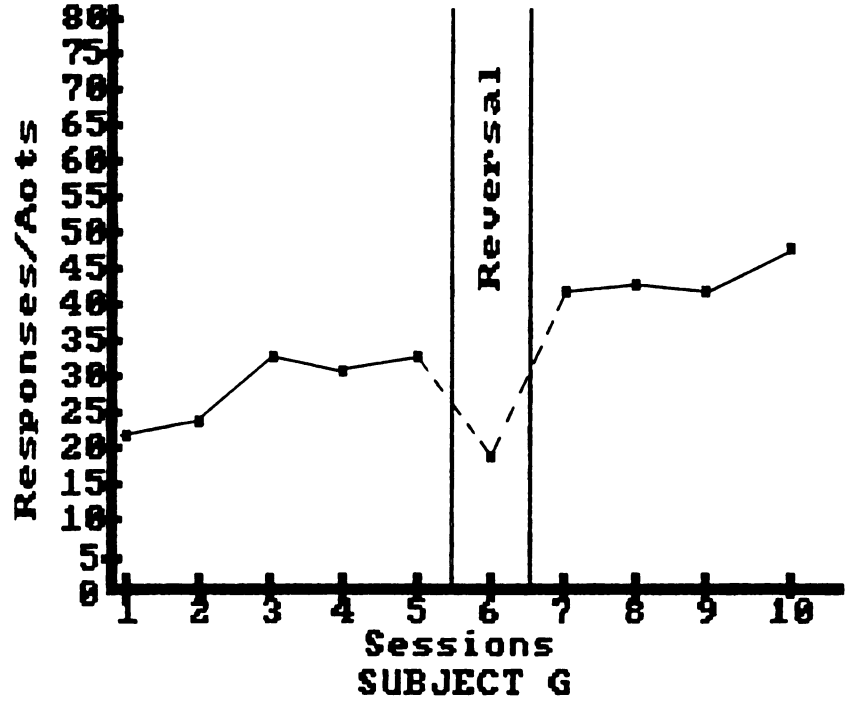

Figure 8. Communicative Responses/Acts of Subject G across 10 Sessions.

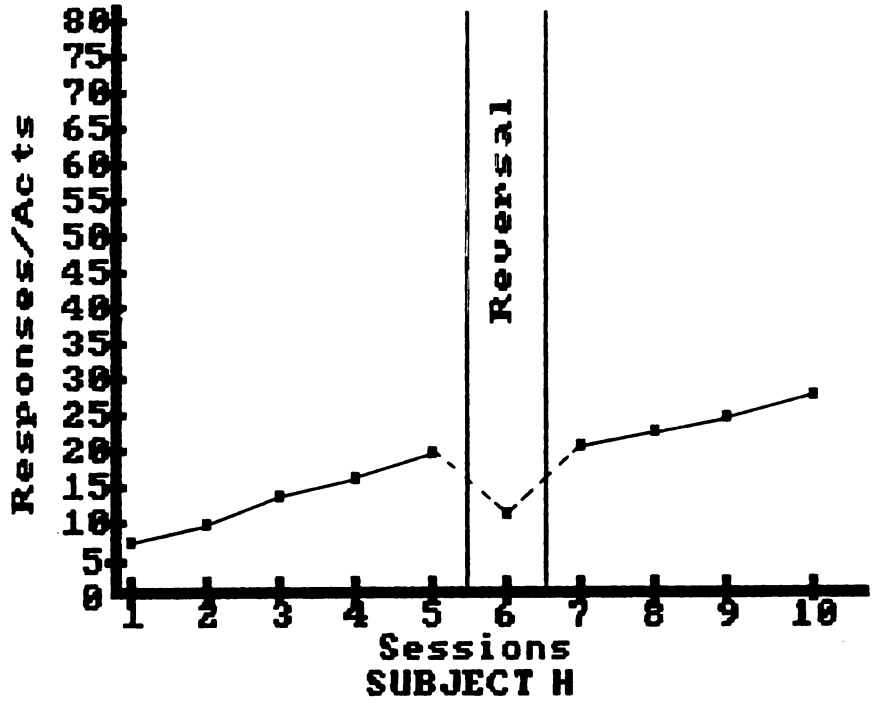

Figure 9. Communicative Responses/Acts of Subject H across 10 Sessions.

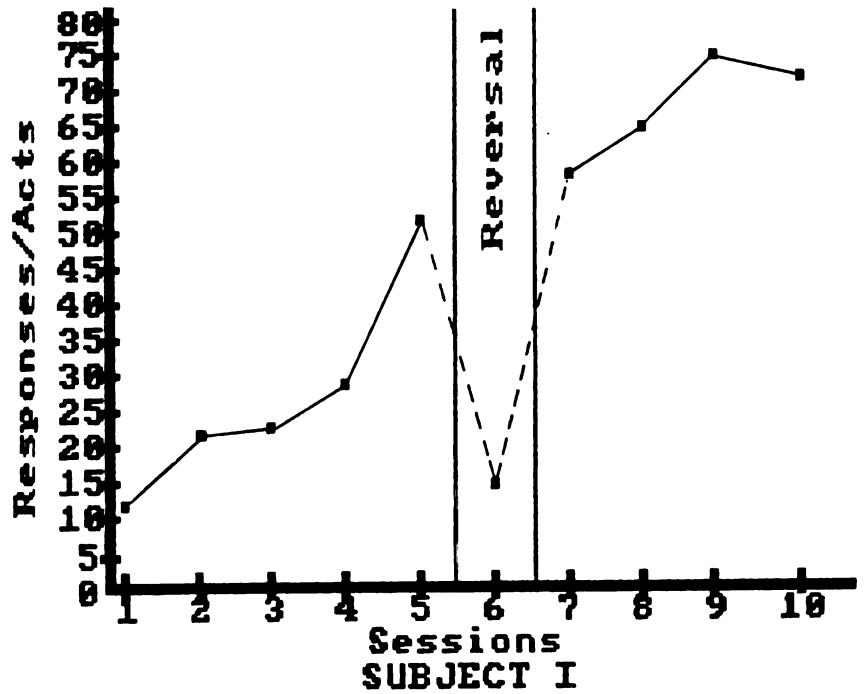

Figure 10. Communicative Responses/Acts of Subject I across 10 Sessions.

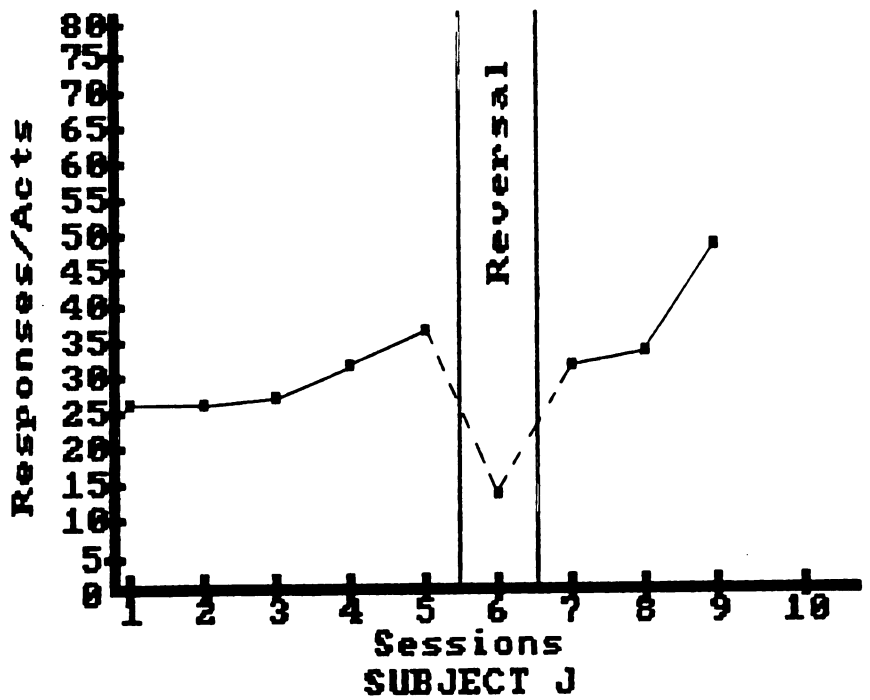

Figure 11. Communicative Responses/Acts of Subject J across 9 Sessions.

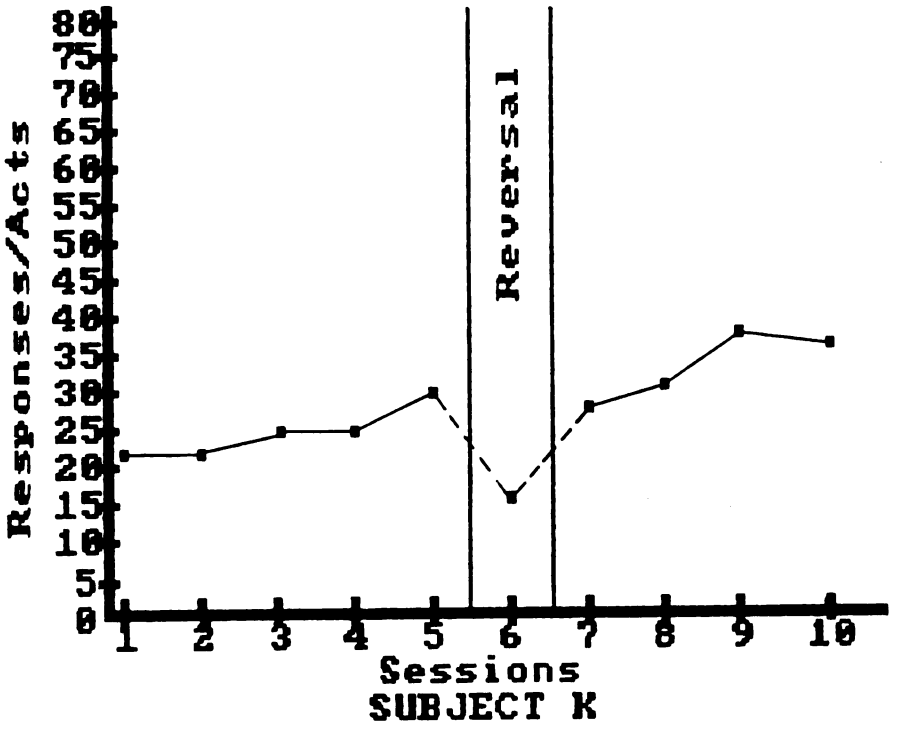

Figure 12. Communicative Responses/Acts of Subject K across 10 Sessions.

Table 1. CRASS Scores for each Subject across Sessions, Individual Overall Gains, and Group Means.

	Sessions										
S.	1	2	3	4	5	6[a]	7	8	9	10	Gain
A	23	31	35	40	54	24	57	53	65	68	45
B	15	21	23	30	33	14	46	49	59	63	48
C	14	19	21	21	23	12	23	32	31	34	20
D	16	25	39	44	50	23	47	56	62	63	47
E	13	18	21	23	25	8	39	33	34	49	36
F	3	10	14	16	17	6	17	24	-	-	21
G	22	24	33	31	33	19	42	43	42	48	26
H	7	10	14	16	20	11	21	23	25	28	21
I	12	22	23	29	52	15	58	65	75	72	60
J	26	26	27	32	37	14	32	34	49	-	23
K	22	22	25	25	30	16	28	31	38	36	14
Means	15.7	20.7	25	27.9	34	14.7	37.3	40.3	48	51.2	32.8[b]

Note. CRASS = Checklist of Communicative Responses/Acts Score Sheet; S. = Subject. A dash indicates no score was available.

[a]Reversal session. [b]This mean is not equal to the tenth session mean minus the first session mean because not all of the subjects completed 10 sessions.

Figures 2-12 reveal individual differences in the total number of Communicative Responses/Acts and in the degree of improvement in the CRASS scores over the 10 sessions; however, an overall trend was demonstrated, showing an increase in the CRASS scores during both intervention phases and a decrease in these scores during reversal for each individual.

In the initial intervention phase, the level of change for all subjects was in an improving direction and ranged from 8 to 40 points, with a mean of 18.3. The withdrawal of the intervention resulted in an abrupt and substantial decrease in the quantity of Communicative Responses/Acts. Decreasing level changes ranged from 9 to 37 points, with a mean of 19.3. This level was reversed immediately upon reintroduction of treatment procedures. Increasing level changes from the reversal to the reinstatement of intervention ranged from 10 to 43 points, with a mean of 22.6. During the second intervention phase, the level of change was in an improving direction and ranged from 6 to 17 points, with a mean of 11.3.

A positive acceleration trend was noted in both intervention phases for all eleven subjects. Trend stability within conditions was determined for both intervention phases for each subject. Criteria for trend stability was set at 80% of the data points falling within 15% along the trend line (Tawney & Gast, 1984). All 22 conditions showed a stable trend.

For five of the subjects, scores achieved in the reversal phase overlapped with the first intervention phase. The overlap for four of these subjects occurred when comparing reversal and the first session scores. One subject's reversal score overlapped with the first and

second sessions of the first condition. For the other six subjects, the percentage of overlap between these two conditions was 0%. In comparing the reversal phase with the reinstatement of intervention phase, the percentage of overlap was 0% for all 11 subjects.

In addition to scoring the total number of points on the CRASS, each subject was also given subjective ratings for his/her overall level of communicativeness during every session. A scale of 1 (indicating a low level) to 7 (indicating a high level) was utilized for both quantity and creativity of communicativeness. Table 2 shows the group means for both categories across the ten sessions. The levels increased in both quantity, from a mean of 1.6 to a mean of 4.9, and creativeness, from a mean of 1.4 to a mean of 5.2. Also, during reversal, there was a noticeable change in all of the subjects' communicativeness. Creativeness dropped from a mean of 4.1 to a mean of 1.8, and quantity decreased from a mean of 3.6 to a mean of 1.7. These data support the trend observed in the total score data. Not only did the subjects increase their scores, but they also appeared to demonstrate more creativity and a greater number of communicative behaviors.

Table 2. Group Mean Quantity and Creativity of the Overall Level of Communicativeness across Sessions.

Sessions									
1	2	3	4	5	6[a]	7	8	9	10
Quantity									
1.6	3.1	3.7	3.6	3.6	1.7	4.1	4.4	4.7	4.9
Creativeness									
1.4	3.0	3.8	3.6	4.1	1.8	4.2	4.3	5.1	5.2

[a]Reversal session.

Research Question #1

The Wilcoxon Matched-Pairs Signed-Ranks Test was utilized to determine if a significant difference existed between all of the subjects' scores of their first sessions and those of their last sessions. Table 3 shows that all of the subjects' last session scores were larger than their first session scores. Consequently, the differences between the scores were significant at the .01 level (T = 0). The subjects made significant gains in communicative behaviors when involved in improvisational music therapy sessions.

Table 3. Total First and Last Session CRASS Scores - Wilcoxon Matched-Pairs Signed-Ranks Test.

Subject	Total CRASS Score: First Session	Total CRASS Score: Last Session	*d*	Rank of *d*	Rank with less frequent sign
A	23	68	-45	-8	
B	15	63	-48	-10	
C	14	34	-20	-2	
D	16	63	-47	-9	
E	13	49	-36	-7	
F	3	24	-21	-3.5	
G	22	48	-26	-6	
H	7	28	-21	-3.5	
I	12	72	-60	-11	
J	26	49	-23	-5	
K	22	36	-14	-1	
					$T = 0$*

Note. CRASS = Checklist of Communicative Responses/Acts Score Sheet; *d* = Difference score - the difference between the first and the last session scores.

*$p < .01$

Research Questions #2 - #8

The CRASS was divided into the following two categories: musical and nonmusical. There were 91 possible points in the musical category and 16 possible points in the nonmusical category. Figure 13 and Table 4 show the group mean scores in these categories across 10 sessions. Gains were noted in the group mean scores of both categories. In comparing the first and the tenth sessions, musical means increased from 9.5, with a range of 0-18, to 39, with a range of 21-56. Using the same comparison, nonmusical means increased from 6.3, with a range of 3-11, to 12.2, with a range of 7-16. Four of the subjects achieved all of the 16 total points in the nonmusical category by their tenth session.

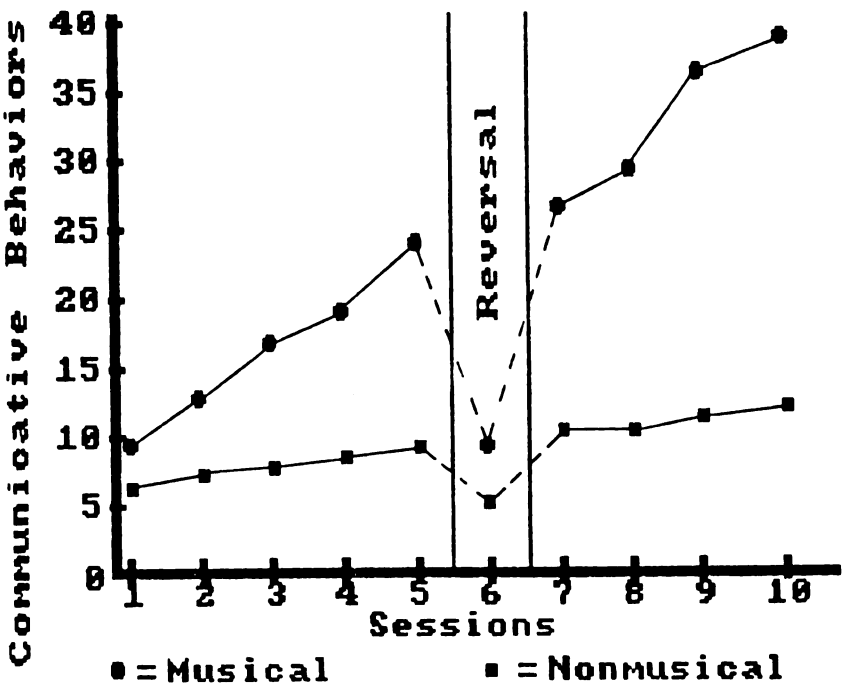

Figure 13. Group Mean Musical and Nonmusical Communicative Behaviors across 10 Sessions.

Table 4. Group Mean Musical and Nonmusical Communicative Behaviors across 10 Sessions.

Sessions										
1	2	3	4	5	6[a]	7	8	9	10	Gain
Musical										
9.5	13.5	17.1	19.5	24.6	9.5	26.7	29.8	36.5	39	29.5
Nonmusical										
6.3	7.2	7.9	8.5	9.3	5.2	10.5	10.5	11.5	12.2	5.9

[a] Reversal session.

Each of the two categories was divided into subcategories. Musical subcategories included tempo, rhythm, structure/form, and pitch, and nonmusical subcategories were speech production, communicative-interactive, and communicative intent. The subjects' raw scores of their first and last sessions in the four musical subcategories are shown in Table 5. Group mean scores across 10 sessions in these musical subcategories can be seen in Figure 14. Table 6 lists the subjects' raw scores of their first and last sessions in the three nonmusical subcategories, and Figure 15 shows the group mean scores across 10 sessions. In all subcategories, the group mean for the last sessions is different from the group mean for the tenth sessions because not all subjects participated in a total of 10 sessions.

Statistical analyses were applied to the subjects' first and last session scores in all of the subcategories of the CRASS. The Wilcoxon Matched-Pairs Signed-Ranks Test indicated significant differences at the .01 level between first session scores and last session scores for tempo (T = 0), rhythm (T = 0), structure/form (T = 0), pitch (T = 0), speech production (T = 0), and communicative-interactive (T = 0). Significant differences at the .05 level were found between first session scores and last session scores for communicative intent (T = 2.5).

Table 5. Total First and Last Session Scores in Tempo, Rhythm, Structure/Form, and Pitch - Work-up for the Wilcoxon Matched-Pairs Signed-Ranks Test.

	Tempo		Rhythm		Form		Pitch	
Subject	First	Last	First	Last	First	Last	First	Last
A	5	20	1	10	1	8	8	14
B	5	22	1	6	0	7	0	12
C	9	18	0	2	0	0	0	6
D	2	17	0	9	1	7	2	14
E	4	13	5	13	0	4	0	10
F	0	10	0	1	0	0	0	6
G	9	16	1	3	1	7	3	8
H	0	8	0	2	0	4	3	7
I	9	20	0	10	0	11	0	15
J	8	11	1	5	1	5	8	14
K	11	15	4	7	1	3	0	3
Means	5.6	15.5	1.2	6.2	.5	5.1	2.2	9.9
Total Items	36		25		14		16	

Note. First = first session scores; Last = last session scores; Total Items = total number of points possible in each subcategory.

Table 6. Total First and Last Session Scores in Speech Production, Communicative-Interactive, and Communicative Intent - Work-up for the Wilcoxon Matched-Pairs Signed-Ranks Test.

	Speech Production		Comm.-Interactive		Comm. Intent	
Subject	First	Last	First	Last	First	Last
A	5	7	3	6	Ø	3
B	4	7	4	6	1	3
C	1	1	2	4	2	3
D	5	7	3	6	3	3
E	Ø	2	3	6	1	1
F	1	2	1	4	1	1
G	2	5	5	6	1	3
H	1	2	1	4	2	1
I	Ø	7	3	6	Ø	3
J	2	7	4	4	2	3
K	Ø	1	5	5	1	2
Means	1.9	4.4	3.1	5.2	1.3	2.4
Total Items	7		6		3	

Note. First = first session score; Last = last session score; Total Items = total number of points possible in each subcategory; Comm. = Communicative.

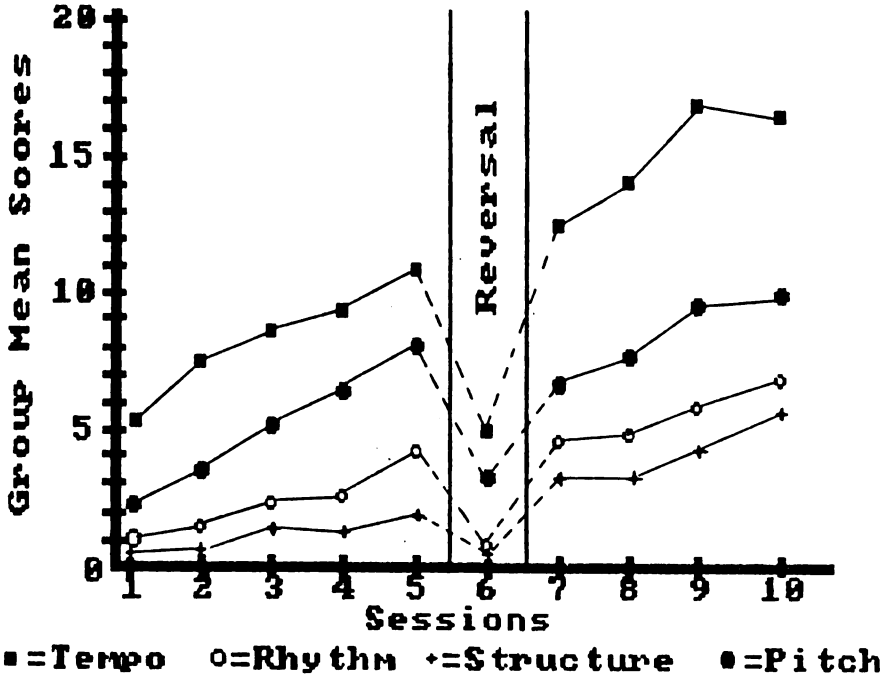

Figure 14. Group Mean Scores in Tempo, Rhythm, Structure/Form, and Pitch across 10 Sessions.

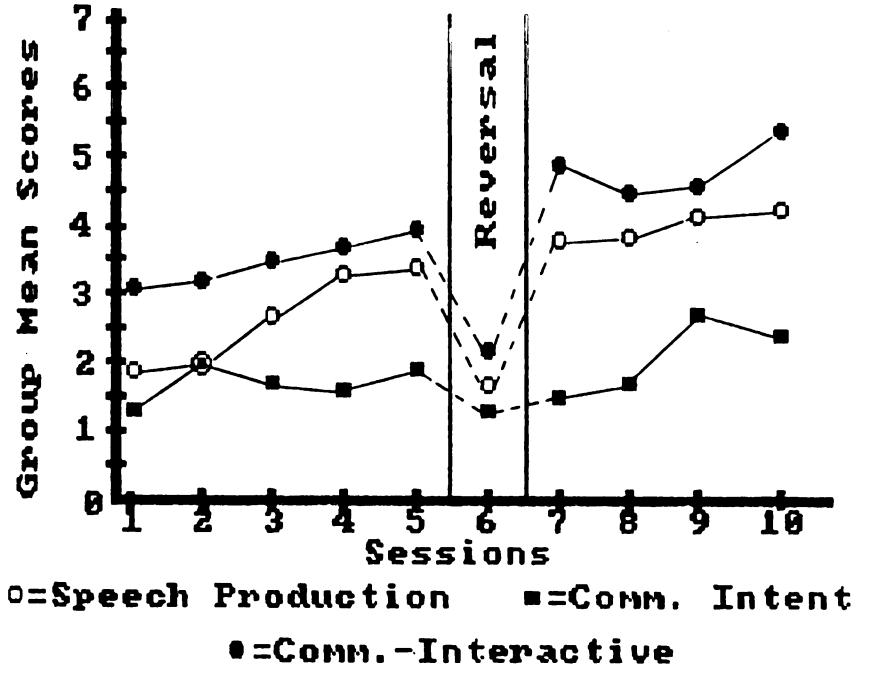

Figure 15. Group Mean Scores in Speech Production, Communicative-Interactive, and Communicative Intent across 10 Sessions.

Research Question #9

The Wilcoxon Matched-Pairs Signed-Ranks Test was utilized to determine whether there were any significant differences between the number of spontaneous and creative acts as measured by the CRASS demonstrated by the subjects in their first sessions and those demonstrated in their last sessions. Table 8 shows that all of the subjects' last session scores were larger than or equal to their first session scores. Consequently, the differences between the scores were significant at the .Ø1 level (T = Ø).

Research Question #1Ø

A Spearman Rank Correlation Coefficient was calculated between the musical vocal behavior gains and the nonmusical speech production gains as recorded on the CRASS (Table 7). The coefficient corrected for ties was .645 which was significant at the .Ø5 level (t = 2.532). These results indicate that as musical vocal behaviors increased, nonmusical speech production behaviors also increased.

Table 7. Total First and Last Session Spontaneous, Creative Communicative Acts - Wilcoxon Matched-Pairs Signed-Ranks Test.

	Spontaneous Communicative Acts				
Subject	First Session	Last Session	*d*	Rank of *d*	Rank with less frequent sign
A	Ø	Ø	Ø		
B	Ø	1	-1	-1.5	
C	Ø	1	-1	-1.5	
D	Ø	4	-4	-6	
E	4	8	-4	-6	
F	Ø	Ø	Ø		
G	Ø	4	-4	-6	
H	Ø	6	-6	-9	
I	Ø	5	-5	-8	
J	Ø	2	-2	-3	
K	2	5	-3	-4	
					T = Ø*
Means	.5	3.3			
Total Items		19			

d = Difference score - the difference between the first and last session scores; Total items = total number of points possible.

*p < .Ø1

Table 8. CRASS Musical Vocal Gain Scores and Nonmusical Speech Production Gain Scores - Work-up for the Spearman Rank Correlation Coefficient.

Subject	Vocal Gain	Speech Production Gain
A	23	2
B	26	3
C	9	Ø
D	32	2
E	21	2
F	8	1
G	19	3
H	12	1
I	36	7
J	11	5
K	3	1
Means	18.2	2.5

Note. CRASS = Checklist of Communicative Responses/Acts Score Sheet.

The Behavior Change Survey (Appendix C) was the second measurement device utilized in this study. This survey was completed at the conclusion of the study by 11 parents, 4 teachers, and 2 speech therapists. Thirty-three surveys were given out and twenty-nine were returned (88% return rate). Two of the surveys returned were filled out by teacher aides as opposed to speech therapists. These two forms were not utilized in the following analyses.

Research Questions #11 - #13

Table 9 shows the means for each of the 13 questions as answered by the parents, teachers, and speech therapists. Most of the means fell between 4, which indicated no change, and 5, which indicated a slight change. Overall, the parents gave the highest ratings ($\bar{M}$ = 4.8), followed by the teachers ($\bar{M}$ = 4.7), and finally the speech therapists ($\bar{M}$ = 4.2). The last two questions, which concerned the subjects' musical behaviors, got the highest rankings, both achieving a mean of 4.9. The lowest rankings ($\bar{M}$ = 4.3) were given to questions #7 and #9, which asked about changes in emotional behaviors such as anxiety, irritability, and sadness.

Changes were seen in all three categories by parents, teachers, and speech therapists. In the communicative category, the parents' mean was 4.8, the teachers' mean was 4.5, and the speech therapists' mean was 4.2. In the social/emotional category, the parents' mean was 4.7, the teachers' mean was 4.7, and the speech therapists' mean was 4.2. Means in the musical category for the parents, teachers, and speech therapists were 5.3, 5.1, and 4.4, respectively.

Table 9. Mean Scores for each Question on the Behavior Change Survey as rated by Parents, Teachers, and Speech Therapists.

Question #	Parent	Teacher	Speech Therapist	Total
		Communicative Behaviors		
1	4.7	4.5	4.Ø	4.4
2	4.7	4.5	4.6	4.6
3	5.1	4.4	4.1	4.5
4	5.Ø	4.7	4.3	4.7
5	4.5	4.6	4.1	4.4
Means	4.8	4.5	4.2	4.5
		Social/Emotional Behaviors		
6	5.Ø	4.9	4.1	4.7
7	4.5	4.3	4.1	4.3
8	4.8	4.8	4.1	4.6
9	4.5	4.3	4.1	4.3
1Ø	4.9	4.9	4.3	4.7
11	4.7	4.7	4.3	4.6
Means	4.7	4.7	4.2	4.5
		Musical		
12	5.3	5.Ø	4.4	4.9
13	5.2	5.1	4.4	4.9
Means	5.3	5.1	4.4	4.9
		Overall		
Means	4.8	4.7	4.2	4.6

Research Questions #14 - #16

The Spearman Rank Correlation Coefficient was used to determine whether there were any correlations between (a) gains in CRASS scores (total score of last session minus total score of first session for each subject) and parent Behavior Change Survey ratings, (b) gains in CRASS scores and teacher Behavior Change Survey ratings, and (c) gains in CRASS scores and speech therapist Behavior Change Survey ratings.

Table 10 shows each subject's gain in CRASS scores and his/her total ratings obtained from the Behavior Change Survey. A significant correlation was found between the gains in CRASS scores and the parent ratings. The rho was .773, which obtained significance at the .01 level (t = 3.658). The rho corrected for ties for gains in CRASS scores and teacher ratings was .217 and did not reach significance. The Spearman Rank Correlation Coefficient corrected for ties for gains in CRASS scores and speech therapist ratings was .387 and did not obtain significance.

Some of the parents observed their child's music therapy sessions. To determine whether these observations had an influence on the significant correlation between the parents' ratings and the overall CRASS gains, two additional correlation coefficients were calculated. The Spearman Rank Correlation Coefficient for the ratings of the parents who observed their children's sessions and overall CRASS gains was .400. The coefficient for the ratings of the parents who did not observe their children's sessions and overall CRASS gains was .500. Neither of these two rho's obtained significance. These results suggest that the factors or elements basic to personal observation were not in common with factors underlying CRASS gains.

Table 1Ø. CRASS Gain Scores and Total Behavior Change Survey Ratings as reported by Parents, Teachers, and Speech Therapists - Work-up for the Spearman Rank Correlation Coefficient.

		Behavior Change Survey Total Ratings		
Subject	CRASS Gain	Parent	Teacher	Speech Therapist
A	45	66	63	64
B	48	66	69	56
C	2Ø	6Ø	-	-
D	47	65	52	52
E	36	62	63	54
F	21	62	52	52
G	26	7Ø	52	54
H	21	59	63	54
I	6Ø	77	65	-
J	23	52	-	-
K	14	54	66	-
Means	32.8	62.9	6Ø.6	55.1

Note. CRASS = Checklist of Communicative Responses/Acts Score Sheet. A dash indicates no score was available.

Research Questions #17 - #25

The Behavior Change Survey consisted of three categories, communication, social/emotional, and musical. These categories were analyzed independently for correlations with CRASS gain scores. The Spearman Rank Correlation Coefficient was determined for gains in CRASS scores and (a) parent ratings in the communication category, (b) teacher ratings in the communication category, (c) speech therapist ratings in the communication category, (d) parent ratings in the social/emotional category, (e) teacher ratings in the social/emotional category, (f) speech therapist ratings in the social/emotional category, (g) parent ratings in the musical category, (h) teacher ratings in the musical category, and (i) speech therapist ratings in the musical category. Each student's ratings in the communication, social/emotional, and musical categories can be seen in Table 11.

Significant correlations were found between CRASS gain scores and parent communication ratings (r_s corrected for ties = .711, t = 3.Ø35, p < .Ø2), parent social/emotional ratings (r_s corrected for ties = .624, t = 2.395, p < .Ø5), and parent musical ratings (r_s corrected for ties = .612, t = 2.39Ø, p < .Ø5). The coefficients corrected for ties which did not obtain significance were (a) CRASS gains and teacher social/emotional ratings (r_s = .513), (b) CRASS gains and speech therapist social/emotional ratings (r_s = .2Ø6), (c) CRASS gains and teacher communication ratings (r_s = .22Ø), (d) CRASS gains and speech therapist communication ratings (r_s = .638), (e) CRASS gains and teacher musical ratings (r_s = -.451), and (f) CRASS gains and speech therapist musical ratings (r_s = -.5Ø9). Table 12 lists all of the rho's calculated in comparing the CRASS and the Behavior Change Survey.

Table 11. CRASS Gain Scores and Behavior Change Survey Categorical Ratings as reported by Parents, Teachers, and Speech Therapists - Work-up for the Spearman Rank Correlation Coefficient.

		BEHAVIOR CHANGE SURVEY								
		Communication			Social/Emotional			Musical		
Subject	Gains	P	T	ST	P	T	ST	P	T	ST
A	45	25	23	24	29	32	32	12	8	8
B	48	25	26	24	3Ø	31	24	11	12	8
C	2Ø	23	-	-	27	-	-	1Ø	-	-
D	47	27	2Ø	2Ø	28	24	24	1Ø	8	8
E	36	27	21	2Ø	26	3Ø	24	9	12	1Ø
F	21	25	2Ø	2Ø	28	24	24	9	8	8
G	26	23	2Ø	2Ø	33	24	24	14	8	1Ø
H	21	2Ø	2Ø	2Ø	29	29	24	1Ø	14	1Ø
I	6Ø	27	26	-	36	31	-	14	8	-
J	23	2Ø	-	-	24	-	-	8	-	-
K	14	22	27	-	24	26	-	8	13	-
Means	32.8	24	22.6	21.1	28.5	27.9	25.1	1Ø.5	1Ø.1	8.9

Note. CRASS = Checklist of Communicative Responses/Acts Score Sheet; P = parent; T = teacher; ST = speech therapist. A dash indicates no score was available.

Table 12. Spearman Rank Correlation Coefficients for CRASS Gain Scores and Behavior Change Survey Total and Categorical Ratings as reported by Parents, Teachers, and Speech Therapists.

	Communication	Social/Emotional	Musical	Total
		Parents		
CRASS Gains	.711**	.624*	.612*	.773***
		Teachers		
CRASS Gains	.220	.513	-.451	.217
		Speech Therapists		
CRASS Gains	.638	.206	-.509	.387

Note. CRASS = Checklist of Communicative Responses/Acts Score Sheet; CRASS Gains = Last session CRASS scores minus first session CRASS scores.

*$p < .05$. **$p < .02$. ***$p < .01$.

CHAPTER V

SUMMARY

Discussion

Results of this study suggest that improvisational music therapy is effective in increasing the amount of communicative behaviors in autistic children. These results support numerous case studies and clinical experiences which suggest the effectiveness of improvisational music therapy (Alvin & Warwick, 1992; Hollander & Juhrs, 1974; Nordoff & Robbins, 1964, 1968a, 1971, 1977; Saperston, 1973). This study differs from current research available in the area of improvisational music therapy and communicativeness in autistic children in that objective methods of control, observation, and data reporting were utilized. Although any one study alone cannot validate the effectiveness of a technique, this study strongly suggests that improvisational music therapy with autistic children is effective in eliciting and increasing communicative behaviors within a musical setting.

The reversal design utilized in this study had the advantage of beginning and ending with an intervention phase, allowing two phases that demonstrated the effectiveness of the intervention. Practical considerations did not permit baseline data to be collected prior to intervention. In this design, each subject served as his/her own control.

Each of the 11 subjects demonstrated gains in Communicative Responses/Acts across their sessions and abrupt decreases in the number

of Communicative Responses/Acts when reversal was applied. Significant differences were noted ($p < .01$) when comparing the total CRASS scores of the first sessions and those of the last sessions. Taking into account that one of the characteristics of autistic children is resistance to change, questions emerged concerning the validity of the first session scores. Therefore, a statistical analysis was computed to determine whether a significant difference existed between the subjects' third session scores and their last session scores. Utilizing the third session scores instead of the first session scores in the analysis was based on the assumption that by the third session, the subjects were not viewing music therapy as a change in their routine. Therefore, the third session scores may have been more accurate in portraying the communicative abilities of the children at the beginning of the study. Significance was achieved at the .01 level ($T = 0$), thus supporting the original analysis completed.

The mean group gain in total number of Communicative Responses/Acts from the first to the last session was 32.8, with a range of 14-60, on the 107 point scale. The mean group decrease in total CRASS scores when reversal was applied was 19.3, dropping from a mean of 34 to a mean of 14.7. Individual data indicate a range of 9-37 point decrease in total CRASS scores when reversal was applied. This range indicates an abrupt decreasing change in the number of Communicative Responses/Acts for each subject. Due to the abrupt and substantial level changes between conditions, it can be said with some confidence that the improvisational music therapy approach produced the changes. Inherent within this single-subject design is the additional external validity of these findings since the positive effect of

improvisational music therapy on the total number of Communicative Responses/Acts of one subject was replicated across 10 similar children.

Reversal consisted of structured songs as opposed to improvisational music. The character of the improvisational music was responsive consistently to the child, where the structured songs were responsive only to their own forms. Also, in improvisational music therapy, the songs that were used belonged to that particular child since they emerged as a result of the child's responses. The structured songs used in the reversal were imposed on the child.

There were two variables which were not controlled during reversal:

1. Eye contact with the subjects was decreased in frequency during reversal, due to the experimenter glancing at the written music.

2. Additional written music was placed on the piano during reversal. During intervention, there were 2 sheets of paper on the piano, one piece of staff paper on which were written music and words and another piece of paper on which were written words. During the reversal session, written music for the five songs used in conjunction with the session activities was on the piano.

One of the subjects was distracted by the change in written music. He/she read the words to the songs at the beginning of the reversal session, which became evident when the experimenter substituted this subject's name for the name written in the music. He/she stopped the experimenter and pointed to the name written in the music. Both the decrease in eye contact and the increase in written music could have influenced the decreasing behavioral responses.

Other than these two factors, all other conditions during reversal remained the same as in the experimental intervention phases. The number of verbal prompts, gestural prompts, and reinforcement acts remained at constant levels. Also, each subject was given the same number of opportunities to score points on the CRASS as in the intervention phases.

Subjective data on the creativeness and quantity of overall musical communicativeness were also collected for each of the 107 videotaped segments observed. The scale utilized ranged from a low level of 1 to a high level of 7. These data represented a gestalt subjective impression of each child's level of communicativeness during every session. The results supported the trend observed in the objective data discussed above. The group mean creativeness rating increased from 1.4 to 5.2, and the group mean quantity rating increased from 1.6 to 4.9. Decreases in both of these ratings were noted when reversal was applied. Group mean creativeness ratings decreased from 4.1 to 1.8, and group mean quantity ratings decreased from 3.6 to 1.7.

These data suggest that the improvisatory aspect of the music facilitated communicative growth and development in autistic children within the musical setting. Therefore, insight into the results may best be gained by looking at specific characteristics of improvisational music therapy.

One of these characteristics was the ability to convey acceptance and support through the music. From the time each subject entered the room, he/she was accepted as he/she was, and the improvisation reflected this acceptance. The skills the subjects demonstrated were viewed as potential communicative modalities. Autistic children

frequently exhibit behaviors that may not be acceptable in some classroom, therapeutic, home, and social settings. One example of a behavior that was incorporated into the musical improvisation and utilized to establish intercommunication was repetitious vocalizing. Five of the subjects in this study emitted repetitious vocal sounds throughout their sessions. All five of these subjects eventually utilized these vocal sounds communicatively, placing their vocal sounds on tones in the key of the improvisation and vocalizing in rhythmic relationships with the improvisation. Also, all of these five subjects' vocal sounds were influenced by the music, which was shown by the subjects matching pitches of the improvisation and increasing or decreasing the tempo of their vocal sounds.

The supporting aspect of improvisational music therapy may provide an atmosphere in which autistic children are more willing to attempt to use both new and difficult skills. For three of the subjects, calm subtle music was very effective in decreasing hyperactivity and physical and vocal expressions of fear, anxiety, and/or nervousness. One of the subjects began a session crying anxiously and running around the room. Both his vocal and physical expressions of anxiety stopped upon hearing one organum chord. This subject immediately walked to the piano area and sat down in the chair, giving eye contact to the experimenter. For the other two subjects, the children's tune, improvised with a harmonic chord progression of a major seventh proceeded by a minor seventh chord, resulted in slower physical behaviors, less agitated vocalizations, and in some cases, increased vocal and/or instrumental participation. A parental report indicated that the amount of time one of these subjects sat in the chair was

rarely observed in other settings. During the session after which the parent made that observation, this subject sat in the chair for 7 minutes. Several sessions later, he/she sat continuously for 14 minutes.

Recent observations have reported that some autistic people who were once thought to be severely disabled intellectually due to their communication deficits demonstrated unexpected levels of understanding and knowledge (Biklen, 1990). For these people, acceptance is of utmost importance for any type of change to occur. One of the two basic principles used in the improvisational music therapy technique was treating each child as competent; such treatment occurred on both musical and nonmusical levels throughout each session. This variable could have interacted with the musical improvisation in effecting the large number of gains seen in CRASS scores. However, treating each person as competent also occurred during the reversal, which suggests that it was not this variable in itself that effected the positive changes.

Another characteristic of the improvisational music therapy was individualization. The music improvised by the experimenter related directly to the child from moment to moment and belonged to the child. Behaviors demonstrated and vocalizations/verbalizations emitted by the child were incorporated into the music. This technique of incorporation seemed to have a direct influence on increasing the amount of participation. Upon hearing their own words placed into an improvisation, several subjects immediately increased their frequency of both vocal and instrumental participation. Also, several of the subjects then began spontaneously stating more words to be incorporated

into the improvisation. One example of this increased participation occurred when one subject stated that he/she did not want to sing that day. Upon hearing the experimenter's improvisation using those words, this subject immediately joined in singing the words, "____ doesn't want to sing today, oh not today". This subject continued singing throughout that entire 30-minute session. The activity was individualized, allowing the subject to be and do what he/she wanted at that moment.

Motivational factors must also be considered as a variable within improvisational music therapy. Motivation may be enhanced through the use of improvisational music therapy due to several factors. First of all, the music itself may be motivating to the child. Research has shown that many autistic children show an unusual interest in music. Secondly, music as a communication medium may be more manageable for autistic children who frequently demonstrate difficulties in conventional communication intervention techniques. If this is true, the children may experience initial successes which could reduce emotional pressures that accompany past experiences in attempts to communicate. Subsequently, decreased pressures could lead to increased motivation to communicate.

The motivation inherent in music itself was a variable present in both treatment and reversal. The motivation from initial successes was more prevalent in the treatment phases than in the reversal session. Structured songs place more emphasis on specific responses and require the child to respond to extraneous musical demands. Rhythmic settings, tempi, and melodic tones are determined for the child as opposed to being determined by the child. Some of the subjects did experience

success during reversal; however, the frequency of success was higher during intervention.

In examining each of the subject's willingness to come to music therapy, five of the subjects demonstrated no resistance throughout the entire study. Four of the subjects demonstrated varying degrees of resistance during the first several sessions. Each of these four decreased his/her amount of resistance, and by the fifth session eagerness to attend music therapy was seen by the experimenter and reported by the parents. One subject was inconsistent in the amount of resistance demonstrated throughout the study. Parental reports also indicated that some of the subjects were disappointed once the study was completed.

According to parental reports, one subject demonstrated resistance, not wanting to attend the music therapy sessions, during the entire study. Even though this subject demonstrated gains in CRASS scores, parental and teacher reports indicated that he/she never really reached his/her potential, both musically and communicatively, within the music therapy sessions. Two interpretations offered by the parent and the teacher, who observed the sessions, were that the subject was bored with the materials in the room and that the setting was not structured enough to allow the subject to understand the expectations and requirements. This raises several questions: Is the improvisatory atmosphere too threatening for some autistic children? Research has supported structured environments for autistic people. Was the amount of communication which can occur through the music overwhelming for this subject? This subject did demonstrate communication through music, but had a difficult time sustaining each communicative episode.

Should additional instruments be utilized in order to increase motivation and supply additional means for communication to occur? One drum, one cymbal, and a piano might not provide enough motivation or means of expression for some autistic children. Does musical communication necessarily result in subjects using all of their available musical skills? Research has shown that many autistic children have communication skills which are not consistently utilized. Could this also be true when looking at musical communication? This question could suggest an explanation of why this subject did make gains in CRASS scores. It is possible that the amount of communication the subject was willing or able to engage in limited the number of actual musical skills utilized.

Results of this study show that autistic children are able to make gains in the area of communication when participating in a low structured intervention. These findings are contradictory to the current literature and research cited earlier in the literature review, in which structured approaches are frequently recommended. An important question emerges as a result of the increasing levels of communicative behaviors in these autistic children resulting from this improvisatory intervention. Do autistic children need more opportunities to experience successfully spontaneity and creativity? The improvisational approach not only allows for spontaneity and flexibility, but it also allows for successful experiences. Within this spontaneity, music provides for sufficient predictability to give the child the amount of support he/she needs.

The CRASS was divided into two categories: musical and nonmusical. All eleven subjects made gains in both of these categories

when comparing their first and their last session scores. These data suggest that within an improvisational music therapy setting, autistic children's use of both musical and nonmusical skills can increase.

Significant differences were noted between the number of each of the four musical communicative modalities used by the autistic children in their first sessions and the number used in their last sessions. In comparing these four modalities (tempo, rhythm, structure/form, and pitch), the group as a whole utilized tempo most frequently in both the first and the last sessions. Also, the largest point gain from the first to the last session was noted in tempo for the group as a whole ($\bar{M}$ = 9.9). The other three modalities, in order of group mean decreasing point gains, were pitch ($\bar{M}$ = 7.7), rhythm ($\bar{M}$ = 5), and form ($\bar{M}$ = 4.6). One interpretation of these data concerns the rhythmic repetitive behaviors characteristic of autistic children. Colman and his colleagues (1976) assert that there is a stability in the frequency at which repetitive behaviors occur. The modality of tempo consisted of beating/vocalizing in a steady tempo, matching the experimenter's tempo, and beating/vocalizing and matching tempo variations. Because of the fundamentally rhythmic behaviors of autistic children, tempo may initially be one communicative modality in which autistic children can immediately experience success.

Thaut (1980) suggested the possibility of rhythm being absorbed on a physiological level and bypassing the cognitive deficits of autistic children. His definition of rhythm encompassed both the tempo and the rhythmic modalities measured in this study. This could be one possible explanation of the high levels of communicativeness demonstrated in the tempo modality. However, as noted below, the subjects made minimal

increases in the rhythm modality.

Another interpretation of the increased amount of communicativeness utilized in the tempo modality concerns interactional synchrony. Condon (1976) found that listeners move in exactly synchronous relationships with speakers. In researching autistic children, this synchrony is distorted (Condon, 1975). The subjects in this study were able to synchronize their drum beating with the ongoing music in varying degrees. One could posit that this synchrony facilitated communicative interaction through the music. Also, for some of the subjects, the music reflected their behaviors and vocalizations. The music was synchronized with the children's repetitive movements, using their levels of intensity, their rhythms, and their tempi. This could have created a sense of awareness, sense of control over their environment, and a new means of communication.

In the modality of pitch, gains ranging from 3 to 15 points were noted. All of the items in this modality were vocal responses. It is significant that each of the 11 subjects made gains in this modality.

Overall gains were also noted in rhythm and structure/form. However, the gains were smaller than the previous two modalities discussed. Gains were made by all 11 subjects in rhythm and by 9 subjects in structure/form. Two of the subjects maintained their scores in structure/form when comparing the first and the last sessions. Both of these modalities utilize more cognitive involvement as compared to tempo. Perhaps there is a connection between the cognitive deficiencies found in autistic children and the modalities of rhythm and structure/form. Participating in a give-and-take, one of the items under structure/form, requires one to organize and retain

complex sequences of information and then to use this information in responding. Autistic children's cognitive deficiencies could account for the smaller amount of gains in this modality. However, it should be repeated that structure/form gains were made by 9 of the subjects.

Under the nonmusical modalities, group mean gains were noted in all three subcategories: speech production, communicative-interactive, and communicative intent. During their last sessions, five subjects achieved all of the items under speech production (a total of 7), six subjects demonstrated all 6 of the items under communicative-interactive, and seven subjects demonstrated all 3 of the items under communicative intent. Looking at individual data from the first to the last sessions, one subject maintained his/her score and ten subjects demonstrated increases in speech production; two subjects maintained their scores and nine subjects demonstrated increases in communicative-interactive; and one subject demonstrated a decrease, three subjects maintained their scores, and seven subjects demonstrated increases in communicative intent. Statistical comparisons between these subcategories are not possible due to the small number of items within each subcategory.

A significant correlation coefficient was obtained between the musical vocal behavior gains and the nonmusical speech production gains (r_s = .645, p < .05), which indicates that as musical vocal behaviors increased, on the average, nonmusical speech production behaviors also increased. These results suggest that improvisational music therapy may be an effective language intervention approach for autistic children. Only one point was given for any vocalization emitted. The other points were given for spoken words/phrases of a song and

spontaneous appropriate words/phrases. This approach incorporated the children's spoken words and vocalizations, whether they were seen as nonfunctional or functional, into meaningful communicative activities. Several current communication intervention techniques stress the importance of this technique (Fay & Schuler, 1980; Wetherby, 1984). These speech production skills were not analyzed according to the specific communicative functions they served.

It has been stated that communication through music bypasses the speech and language barriers of autistic people. This could be one possible explanation for the increases in musical vocal behaviors. However, the significant relationship found between the increases in musical vocal skills and the increases in speech production skills leads to the question as to whether there is a cause-effect relationship. Further research is needed to examine this question.

Nine of the eleven subjects made gains in the number of spontaneous and creative acts from their first to their last sessions. These increases ranged from 1 to 6 points, and the group mean increase for all eleven subjects was 2.8 points. Even though the actual increases were relatively small, these could be valuable data for a population in which spontaneity is very limited. One interpretation of these data could be that the improvisational approach allows for creative exploration as opposed to placing external structural demands on the child. All of the subjects' creative explorations were incorporated into the ongoing improvisation and thus reinforced. Therefore, these explorations could have been perceived by the subjects as successful, which returns to the possibility discussed above of successes heightening motivation which in turn elicits increased

attempts. Since it has been reported that autistic children generally do not respond well to low structured environments, they may be limited by their overall environment in experiencing successes in spontaneity.

The Behavior Change Survey was the second measurement device utilized. The group mean ratings for changes in the subjects' communicative, social/emotional, and musical behaviors as noted by parents, teachers, and speech therapists ranged from 4.2 to 5.3, with an overall mean of 4.6. This indicated that there was change seen in the subjects' behaviors; however, it was minimal. Parents and teachers reported more changes than speech therapists in all three categories. This could be due to the limited amount of time the speech therapists see the subjects as compared to the teachers and parents. Also, the placebo effect must be taken into consideration when interpreting these data. It is possible that the changes observed in the subjects' behaviors could have been attributed to changes in the parents' and teachers' attitudes and expectations of the subjects since they were aware of the purpose of this study.

The musical category was the highest rated category overall. This could have been influenced by the knowledge of the subjects' participation in the music therapy research study. It is possible that due to this knowledge, the parents, teachers, and speech therapists became increasingly aware of the subjects' attraction to musical stimuli and demonstration of musical behaviors.

Through the Behavior Change Survey and verbal comments, the experimenter was able to ascertain the feelings of many of the parents, teachers, and speech therapists. Interest in a continuation of music therapy services for the subjects was widespread. Also, the limited

amount of time the subjects participated in the study was stated as a possible reason for the minimal behavioral changes observed outside of the music therapy setting by three of the four teachers and both speech therapists.

Significant correlations were found between the subjects' CRASS gains and the parents' total and categorical Behavioral Change Survey ratings. These results indicate that on the average, parents of the subjects who demonstrated the most CRASS gains rated their children higher on the Behavior Change Survey than the other parents. As stated in Chapter IV, this did not seem to be influenced by the parents who observed their children's music therapy sessions. The question of possible generalization, or transfer of learning from one setting to another, emerges from these findings.

The teachers' total ratings and their ratings in the three categories of the Behavior Change Survey were not significantly correlated with the subjects' CRASS gains. Also, no significant correlation coefficients were obtained between the speech therapists' ratings and the subjects' CRASS gains.

One possible reason for these differences might be that teachers and speech therapists utilize more of a structured setting than parents. Within the structured environment, opportunities for the subjects to demonstrate spontaneity and utilize new skills may be limited.

The experimental design utilized in this study minimally limited the improvisational music therapy technique. Within a preselected 10-minute interval, certain musical opportunities needed to be presented to the subjects during every session. It is possible that some of

these opportunities would not have been presented at that specific time if not involved in an experimental study. Other than this limitation, the large number of techniques provided in the hierarchy of musical experiences/activities (listed in Chapter III) enabled the experimenter to individualize each session, responding to each subject according to his/her needs and capabilities.

Recommendations for Further Study

The initial purpose of this study was to explore the effectiveness of improvisational music therapy on the communicativeness of autistic children. Analyses of individual responses to the study strongly suggests the efficacy of this technique as a communication intervention tool with autistic children. All eleven subjects demonstrated positive acceleration trends during both intervention phases and abrupt decreasing levels when reversal was applied. Also, significant differences were noted between the first session and the last session total CRASS scores.

If this study is replicated, some changes should be considered. First of all, a larger number of subjects would make the study more valid. Also, a male:female ratio which is proportional to the actual ratio found in autism would help increase the generalizability of the results. The uncontrolled factors, including the various settings of the study and the decrease in eye contact and increase in materials during reversal, should be controlled in future studies. Another suggestion would be to increase the total number of sessions for each subject, which would allow for more sessions during the reversal phase.

Some changes in the CRASS are also recommended for future research. An increase in the number of items in the nonmusical

category would provide a more comprehensive look at the communicative behaviors of autistic children in music settings and would balance the nonmusical and musical sections of this measurement device. Also, it would be beneficial to categorize items in the nonmusical section according to Communicative Responses and Communicative Acts.

More research is needed in the area of unstructured learning environments for autistic children in regard to their communicative and spontaneous behaviors. Although research has shown that autistic children learn best in structured environments, do these environments limit the children's number of opportunities and successful experiences in both communication and spontaneity?

Other research questions concerning speech production and musical vocal skills in autistic children emerge from this study. The increases demonstrated by the subjects in both of these areas, along with the significant correlation found between these two areas, deserve further investigation. Studies which identify the specific communicative functions used by autistic children in an improvisational music therapy setting would provide additional information in the area of communication deficits of autistic children. The specific communicative functions utilized while singing and while speaking could then be compared within the music therapy setting. Also, studies which investigate specific variables inherent in improvisational music therapy and their effects on vocal and verbal abilities of autistic children could enhance current knowledge of effective intervention techniques. Further research is also needed to study the transfer of learning from music therapy settings to situations in other life contexts.

Future research studies in improvisational music therapy could be designed to study both the effects of specific techniques within improvisational music therapy and autistic children's specific responses in the various musical communicative modalities. This study answered some of the initial questions and raised numerous new questions. Further experimentation and investigation might help to better understand the communication deficits of autistic children. This increased knowledge could possibly facilitate the development of intervention programs in which autistic children are able to express themselves and experience the joys of communication.

APPENDICES

APPENDIX A

Approval Letter from University Committee on Research Involving Human Subjects

MICHIGAN STATE UNIVERSITY

OFFICE OF VICE PRESIDENT FOR RESEARCH
AND DEAN OF THE GRADUATE SCHOOL

EAST LANSING • MICHIGAN • 48824-1046

August 26, 1992

Cindy Lu Edgerton
443 Forest
Charlotte, MI 48813

RE: THE EFFECT OF IMPROVISATIONAL MUSIC THERAPY ON THE COMMUNICATIVE BEHAVIORS OF AUTISTIC CHILDREN, IRB #92-435

Dear Ms. Edgerton:

The above project is exempt from full UCRIHS review. The proposed research protocol has been reviewed by a member of the UCRIHS committee. The rights and welfare of human subjects appear to be protected and you have approval to conduct the research.

You are reminded that UCRIHS approval is valid for one calendar year. If you plan to continue this project beyond one year, please make provisions for obtaining appropriate UCRIHS approval one month prior to August 26, 1993.

Any changes in procedures involving human subjects must be reviewed by UCRIHS prior to initiation of the change. UCRIHS must also be notified promptly of any problems (unexpected side effects, complaints, etc.) involving human subjects during the course of the work.

Thank you for bringing this project to my attention. If I can be of any future help, please do not hesitate to let me know.

Sincerely,

David E. Wright

David E. Wright, Ph.D., Chair
University Committee on Research Involving
Human Subjects (UCRIHS)

DEW/pjm

Dr. Roger Smeltekop

APPENDIX A

Approval Letter from Lansing School District Office of Research and Evaluation

LANSING
SCHOOL
DISTRICT
Committed to Quality

14 September 1992

Cindy Lu Edgerton, RMT-BC
443 Forest
Charlotte, MI 48813

Dear Ms. Edgerton:

In regard to the proposed study, "The Effect of Improvisational Music Therapy on the Communicative Behaviors of Autistic Children", the request to conduct the study in the Lansing School District has been approved.

The following comments apply to the study:

> No student contact may be made until written parent permission is on file in the school(s). Any teacher participation must be clearly voluntary.

If you have any questions or need additional information, please contact me (374-4347).

Thank you.

Pat Petersen

PP/mlc

cc: Research Review Committee Members

Research & Evaluation Services Office
500 W. Lenawee St.
Lansing, Michigan 48933
An Equal Opportunity District

APPENDIX B

Parental Consent Form

Description and Purpose of Study

My name is Cindy Edgerton, and I am writing to ask your permission for your child to participate in my music therapy research study. This study is a partial fulfillment for my Masters Degree in Music Therapy and is being supervised by Roger Smeltekop, Chairperson of Music Therapy at Michigan State University.

The purpose of my study is to see if improvisational music therapy can increase communicative behaviors in children diagnosed with autism. Improvisational music therapy allows for spontaneous music making in which musical interactions between the therapist and the child can occur. Beginning in September, your child will have the opportunity to participate in a half-hour individual music therapy session per week for a period of ten weeks. During the majority of the sessions, I will be creating music on the piano and singing/vocalizing, and your child will have opportunities to beat the drum and the cymbal, play the piano, and vocalize or sing along with me. He/She will be videotaped for purposes of data collection only. Videotapes will be erased once the final written copy of the study is completed.

There are no potential risks anticipated to your child. Benefits cannot be guaranteed. However, your child's participation may help us to better understand the communication deficits of children with autism and to develop more treatment interventions designed to increase and expand their communicative behaviors.

This study has already been approved by my thesis committee at Michigan State University, the Lansing School District Office of Research and Evaluation Services, the Director of Special Education of Charlotte Public Schools, and the Director of Special Education of Eaton Intermediate School District. With your help, we may be able to use this information to improve our ability to help children with autism.

I would appreciate if you would indicate your approval by signing the *Consent for Participation in Improvisational Music Therapy Study* and returning it to me in the self-addressed stamped envelope. If you have any questions or concerns, please contact me at the phone number listed below. Thank you very much for your support.

Cindy Lu Edgerton, RMT-BC
music therapy graduate student
443 Forest
Charlotte, MI 48813
(517) 543-1981

Roger Smeltekop, RMT-BC
Chairperson, Dept. of
Music Therapy
Michigan State University
(517) 355-6753

APPENDIX B

Parental Consent Form

Consent for Participation in Improvisational Music Therapy Study

I consent to my child's participation in a study which intends to investigate the effects of improvisational music therapy on the communicative behaviors of children diagnosed with autism. I have read the *Description and Purpose of the Study* and have had the opportunity to obtain additional information regarding the study. I understand that my child's participation is voluntary and that he/she may withdraw from the study at any time without prejudice to me or to him/her. I also understand that my child's permission will also be obtained if possible. My child's identity will remain confidential. Videotapes of my child will be used for purposes of data collection only and will be erased once the final written copy of the study is completed.

Finally, I acknowledge that I have read and fully understand the consent form. I have signed it freely and voluntarily. When the study is completed, I understand that I may send the researcher a written request to receive a copy of the summary of the final results.

_____	_____	_____
Parent's signature	Date	Child's name

APPENDIX C

CHECKLIST OF COMMUNICATIVE RESPONSES/ACTS SCORE SHEET

I. MUSICAL

I	V	- RESPONSES		ACTS -	I	V
			A. TEMPO			
			1. Steady tempo (3 responses)			
_____	_____	Match Approx	a. Voc/Beats w/in a single tempo range		_____	_____
			b. Basic Beat			
_____	_____	Matches	(1) Fast (>149 bpm)	Voc/Beats	_____	_____
_____	_____	Matches	(2) Mod. (95-149 bpm)	Voc/Beats	_____	_____
_____	_____	Matches	(3) Slow (<95 bpm)	Voc/Beats	_____	_____
_____	_____	Matches	c. 12 continuous beats	Voc/Beats	_____	_____
			2. Accelerando	a. Voc/Beats	_____	_____
_____	_____	Responds	b. Increases own			
_____	_____	Matches	c. Accurately or approximately			
_____	_____	Matches	d. Accurately			
			3. Ritardando	a. Voc/Beats	_____	_____
_____	_____	Responds	b. Decreases own			
_____	_____	Matches	c. Accurately or approximately			
_____	_____	Matches	d. Accurately			
			B. RHYTHM			
_____	_____	Corres	1. Voc/Beats multiples of basic beat (4 ther beats)			
			2. 2 diff synchronized rhythms	Beats _____		
			3. Rhythmic pattern/mel motif (1 measure or less)			
_____	_____	Imitates	a. Simultaneously			
_____	_____	Imitates	b. Subsequent to therapist (after)			
			c. Creates		_____	_____
			d. Repeats own		_____	_____
			4. Rhythmic/melodic phrase (greater than 1 measure)			
_____	_____	Imitates	a. Simultaneously			
_____	_____	Imitates	b. Subsequent to therapist (after)			
			c. Creates		_____	_____
			d. Repeats own		_____	_____
			5. Entire melodic rhythm (2 or more phrases)			
_____	_____	Imitates	a. Simultaneously			
_____	_____	Imitates	b. Subsequent to therapist (after)			
			c. Creates		_____	_____
			C. STRUCTURE/FORM			
_____	_____	Responds	1. Phrase a. End of phrase			
_____	_____	Responds	b. Phrase or measure beginning-specific & not 1st			
	_____	Produces	2. One word at appropriate time			
_____	_____	a. Resp	3. Rhythmic give & take (th-ch-th-ch)			
			b. Initiates (ch-th-ch)		_____	_____
			c. Develops (¨/ch 2nd reponse diff)		_____	_____
	_____	a. Resp	4. Melodic give & take (th-ch-th-ch)			
			b. Initiates (ch-th-ch)			_____
			c. Develops (¨/ch 2nd response diff)			_____

D. PITCH

_____ a. Voc 1. Vocalizes (singing quality)
_____ Responds b. In key of improvisation
_____ Matches c. Therapist's pitch

2. Varies pitch
a. Ascends in pitch _____
b. Descends in pitch _____

3. Melodic motif a. Voc/Sings _____
_____ Matches b. Melodic contour-approx or accurately
_____ Matches c. Pitches-approx or accurately

4. Melodic phrase a. Voc/Sings _____
_____ Matches b. Melodic contour-approx or accurately
_____ Matches c. Pitches-approx or accurately
d. Spontaneously creates new melodic phrase _____

5. Entire song a. Voc/Sings _____
_____ Matches b. Melodic contour-approx or accurately
_____ Matches c. Pitches-approx or accurately
d. Spontaneously creates new song _____

II. NON-MUSICAL

A. SPEECH PRODUCTION SKILLS

_____ 1. Produces sound/vocalization/word

2. Song vocalization/word
_____ Produces a. Word of song being sung
_____ Produces b. Motif of song being sung
_____ Produces c. Phrase of song being sung

_____ Spon prod 3. Appropriate vocalization/word
_____ Spon produces a. Appropriate 2-word combination
_____ Spon produces b. Appropriate >2-word combination

B. COMMUNICATIVE-INTERACTIVE SKILLS

_____ 1. Plays instrument
_____ 2. Plays 2 instruments
_____ 3. Uses both hands simultaneously in beating
_____ 4. Vocalizes and beats simultaneously
_____ 5. Tolerates entire 10 minutes
_____ 6. Participates w/ther in entire 10 minutes

C. COMMUNICATIVE INTENT SKILLS

_____ 1. Expresses emotional reaction
_____ 2. Indicates any need/want
_____ 3. Indicates wanting a music activity/song

_____ - *TOTAL* Communicative Responses/Acts

Overall Level of Musical Communicativeness

Quantity------(low level) 1 2 3 4 5 6 7 (high level)

Creativeness--(low level) 1 2 3 4 5 6 7 (high level)

APPENDIX C

Communicative Responses/Acts Definitions

Beats - This term refers to the playing of the drum, cymbal, or piano with mallets or with hands, and/or making a percussive sound using body parts or mallets.

Vocalizes - To produce musical tones or tones with musical inflections by means of the voice

I - Instrumental - Any response in which the child beats (as defined above)

V - Vocal - Any response in which the child vocalizes (as defined above)

I. MUSICAL:

A. TEMPO

1. Steady tempo
   a. Vocalizes/beats within a single tempo range-a minimum of 3 responses in the same tempo range. Tempo ranges are defined in section I.A.1.b.(1-3)
      Matches Approx-vocalizes/beats a minimum of 3 consecutive responses in the same approximate tempo of the therapist
   b. Basic beat-an equal number of beats per minute for 3 consecutive beats/vocalizations
      (1) Fast-Vocalizes/beats a basic beat in a fast tempo range or greater than 149 beats per minute
      Matches-vocalizes/beats the same fast basic beat as the therapist
      (2) Moderate-Vocalizes/beats a basic beat in a moderate tempo range or from 95 to 149 beats per minute
      Matches-vocalizes/beats the same moderate basic beat as the therapist
      (3) Slow-Vocalizes/beats a basic beat in a slow tempo range or less than 95 beats per minute
      Matches-vocalizes/beats the same slow basic beat as the therapist
   c. Vocalizes/beats 12 continuous beats-vocalizes/beats 12 continuous basic beats
      Matches 12 continuous beats-vocalizes/beats 12 continuous basic beats which match that of the therapist-therapist must initiate tempo
2. Accelerando (a minimum of 10 beats per minute change)
   a. Vocalizes/beats an accelerando-increases own tempo
   b. Responds/Increases own-while continuously beating/vocalizing, increases own tempo when therapist increases hers

c. Matches/Accurately or Approximately-follows the therapist's accelerando accurately or by playing close approximations-almost with therapist's beats during the entire accelerando-all child's beats must speed up
d. Matches/Accurately-follows the therapist's entire accelerando accurately

3. Ritardando (a minimum of 1Ø beats per minute change)
a. Vocalizes/beats a ritardando-decreases own tempo
b. Responds/Decreases own-while continuously beating/vocalizing, decreases own tempo when therapist decreases hers
c. Matches/Accurately or Approximately-follows the therapist's ritardando accurately or by playing close approximations-almost with therapist's beats during the entire ritardando-all child's beats must slow down
d. Matches/Accurately-follows the therapist's entire ritardando accurately

B. RHYTHM (Rhythmic Pattern-the grouping of 2 or more beats/vocalizations/words played/vocalized/sung in succession which differs from but is referenced to the basic beat. The length of a rhythmic pattern will be no longer than 1 measure. Phrase-any short figure or passage complete in itself and unbroken in continuity. The length of a phrase will be greater than 1 measure. Motif-a part or portion of a phrase. Melodic phrase/motif-a phrase/motif taken from the played or sung melody.)
1. Corresponds/Vocalizes/beats multiples of basic beat-vocalizes/beats any multiples the therapist's basic beat-minimum of 4 of the therapist's beats- therapist must be playing the basic beat
2. Beats 2 different synchronized rhythms-simultaneously uses both hands to beat 2 different rhythms which are both referenced to the same basic beat
3. Rhythmic pattern/melodic motif
a. Imitates simultaneously-accurately vocalizes/beats the rhythmic pattern/melodic motif with the therapist
b. Imitates subsequent to therapist-accurately vocalizes/beats the rhythmic pattern/melodic motif after the therapist finishes playing/vocalizing it-therapist can not be singing or playing it
c. Creates-vocalizes/beats a new, definite rhythmic pattern/melodic motif-must be referenced to a basic beat and be repeatable
d. Repeats own-vocalizes/beats own new rhythmic pattern/melodic motif 2 times
4. Rhythmic/melodic phrase
a. Imitates simultaneously-accurately vocalizes/beats the rhythmic/melodic phrase with the therapist
b. Imitates subsequent to therapist-accurately vocalizes/beats the rhythmic/melodic phrase after the therapist finishes playing/vocalizing it-therapist can not be singing or playing it

c. Creates-vocalizes/beats a new, definite rhythmic/melodic phrase-must be referenced to a basic beat and be repeatable
d. Repeats own-vocalizes/beats own new rhythmic/melodic phrase 2 times

5. Entire melodic rhythm
   a. Imitates simultaneously-accurately vocalizes/beats the entire melodic rhythm with the therapist
   b. Imitates subsequent to therapist-accurately vocalizes/beats the entire melodic rhythm after the therapist finishes playing/vocalizing it-therapist can not be singing or playing it
   c. Creates-vocalizes/beats a new, definite entire melodic rhythm-must be referenced to a basic beat and be repeatable

C. STRUCTURE/FORM
   1. Phrase
      a. Responds/end of phrase-stops beating/vocalizing at the end of a phrase, beats/vocalizes only on the last beat of the phrase, punctuates the last beat of the phrase using accented beat/vocalization or a different instrument, or holds note at the end of a phrase
      b. Responds/phrase or measure beginning-specifically places beats to coincide with beginning of measure or phrase, accents first beats of the measure/phrase while beating/vocalizing the basic beat, responds with a differentiated use of two instruments, beats/vocalizes the first beat only, and/or vocalizing/beating song phrases using appropriate rests-2 successive measures/phrases
   2. Produces one word at appropriate time-says or sings one word of a motif/phrase/song at the correct moment of the motif/phrase/song
   3. Rhythmic give-and-take (must follow a meter/beat/tempo and be continuous-child's response must consist of more than one beat/vocalization)
      a. Responds-Participates in rhythmic give-and-take initiated by the therapist-1 therapist-child-therapist-child cycle
      b. Initiates-Begins a rhythmic give-and-take-1 child-therapist-child cycle
      c. Develops-While participating in a rhythmic give-and-take initiated by the therapist or by the child, the child's second response is different from his/her first response (Either child-therapist-child or therapist-child-therapist-child cycle)
   4. Melodic give-and-take (must follow a meter/beat/tempo and be continuous-child's response must consist of more than one vocalization)
      a. Responds-Participates in melodic give-and-take initiated by the therapist-1 therapist-child-therapist-child cycle

b. Initiates-Begins a melodic give-and-take-1 child-therapist-child cycle
c. Develops-While participating in a melodic give-and-take initiated by the therapist or by the child, the child's second response is different from his/her first response (Either child-therapist-child or therapist-child-therapist-child cycle)

D. PITCH (Phrase-any short figure or passage complete in itself and unbroken in continuity. Motif-a part or portion of a phrase.)
1. Vocalizes
a. Vocalizes-produces any sung vocalization/word/sound
b. Responds in key of improvisation-a minimum of one note must be within the key of the therapist's music
c. Matches therapist's pitch-sings the same pitch the therapist is vocalizing/playing
2. Varies pitch
a. Ascends in pitch-produces a minimum of two ascending pitches
b. Descends in pitch-produces a minimum of two descending pitches
3. Melodic motif
a. Vocalizes/sings a melodic motif
b. Matches melodic contour approximately or accurately-sings/vocalizes a melodic motif with or after the therapist, accurately matching the melodic contour or producing close approximations of the melodic contour
c. Matches pitches approximately or accurately-sings/vocalizes a melodic motif with or after the therapist, accurately matching the pitches or producing close approximations of the pitches
4. Melodic phrase
a. Vocalizes/sings a melodic phrase
b. Matches melodic contour approximately or accurately-sings/vocalizes a melodic phrase with or after the therapist, accurately matching the melodic contour or producing close approximations of the melodic contour
c. Matches pitches approximately or accurately-sings/vocalizes a melodic phrase with or after the therapist, accurately matching the pitches or producing close approximations of the pitches
d. Spontaneously creates new melodic phrase-one not known by therapist and observers
5. Entire song (a minimum of 2 phrases)
a. Vocalizes/sings an entire song
b. Matches melodic contour approximately or accurately-sings/vocalizes an entire song with or after the therapist, accurately matching the melodic contour or producing close approximations of the melodic contour
c. Matches pitches approximately or accurately-sings/vocalizes an entire song with or after the therapist, accurately matching the pitches or producing

close approximations of the pitches
d. Spontaneously creates new song-one not known by therapist and observers

II. NON-MUSICAL:

A. SPEECH PRODUCTION SKILLS
1. Produces sound/vocalization/word-spoken, stated, or sung
2. Song vocalization/word
a. Produces word of song being sung-at any time during or immediately after song (within 5 seconds after the song ended)
b. Produces motif of song being sung-at any time during or immediately after song (within 5 seconds after the song ended)
c. Produces phrase of song being sung-at any time during or immediately after song (within 5 seconds after the song ended)
3. Spontaneously produces appropriate vocalization/word-any vocalization/word appropriate to the ongoing activity
a. Spontaneously produces appropriate 2-word combination
b. Spontaneously produces appropriate >2-word combination

B. COMMUNICATIVE-INTERACTIVE SKILLS
1. Plays instrument
2. Plays 2 instruments
3. Uses both hands simultaneously in beating
4. Vocalizes and beats simultaneously-must approximate synchronization
5. Tolerates entire 10 minutes-does not demonstrate any of the following behaviors: attempt to leave the room, physically stop therapist from improvising, vocalize/beat disruptively, suggest another activity, and exhibit aggressive and/or self-injurious behaviors
6. Participates with therapist in entire 10 minutes-stays in piano/drum/cymbal area the entire time and actively participates the majority of the time-must tolerate the entire 10 minutes

C. COMMUNICATIVE INTENT SKILLS
1. Expresses emotional reaction to music-e.g., smiling, laughing, clapping, crying, frowning, moving body excitedly, vocalizing excitedly, hugging therapist, vocalizing intensely, throwing arms up in the air (like "hurray!!)
2. Indicates any need/want-through verbalizing, vocalizing, signing, gesturing, or physically prompting
3. Indicates wanting a music activity/song-specific activity/song, element of music, instrument

Overall Level of Communicativeness-rate the child according to both the quantity and creativeness of communicative behaviors, both musical and nonmusical, demonstrated during the 10 minute segment

APPENDIX C

BEHAVIOR CHANGE SURVEY

Child's Name_____ Date_____ Your Name_____

Please circle one number for each statement using the following scale:

much less	somewhat less	slightly less	same	slightly more	somewhat more	much more
1	2	3	4	5	6	7

I. COMMUNICATIVE BEHAVIORS

A. Changes in the quantity of gestural communicative behaviors:

1 2 3 4 5 6 7

B. Changes in the quantity of nonverbal vocalizations:

1 2 3 4 5 6 7

C. Changes in the quantity of verbal behaviors:

1 2 3 4 5 6 7

D. Changes in the quantity of spontaneous communicative behaviors:

1 2 3 4 5 6 7

E. Changes in the amount of variation in dynamics of verbal/vocal behaviors:

1 2 3 4 5 6 7

II. SOCIAL/EMOTIONAL

A. Changes in the quantity of emotional behaviors such as happiness, confidence, and contentment:

1 2 3 4 5 6 7

B. Changes in the quantity of emotional behaviors such as anxiety, irritability, and sadness:

1 2 3 4 5 6 7

C. Changes in the intensity of emotional behaviors such as happiness, confidence, and contentment:

1 2 3 4 5 6 7

D. Changes in the intensity of emotional behaviors such as anxiety, irritability, and sadness:

1 2 3 4 5 6 7

E. Changes in the quantity of interactive behaviors:

1 2 3 4 5 6 7

F. Changes in comfort in relating to others:

1 2 3 4 5 6 7

III. MUSICAL

A. Changes in attraction to musical sounds:

1 2 3 4 5 6 7

B. Changes in quantity of musical behaviors:

1 2 3 4 5 6 7

IV. Please use the back of this sheet to comment on your responses above or to provide me with any additional information. Once again, THANK YOU VERY MUCH!!

LIST OF REFERENCES

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