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**A STUDY OF THE EFFECTIVENESS OF AN ADAPTATION
OF MELODIC INTONATION THERAPY IN INCREASING
THE COMMUNICATIVE SPEECH OF YOUNG CHILDREN
WITH DOWN SYNDROME**

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ABSTRACT

This study examined the effectiveness of an adaptation of Melodic Intonation Therapy (MIT) in increasing the communicative speech of young children with Down syndrome. Eight children were matched according to their mean length of utterance and divided into two groups, the melodic group and the spoken group. The same individual treatment was received by all during twelve weekly sessions, except for the manner in which target phrases were presented: spoken versus melodically intoned. Data was collected from language samples taken before and after treatment as well as from audiotapes of the children's verbal responses produced during the weekly sessions. Findings revealed greater gains for the melodic group than for the spoken group for total verbal output, length of response and production time, thereby providing evidence for the positive effect of MIT. Implications for future research were addressed and applications for implementing MIT with young children were discussed.

RÉSUMÉ

Cette étude a examiné l'effet d'une adaptation de "Melodic Intonation Therapy" (MIT) sur le langage verbal communicatif de jeunes enfants trisomiques. Huit enfants étaient jumelés selon la longueur moyenne de leur énoncés et divisés en deux groupes, le groupe mélodique et le groupe parlé. Tous ont reçu la même intervention individuelle pendant douze semaines. Par contre, la présentation des phrases cibles étaient chantées pour un groupe et parlées pour l'autre. Les données étaient recueillies des échantillons de langage, avant et après l'intervention ainsi que des réponses verbales produites durant chacune des sessions d'intervention. Les résultats ont démontrés des gains plus grands pour le groupe mélodique pour le nombre total des mots, la longueur des énoncés et le temps de production, suggérant ainsi l'effet positif de MIT. L'auteur discute des implications pour la recherche future et des façons pratiques de mettre à exécution le MIT auprès des enfants.

TABLE OF CONTENTS

	Page
LIST OF FIGURES	v
LIST OF TABLES	vi
ACKNOWLEDGEMENTS	vii
 CHAPTER	
INTRODUCTION	1
Statement of Purpose	5
 II. REVIEW OF LITERATURE	
Right hemispheric processing of music and speech prosody	7
Music-based activities to develop speech	8
Melodic Intonation Therapy research	11
Conclusions	15
Restatement of purpose and sub-problems	17
 III. METHODOLOGY	
Subjects	18
Research design	19
Intervention	20
Implementation of intervention	22
Procedures for data collection	27
. Home visits	27
. Intervention period	28
Procedures for data analysis	29
. Home visits	29
. Intervention period	30
 IV. FINDINGS	
Home visits	32
Intervention process	39
Contextual factors affecting output	46
Pre- and post-intervention differences in verbal output	63

TABLE OF CONTENTS

(cont'd)

	Page
CHAPTER	
V. SUMMARY, DISCUSSION, CONCLUSIONS, IMPLICATIONS	69
Summary	69
Discussion	72
Conclusions	78
Implications for future research	79
Implications for clinical practice	80
Implications for educational practice	82
APPENDIXES	
1. FORMS AND LETTERS	87
. Letter sent to professionals and associations	
. Letter sent to parents with enclosures:	
Informed Consent Form, Language Profile	
Form, Checklist, Questionnaire	
2. ADAPTED MIT PROTOCOL	94
3. SESSION DATA FORM	97
4. EXCERPT FROM A CHAT-CODED LANGUAGE TRANSCRIPT	99
REFERENCES	100

Raw data, including language transcripts, fieldnotes and session data forms are available upon request

LIST OF FIGURES

	Page
FIGURES	
1. Selected melodically intoned phrases	23
2. Techniques to elicit target word or phrase	24
3. Number of responses at each level of intervention for children in the melodic group	44
4. Number of responses at each level of intervention for children in the spoken group	45
5. Musical greeting	46
6. Modification of target phrases	53
7. Exploring pitch and intensity	54
8. Call-and-response improvisation	55
9. Technique used to elicit unison response	59
10. Technique used to elicit "I play drum" with R ^s	59
11. Technique used to elicit "I play drum" with T ^m	60
12. Chanting versus intoning "Bear on chair"	61
13. From imitative to conversational response	62
14. Pre- and post-intervention group means for production time	68
15. Group means for total number of responses during intervention process	70
16. Pre- and post-intervention group means for total number of words	71
17. Pre- and post-intervention group means for mean length of utterance (MLU)	72

LIST OF TABLES

	Page
TABLES	
1. Subject descriptive data	18
2. Interactional style of parent during collection of pre-intervention language sample	34
3. Interactional style of parent during collection of post-intervention language sample	38
4. Total number of responses per session	40
5. Range of length of utterance (in words) during intervention process	42
6. Setting in which session took place	50
7. Modification of target phrases during sessions	52
8. Pre- and post-intervention scores for each subject	64
9. Means and standard deviations for each group	65
10. Total number of words for entire sample	65
11. Mean length of utterance (MLU) for entire sample	66
12. Production time for entire sample	67
13. Production time for the melodic group	67
14. Number of unintelligible responses from pre- and post-intervention language samples	68

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CHAPTER I

INTRODUCTION

Language is the source of human life and power (Chapey, 1994). The ability to communicate effectively is essential to every aspect of modern life and the key to social and economic independence (Nadel, 1992). From its origin in a baby's first cry, the acquisition of speech is a truly remarkable achievement. The child's developing language is based on the convergence of cognitive, sensorimotor and affective processes (Miller et al, 1980) and is influenced by the cultural and interactive forces in the social environment (Vygotsky, 1986; Conti-Ramsden & Snow, 1990; Bloom, 1993). If one or more of these developmental processes is not intact, there may be a delay in acquiring speech. Young children who are speech-delayed are likely to experience failure and considerable frustration at not being able to meet the expectations and hopes of others, especially parents. This can cause considerable frustration which might have serious consequences on their future emotional, cognitive and social development.

Children with Down syndrome are a case in point. Described by Langdon Down in 1866, Down syndrome is a major cause of mental retardation and congenital heart disease, occurring in approximately one in every 600 live births (Cicchetti & Beeghly, 1990; Kronenberg et al, 1992). Also known as Trisomy 21 because of extra genetic material on the twenty-first chromosome, Down syndrome is characterised by particular facial and other physical features, as well as by defects of the immune system (increased immunity to infection). Advances in the field of human molecular genetics are making it increasingly possible to discover the genetic basis for the associated defects, perhaps eventually preventing and treating them (Kronenberg et al, 1992).

Children with Down syndrome are also known to have a specific delay in sequencing words into speech patterns and diminished speech intelligibility (Fowler, 1990). Furthermore, as these children get older, their linguistic deficits may increasingly affect other areas of development (Cornwell & Birch, 1969). As Nadel (1992) notes, "the ability to communicate effectively is essential to social life, virtually all forms of gainful employment and just about every other aspect of modern life" (Miller, 1992, p.38). Speech language pathology treatment of children with Down syndrome has applied a developmental approach to improving speech intelligibility and speech-sequencing abilities. Certain techniques have reportedly been used, including sucking, chewing and swallowing to improve oral motor control, the use of signing and pictures to reinforce language comprehension and speech production, the practice of sound patterns, such as C-V-C (ex. phonemic drills) and the use of scripted events or structured child-adult interactions, including games, book-reading and role-play (Mahoney & Snow, 1983; Swift & Rosin, 1990; Spiker, 1990).

Although many areas of cognitive function in individuals with Down syndrome are of interest, the one area that has received the most attention is language. As a practising music therapist, what has often personally intrigued me during an initial assessment of children with speech delay is the ease with which they imitate complex rhythm patterns on a drum despite their inability to string more than two words together. These observations led me to explore further how the active ingredients of music, such as melody and rhythm, might improve speech sequencing abilities. There seemed to be a natural link between music and speech because of the elements they share - rhythm, melody, timbre, pitch, intensity, etc. When exaggerated within the context of musical activities, these elements facilitate vocal and verbal responses. More specifically, setting words to a melodic motif that reflected the intonation and rhythm of the speech pattern, then

gradually increasing the length of the pattern, seemed to be an effective strategy in developing speech.

Melodic Intonation Therapy (MIT) was a method with which I was not entirely familiar, but one that was close to what I had already been using intuitively in my work (Carroll, 1989). It was first developed by Sparks, Helm and Albert in 1973 to aid speech recovery in adult aphasic patients at the Aphasia Research Center of the Boston's Veterans Administration Hospital. MIT is based on the Minor Hemisphere Mediation Model (Chapey, 1994), that recognizes right (minor) cerebral dominance for music and speech prosody (Scheid & Eccles, 1975; Gates & Bradshaw, 1977; Goodglass & Calderon; Ross & Mesulam, 1979; O'Boyle & Sanford, 1988; Morton et al, 1990). By converting speech patterns to melodic motifs, MIT exploits the affective-prosodic qualities (or suprasegmental characteristics) of speech - pitch, loudness, rate and stress - to facilitate communicative speech.

Melodic intonation is a form of singing, dating back to the Judeo-Christian period (Sparks & Deck, 1994) and is distinguished from speech by its slower, more lyrical tempo, more precise rhythm and more accented points of stress. Sparks and Holland (1976) noted that patients appeared to be more capable of processing the structural aspect of the intoned verbal speech patterns when they focused on the melodic line, rhythm and points of stress. This observation seems to be consistent with the current thinking of suprasegmental functions of intonation, rhythm and stress as the foundation or structural support for the organization of speech communication (Leung, 1985).

The original MIT protocol (1973) consists of four levels, gradually increasing in difficulty with regard to phrase length, and gradually reducing dependency on the clinician and reliance on intonation. At Level One, the process of intoning melodic patterns and handtapping the rhythm and stress of each pattern is established. At Level Two, the patient hums and handtaps the speech patterns together in unison with the

clinician, then repeats the patterns after they have been modelled. Finally, the patient responds to a question, using the speech pattern. Level Three is similar to Level Two, except for an enforced delay of response¹, the purpose of which is to maximize efficiency of word retrieval. The aim of Level Four is to return to normal speech by way of the sprechgesang (speech-song) technique, in which the constant pitch of the intoned words is replaced by the variable pitch of speech, with the tempo, rhythm and stress of the speech pattern being retained. Throughout the procedure, patient and clinician sit facing each other. MIT gives the clinician flexibility in determining appropriate target phrases and in adapting to changes in intonation patterns created by the patient.

Sparks et al (1973) reported MIT's effectiveness in the recovery of communicative speech in three adult males who had lost the ability to speak, following left hemispheric damage. Six other studies have been found that provide evidence of the effectiveness of MIT. Two studies² examined the use of MIT in the speech rehabilitation of adult aphasics (Sparks et al, 1974; Marshall & Holtzapple, 1976). Four case studies reported the successful application of modified versions of MIT in the development of speech in children with language delays (Miller & Toca, 1979; Helfrich-Miller, 1980; Ronski, 1980, Krauss & Galloway, 1982). In addition, two articles provided a detailed description of MIT (Sparks & Holland, 1976; Sparks & Deck, 1994) and two papers examined criteria for candidacy for MIT (Berlin, 1976; Naeser & Helm-Estabrooks, 1985).

¹ The patient is required to wait a certain period before repeating the pattern.

² A recent Medline database search revealed an abstract of a third study, that reported MIT's effectiveness in the speech rehabilitation of 80 Romanian aphasics. Unfortunately the article itself was published in the Romanian Journal of Neurology and Psychiatry, and this unavailable.

On the basis of its methodology, candidacy and efficacy, MIT has been rated as promising¹ by the Therapeutics and Technology Assessment Subcommittee of the American Academy of Neurology (1994). As such, this melodic-based language stimulation method seems to be a suitable intervention strategy with a strong theoretical basis that fulfills the child's need for structure, appropriate communicative speech patterns and multisensory stimulation (Preuss & al, 1987). Furthermore, children with Down syndrome possess certain characteristics considered favourable with regard to candidacy for MIT (Sparks et al, 1974; Sparks & Deck, 1994), including difficulties in speech production as compared to language comprehension (Fowler, 1990; Miller, 1992) and poor vocal imitation skills (Preuss et al, 1987).

Determining what kinds of intervention strategies are most effective in overcoming language difficulties is a top priority for researchers (Nadel, 1992). Whereas, it was noted by the Assessment Subcommittee of the American Academy of Neurology (1994) that, as one of the few language therapy techniques formal enough to be evaluated, "MIT can fulfill consistency requirements for research-level studies" (p.566), there have been methodological flaws in the research done to date. The most apparent one has been the lack of a control group to account for time, maturation and practice (or carry-over effect). There have been no comparative studies done to test MIT's effectiveness. Furthermore, no studies have been found that examine the language acquisition of children with Down syndrome across different intervention strategies. Therefore, a study of the effectiveness of MIT in increasing the communicative speech of young children with Down syndrome would fill a void in the research literature.

¹ Promising is defined here as "given current knowledge, this technology appears to be appropriate for the specified patient population" (referring to adult aphasics) (p.567, 1994).

STATEMENT OF PURPOSE

The purpose of the present study was to examine the potential effectiveness of Melodic Intonation Therapy (MIT) in improving the communicative speech of young children with Down syndrome.

Chapter II will develop a theoretical basis for the study and will explore the issues regarding the implementation of an appropriate research design for understanding MIT's effectiveness with children with Down syndrome. Chapter III will describe the methodological procedures that were carried out and the rationale for using them. Techniques for data collection and analysis will also be explained. Chapter IV will present the results of the analyses of data and examine certain contextual factors that might have accounted for these findings. Finally, Chapter V will present a summary of the study, followed by a discussion of the findings, conclusions and implications for future research and clinical practice.

CHAPTER II

REVIEW OF THE LITERATURE

The aim of this chapter is to review the research literature that has provided both theoretical and methodological contexts for the present study. The literature will be reviewed here under the following three headings: Right hemispheric processing of speech and music, Music-based activities to develop speech, and Melodic Intonation Therapy.

RIGHT HEMISPHERIC PROCESSING OF SPEECH AND MUSIC

There is considerable evidence, primarily from brain lesion studies and dichotic listening experiments¹, to suggest that the right hemisphere may be dominant for the processing of speech and music prosody. Prosody, first described by Monrad-Krohn in 1947 as the "third element of speech" (along with grammar and vocabulary), is defined as "the melodic line produced by the variation of pitch, rhythm and stress of pronunciation that bestows certain semantic and emotional meaning to speech" (as reported in Ross & Medulam, 1979, p.146). Ross and Medulam (1979) described the case of two patients with right hemispheric lesions, who spoke with unmodulated and monotone voices that were devoid of the prosodic-affective qualities of speech, supporting the notion that prosody is a dominant function of the right hemisphere.

In a dichotic listening study by Goodglass and Calderon (1976), all subjects - 16 music students, demonstrated a left ear advantage for tonal stimuli, and a right ear advantage for verbal stimuli (words superimposed on piano notes). These findings led the authors to speculate that the phonological and semantic aspects of normal speech perception are processed in the left hemisphere, and the intonational contours in the

¹ In these studies, the subject receives different auditory stimuli simultaneously, one to the right ear and the other one to the left ear.

right hemisphere. Similarly, O'Boyle and Sanford (1985) found a right hemispheric superiority for melody and a left hemispheric superiority for rhythm in a study of 46 male university students, who were asked to first listen to a familiar melody, then to determine whether the rhythmic sequence that was tapped in either their left or right palm matched the rhythm of the previously presented melody. A more recent study by Morton, Kerschner and Siegel (1990) asked sixteen males, aged 10 to 12 years, to remember a series of digits presented under two different conditions, prior exposure to music or to silence. Prior exposure to music resulted in a significant increase in total digits reported. The authors concluded that music might be used to improve attention and memory, by increasing bilateral cerebral arousal levels, possibly through the mediating role of the right hemisphere. This finding is particularly important when considering the application of MIT to young children with Down syndrome in that the interest aroused by the melodic element may be a motivating factor in eliciting verbal output.

MUSIC-BASED ACTIVITIES TO DEVELOP SPEECH

Sound evidence of a neurophysiological link between music and speech, as illustrated above, has important therapeutic implications for using music to improve speech performance. Indeed, for more than four decades, music therapists and speech therapists have been investigating the effect of music on speech production. Studies have reported improved speech (ie. increased vocal range, rate of speech and intelligibility) as a result of specific music activities, including the singing of familiar and specially composed songs, rhythmic chanting, telling stories set to music and the use of rhythmic and singing instruction (Seybold, 1971; Michel & May, 1974; Roger & Fleming, 1981; Leung, 1985; Hoskins, 1988; Cohen & Masse, 1993). Michel & May (1974) described three research projects (Marsh, 1969; Irwin, 1969 & 1971), which dealt specifically with speech production. In one of

these projects (Irwin, 1971), visual cue cards, nonsense syllables and specially composed songs were used to help five nonverbal children with Down syndrome practise three speech sounds [b], [p] and [m]. Although the author reported an increase in the intelligibility of these sounds, the strength of these results is hard to determine. The children acted as their own controls, making it difficult to separate treatment effects from carryover or practice effects.

Another study done about the same time by Seybold (1971) sought to determine the effectiveness of a technique that combined music activities (particularly the singing of familiar songs) with conventional speech therapy techniques. Eight preschool "speech-delayed" males were treated individually for a period of eight weeks. Four children were exposed only to speech therapy techniques. The remaining four children were exposed to the combined music and speech therapy techniques. Due to a theft of the pretests, there was no baseline, thus making it impossible to evaluate the effects of treatment. There were other apparent flaws in this study. Firstly, the author did not clarify what was meant by "speech-delay". Similarly, the dependent variable of interest, spontaneous speech was not clearly defined. Therefore, it was not known exactly what kind of information the investigators intended to obtain. Thirdly, there was an incongruity between the dependent variable of interest and the dependent measure - using the Houston Test to measure spontaneous speech was questionable, given that this test is used to measure various aspects of language concepts, not spontaneous speech. Finally, the two treatments lacked standardized and theoretically sound protocol.

The study by Hoskins (1988) used a pre-posttest within-subjects, repeated-measures design to examine the effect of antiphonal singing¹ on the expressive language abilities of

¹ Antiphonal singing refers here to a procedure in which the therapist showed a picture card to the group while singing a three to five-word phrase about it. The group then repeated the object name on the card with the therapist.

sixteen preschool children (mean IQ of 73). Four tests were administered: a prerecorded musical imitation task and three versions of the Peabody Picture Vocabulary Test (PPVT, EOWPVT-Expressive One-Word Picture Vocabulary Test and Form M, the Melodic version). Following the pretests, children were divided into three groups on the basis of chronological age and functional abilities. After ten weeks of three weekly 30-minute sessions, a significant improvement was found only for the melodic version of the PPVT ($p < .05$), suggesting that antiphonal singing was beneficial. Despite reported gains, as in the Seybold study, there were serious problems with the research design. Firstly, the dependent variable of interest, expressive language abilities, was not clearly defined. Secondly, there was an incongruity between the dependent variable of interest and the test used to measure it. More specifically, the Peabody Picture Vocabulary Test (PPVT) did not seem to be a suitable tool to measure improvement in expressive language, particularly since the required response was either nonverbal (pointing to a picture, as in the PPVT) or a single word (Expressive One-Word PPVT). Thirdly, the lack of a control or comparison group made it difficult to determine the effectiveness of treatment. Finally, the probability of error was increased by the multiple statistical tests used to analyze the data.

A study by Rogers and Fleming (1981) involved the use of a music-speech therapy technique with a 53-year-old aphasic male. Where previous studies used subjects as their own controls in successive treatments, Rogers and Fleming followed their subject concurrently for four months in both music therapy and speech therapy. Findings revealed that every stage of speech recovery, including automatic speech for counting, the development of speech patterns and appropriate verbal response to questions, first appeared in the music therapy sessions. It was concluded that this increased rate of progress in music therapy might have been attributed to the music-speech therapy technique, which was characterised by the

use of a single "carrier melody" ("Yankee Doodle") for all sentence items.

Whereas Rogers and Fleming (1981) intentionally used a familiar tune "to take advantage of any automatic ability present" (p.34), Sparks et al (1974) observed that the use of an intoned utterance resembling a familiar song often produced less than successful results, because the familiar melody often stimulated recall of the more intact non-communicative song lyrics. Subjects would experience difficulty focusing on the "unfamiliar" words, not traditionally associated with the tune. Based on these observations, they argued that there was a dramatic difference between the subjects' automatic speech of well-memorized songs and the deficient quality of their meaningful, communicative speech. Moreover, they challenged the presumptions of music therapists and speech therapists, that the singing of familiar songs could improve language skills in adult aphasic patients.

MELODIC INTONATION THERAPY (MIT) RESEARCH

MIT research with adult aphasics

Melodic Intonation Therapy (MIT) was first introduced in 1973 by Sparks, Albert and Helm. MIT involves setting communicative phrases, such as "May I have some juice, please" to melodic motifs that reflect the intonational contour and rate of stress of the speech pattern. As described in Chapter I, MIT has a well-defined protocol and is grounded in a neurophysiological theory that recognises right hemispheric dominance for music and speech prosody.

Two studies have provided evidence of MIT's effectiveness in recovering speech with severely speech-impaired right-handed adult aphasics. Sparks, Helms and Albert (1974) were the first to provide evidence that improvement in communicative speech occurred as a result of MIT. The authors used a two-treatment within-subjects design in which each patient acted as his own control. Six months of "traditional"

language therapy, during which no progress was reported, was followed by an experimental period of daily individual MIT sessions and group sessions (a less structured form of MIT, where verbal interactions were intoned). Of the eight patients, six showed significant improvement in all subtests of the Boston Diagnostic Aphasia Examination (B.D.A.E.) (1972), with the most significant change occurring for phrase length. Four of these patients began MIT treatment with limited and meaningless but well-articulated stereotype jargon. By the end of treatment, they were using three or four-word phrases. The other two patients began treatment with a few overlearned social phrases and were using one or two-word phrases at the end of treatment. Finally, the two patients who did not improve were the most verbal, scoring very well in the pretests of repetition when compared with the other patients and with their own performances on the other verbal tests. It was concluded that MIT treatment was most appropriate for those with severely restricted verbal output, good auditory comprehension and poor verbal imitation skills. The authors also found that syntactic growth began to appear post-MIT, inferring that the benefits of MIT might be delayed. The strengths of this study lie in the use of an appropriate test instrument, the B.D.A.E., to examine different aspects of verbal expression (ie. responsive naming, confrontation naming, phrase length) and in the establishment of criteria for MIT candidacy. An apparent weakness was the two-treatment within-subjects research design. In the absence of a control group, it was difficult to separate the effect of treatment from the carryover effect.

The three case studies by Marshall and Holtzapple (1976) provided further evidence of the delayed effect of MIT, but in this case it was with regard to speech intelligibility, rather than phrase length. Progress was noted on the basis of the Porch Index of Communicative Ability (PICA) (1974), with the most improvement occurring three months and six months post-MIT. In this study, the MIT protocol was simplified in the

following ways to meet the needs of those patients, who were not responding to the complexities of the "orthodox" form of MIT: three treatment "plans"¹ were used instead of four levels, "intoned sequence units" served as the carrier phrase for several speech patterns (ie. "It's a _____" and a core of five nouns) and graphic representations of the actual intoned target phrase were shown while practising the target. The authors clearly stated that their modified treatment was not meant to replace MIT, but only to respond to the specific needs of those patients who were referred to their clinic. This study is also noteworthy for its detailed descriptions of the progress of each patient at each level and of the verbal instructions that were provided. As well, the authors addressed the need for considering other factors influencing verbal output, in particular, the potentially critical role of handtapping in MIT treatment success.

MIT research with children with speech delay

To date, there have been only four case studies; Miller and Toca (1979), Ronski (1980), Helfrich-Miller (1980) and Krauss and Galloway (1982). The issue of modifying MIT to meet the developmental needs of children for multisensory stimulation and for dynamic, pleasurable interactions is particularly significant in these studies. Miller and Toca (1979) described the case of a three-year-old nonverbal boy with autistic features who began producing spontaneous verbalizations as a result of MIT. The boy acted as his own control, having shown no progress after being treated for one year with a Simultaneous Communication method (signed and verbal language). The ten-week experimental period consisted of four weekly sessions. In each session, a cookie (or cracker) and a drink were placed on a tray in front of the

¹ Plan I comprised a series of steps, increasing in difficulty as in the original MIT protocol except for the return to normal speech via chanting; Plan II was similar to Plan I, but stressed the development of the patient's vocabulary; Plan III involved independent practice using a Language Master Machine.

boy. The researcher sang the target items three times with the appropriate signed gestures, followed by an intoned request "What do you want ?". After 25 sessions, the boy began to consistently sign and intone the three target items. By the end of treatment, he was spontaneously intoning other words at home, or on the school bus. His mother continued to use the MIT procedure at home and after 35 days, he was producing up to four-word utterances. Based on these findings, Miller and Toca recommended prolonging MIT treatment for at least three months. This recommendation echoed that of Sparks et al (1974), who advocated a minimum of three months of daily post-MIT. It must be noted that using food as a reinforcer was a confounding variable that seriously jeopardized the validity of these findings.

Romski (1980) provided an interesting way to meet the young child's need for multisensory stimulation by using a puppet to facilitate handtapping. Her study of a five-year-old apraxic child involved six months of a traditional treatment approach, during which minimal progress was made, followed by six months of MIT. Gains were reported with respect to the intelligibility of spontaneous two-word phrases and to their generalised use at school and at home. Improved speech intelligibility and phrase length were also reported by Helfrich-Miller (1980) in their study of two apraxic children in which American Sign Language was used to assist speech production.

In a study of two apraxic right-handed boys, Krauss and Galloway (1982) went even further to modify the MIT procedure in order to accommodate children's developmental needs. The first level of MIT was extended to give the children time to establish the intonation pattern. Signed gestures, puppets and pictorial representations were used to enhance the meaning of the target phrase and to cue the child's attention to the phrase. Each child served as its own control, with two months of traditional speech therapy followed by an experimental period where MIT was used as a warm-up (facilitating

procedure) for 20% of the language therapy time. Gains in noun retrieval, phrase length and verbal imitation tasks were similar to those reported by Sparks et al (1974).

In addition to the MIT modifications, this study is also noteworthy for its operationalized definitions and clear rationale for the two test instruments used, Language Sampling and the Porch Index of Communicative Ability in Children (PICAC) (1974). Language Sampling, or the sampling of a child's language within the context of spontaneous interactions in naturally occurring situations, was used to measure each child's mean length of utterance (MLU). It has since become a major component of both clinical and research assessment procedures (Bloom & Lahey, 1978; Duchan & Lund, 1983) and has been compared favorably to standardized language tests (Blau et al, 1984). The use of the verbal and auditory sub-tests on the PICAC was justified on the basis of its similarity to the sub-tests of the Boston Diagnostic Aphasia Examination and to tests of repetition used by Sparks et al (1974). Finally, the use of a two-treatment within-subjects research design made it difficult to determine the effect of treatment. This was the case for all the MIT studies.

CONCLUSIONS

The few MIT studies that have been done to date all share two important points: 1) all the studies have been carried out with small groups or with a single subject, and have involved adult aphasics or children with speech-delays, and 2) all have been marred by methodological problems. With the exception of the study completed by Rogers and Fleming (1981), every MIT study used a two-treatment within-subjects design in which there was a period involving traditional language therapy, followed by an experimental period involving MIT. This made it difficult to determine whether reported gains were a result of treatment or practice. Sparks (1974) was very aware of the

problems inherent in this research design, specifically with regard to carryover effects, such as time, maturation and practice. However, from an ethical point of view, depriving some patients for the purposes of research control was for him not easily justified or explained. Thurman and Widerstrom (1990) suggested that the issue of denying service might be resolved if researchers were to randomly assign children to different intervention programs and then collect data to examine which is more effective. If one is to effectively examine MIT, a comparison group is needed. This group would receive a treatment similar to the experimental group in all respects, except for the absence of the melodic component. In this manner, the potential contribution of this element in improving speech might be determined.

The issue of modifying MIT when working with children was also raised in the above literature review. If one is to effectively meet young children's developmental needs (ie. social, emotional and cognitive), it would be important to allow for stimulating and dynamic interactions through careful choice of play materials.

Only one study examined the intervention process by noting the subjects' verbal responses at every level during each session (Marshall & Holtzapple, 1976). This raises the issue of the importance of examining the unfolding of the intervention period, including the contextual factors affecting change in verbal output, if one is to gain a better understanding of the MIT treatment process itself. Furthermore, collecting data from the intervention process and linking these findings to outcome measures might help to strengthen internal validity. It might also assist clinicians in developing effective strategies for the implementation of an adapted form of MIT with young children, and help researchers in refining methodological procedures.

RESTATEMENT OF PURPOSE AND SUB-PROBLEMS

The purpose of the present study was to examine the potential effectiveness of an adaptation of Melodic Intonation Therapy (MIT) in improving the communicative speech of young children with Down syndrome.

A number of questions were important in guiding the collection and analysis of data:

- . How did the children's verbal output evolve during the 12-week intervention period?
- . What differences in verbal output between the two groups could be identified: a) during the intervention process and b) at the end of the intervention period ?
- . What factors affected verbal output during the intervention process and during the collection of language samples ?
- . What recommendations can be drawn up for implementing MIT with young children ?

CHAPTER III

METHODOLOGY

SUBJECTS

Eight children (five boys and three girls) between the ages of three and six were selected to participate in this study. Three restrictions were imposed on subject selection: diagnosis of Down syndrome, production of at least one-word utterances, and English as principal language of communication at home (see Table 1).

Table 1
Subject descriptive data

	Child	Sex	Age yrs;mo	Incoming MLU	Diagnostic Category	School	Traits (personal & medical)
Melodic Group	A ^M	F	5; 7	1.59	Down syndrome	Integrated kindergarten	social, playful
	J ^M	M	3; 7	1.39	Down syndrome	Integrated pre-school	reserved, attentive; possible hearing loss
	L ^M	M	6; 7	1.12	Down syndrome	Special school	friendly, resistive in a playful way; apraxic
	T ^M	M	3; 10	1.26	Down syndrome	Integrated daycare	social, playful; possible hearing loss, many sinus and ear infections
Spoken Group	E ^S	F	4; 1	1.37	Down syndrome	Integrated daycare	restless, curious
	J ^S	M	3; 5	1.18	Down syndrome	Integrated daycare	social, gentle, caring
	R ^S	M	3; 5	1.13	Down syndrome	Integrated pre-school	outgoing, active
	V ^S	F	4; 9	1.17	Down syndrome	Special school	restless, imaginative; mild hearing loss (wears hearing aids)

Children were recruited with the help of several speech-language pathologists, a family doctor, a school nurse and parent-members of local associations for the handicapped, to whom letters were sent, explaining the study and requesting that they distribute copies to the parents of children with Down syndrome. Announcements were also placed in the newsletters of the Montreal Association for the Intellectually Handicapped, the West Island Association for the Handicapped and the local Down Syndrome Association. Prior to the study, parents were informed of the procedures and asked to sign a consent form which stated that their children could be withdrawn at any time during the study upon request (see Appendix 1 - Forms and Letters).

RESEARCH DESIGN

A pretest-posttest comparison group design was used. Three dependent measures - total number of words (also expressed as amount of verbal output), production time or rate of response (as determined by the number of minutes required by the child to produce 100 consecutive utterances) and mean length of utterance (MLU) - were obtained from pre- and post-intervention language samples collected during visits to the children's homes. MLU is a number representing the mean length of a continuous sample of utterances measured in morphemes¹ (Brown, 1973). There is evidence to support MLU as a useful summary measure of syntactical complexity (Cicchetti & Beeghly, 1990) and as a reliable measure of a young child's language competence, when compared to standardised tests, such as the Carrow Elicited Language Inventory (CELI) (1974).

The children were matched on the basis of incoming MLU scores and randomly assigned to one of two groups. Although not used as a basis for matching groups, subject factors, such as physical and emotional state at time of testing,

¹ A morpheme is the minimum unit of meaningful speech. It can stand alone (free morpheme), such as the word "cat", or it can be attached to a word (bound morpheme), such as "s" in "cats"; the "s" provides information regarding quantity.

hearing status, specific language difficulties, sociocultural influences, cognitive function and chronological age, were considered to facilitate the development of specific intervention techniques and for data analysis and interpretation.

INTERVENTION

The intervention period consisted of 12-weekly 30-minute individual sessions that were carried out by myself within the context of a core set of interactive play situations. Each child in the melodic group (N=4) received a modified version of Melodic Intonation Therapy (MIT). Each child in the spoken group (N=4) received the same treatment as the melodic group in all respects, but without the melodic component. More specifically, the only difference between the two intervention strategies was the manner in which the models and requests were presented - all the models and requests were melodically intoned for children in the melodic group, whereas they were spoken for children in the spoken group.

The two intervention strategies were modelled on the basis of the original MIT protocol (1973) and were adapted in the following ways to meet the developmental needs of young children with Down syndrome for stimulating, active and playful interactions:

1. Three levels of response were used instead of four. Each of the three levels of the intervention corresponded to a certain type of response. At Level One, after eliciting the target word or phrase, using a variety of linguistic and nonlinguistic cues, I invited the child to intone or say the target with me (unison response). At Level Two, I asked the child to repeat the target after it was modelled (imitative response). Finally, at Level Three, I asked a question to which the child was expected to respond appropriately with the target or other phrase (conversational response). The order in which these responses were elicited was variable, determined by the way in which each session unfolded.

2. The return to normal speech by way of sprechgesang (speech-song) and chanting was not considered, as it would have applied only for the melodic group. Ensuring that both groups received the same treatment throughout, except for the manner in which the models and requests were presented, was the top priority.

3. Whereas in the original MIT protocol, to progress through the various steps of each level, the patient's score had to be 90% based on the mean of 10 consecutive scores, the children in the present study were simply required to give three correct responses (or approximations) before moving to the next target phrase or level of response. The scoring procedure was simplified to account for the relatively short attention span of young children - requiring 10 consecutive responses before moving on to the next target or level might have provoked resistiveness and uncooperative behaviour.

4. Body actions, pictures and actual objects were used to enhance the meaning of the target word or phrase, and to stimulate children in different ways - auditory, visual, tactile and kinaesthetic. For example, the target phrase, "I see dog" was practised while pointing to the picture of a dog, that was in a book or on a separate piece of paper. Similarly, phrases such as "stand up" and "sit down" were accompanied with body movements. The physical rigidity of patient and clinician sitting at a table facing one another would have been inappropriate for young children, given their need for movement and varied stimulation.

5. A bongo drum was used, instead of handtapping, to emphasize the rhythmic pattern of the target phrase as well as to facilitate listening and turntaking. Occasionally, body parts were used rhythmically instead of the drum (ie. tapping index finger on target object, gently nodding foreheads together).

6. Hand puppets ("Super Bunny" and "Peter Parrot") were used to encourage role-playing. For example, "Super Bunny" was used by myself or the child to model, request and elicit unison

responses, often while playing the drum. "Peter Parrot" was used primarily at the end of the session to praise the children for their efforts during the session and to say good-bye (see Appendix 2 for a description of the adapted MIT protocol used in this study).

IMPLEMENTATION OF INTERVENTION

DETERMINATION OF TARGET PHRASES

Target words and phrases were chosen on the basis of parent reports (Appendix 1), pre-intervention language samples and by the play materials used in the session. In addition, single-word and multi-word utterances were selected from among those commonly used, according to child language acquisition data. For example, single-word utterances include objects, such as names of food, toys and body parts, actions - "go", "sleep", "open", "eat", social words - "bye-bye", "yes", "no", and location words - "there", "up", "down". Multi-word utterances include action + object - "eat apple", "throw ball", agent + action + object - "mommy eat apple", action + object + location - "throw ball up" (Bloom, 1991).

MELODIC INTONATION OF TARGET PHRASES

As stated above, the only element that distinguished the treatment received by the melodic group from that received by the spoken group was in the manner in which target words and phrases were presented. In the melodic group, models and requests were melodically intoned. Target phrases were set to melodic patterns that exaggerated the prosodic elements of the speech pattern, including the intonational contour, rhythm and rate of stress. The melodic range was generally small, however, sometimes I would gradually rise in pitch to the octave (ie. C --> C¹) to emphasize the last word of a phrase (Figure 1, Example 1). Occasionally, I would add a refrain as a link to a repeat of the target phrase (Figure 1, Example 2) or create a song that included imitative or echo responses (Figure 1, Example 3). Familiar motifs were avoided.

Figure 1. Selected melodically intoned phrases

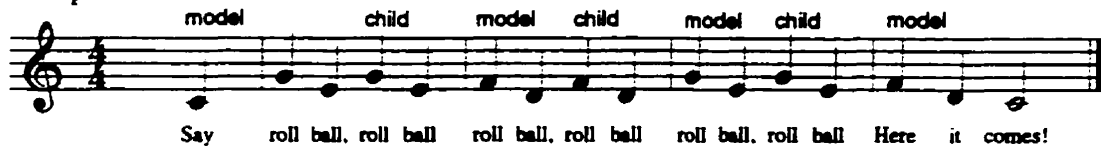
Example 1



Example 2



Example 3

**ELICITATION TECHNIQUES**

Particular target words and phrases were elicited within specific play contexts, gradually increasing in length. The sequence "drum" --> "play drum" --> "I play drum" was used while playing the drum; "help" --> "help please" --> "Debbie help please" was used when the child needed help (ie. to remove the lid of the plastic container with the playmobile figures). Figure 2 illustrates how certain target words and phrases were elicited while playing with a ball, first with children in the spoken group then with those in the melodic group.

Figure 2. Techniques used to elicit target word or phrase

SPOKEN GROUP

NL I bring out ball
 L.1 "What is this?"
 L.2 "This is a (b*)".
 L.3 Say "ball"

NL Get ready to roll ball
 L.1 "What do you want me to do?"
 L.2 "I'm going to (r*)". -
 L.3 Say "roll ball"

NL Put ball in basket. Shrug shoulders and show palm of hands.
 L.1 "Where is the ball?"
 L.2 "The ball's _____"
 L.3 Say "Ball allgone " or "No more ball"

NL = Nonlinguistic Cue; L.1 = First linguistic cue, etc.

*Put lips together to form the consonant sound

MELODIC GROUP

NL I bring out ball



NL Get ready to roll ball



NL Put ball in basket. Shrug shoulders and show palm of hands.



PLAY MATERIALS

Play materials included a ball (ie. rolling, throwing, and hiding) for stimulating physical movement. Playmobile figures (ie. taking a walk, eating a snack, going to sleep and waking up) were used for stimulating imaginary play with the number and type of figures usually corresponding to the people in the child's immediate family. Several children's books and a series of pictures (of animals, food and play materials) were used for identifying objects. A bongo drum (with 5" and 3" drumheads) was used to rhythmically support the target words and phrases, and two hand puppets, "Super Bunny" and "Peter Parrot", were used for encouraging role-play.

DESCRIPTION OF A TYPICAL SESSION

The unfolding of each session, including the choice and nature of the activity, was determined largely by the child. A session typically began with a greeting ("hi", hello Debbie", "How are you?", "I'm fine"). Play with figures might follow, which involved taking them for a walk and then giving them a snack. Next, the child might choose to play with the ball, throwing it up or hiding it in different places. The child might then take a book (or animal pictures) out of my toy bag, identifying the illustrations with the help of the drum. The session would typically end with "Peter Parrot", who praised the children for their efforts during the session and said "good-bye".

EQUIPMENT

A small Panasonic tape recorder (Model No. RQ-356A) was used to record each session. I chose to use a tape recorder because it was unobtrusive and easily hidden from sight, thus maximising the naturalness of the interaction.

ROOM

It was arranged that sessions would take place at the same time in the same room in order to control as much as possible for intrasession history. All room changes were unavoidable, although most were known beforehand (ie. daycare closed, so child seen at home, or room was being renovated so session took place in child's bedroom). In two instances, the room change was unexpected, both for the child and myself.

PILOT TEST

A pilot test, involving two normal 24-month old children (MLU between 1 and 2), allowed me to develop, refine and become familiar with the intervention strategies. This included determining the target phrases and associated intoned patterns, as well as practising the modelling and elicitation of spoken and intoned target phrases at the different levels of intervention. On the basis of the pilot test, it was decided that each session would be 30 minutes in order to allow for time to get to the room and to settle down. Certain observations made during the pilot test were quite different from prior expectations. For example, the move through levels 1 and 2 was faster than I had anticipated. As well, if I modelled a target word or phrase more than four times without getting a response, the children's attention and interest decreased. The introduction of the drum seemed to elicit quicker and more articulate responses, regardless of whether the phrase was spoken or intoned. This observation prompted me to introduce the drum earlier than I had originally intended, for motivational reasons. Finally, as a result of the negative response to "Peter Parrot" by one of the children, I decided to use him only at the end of the session for verbally reinforcing the children for their efforts and for saying good-bye.

PROCEDURES FOR DATA COLLECTION - HOME VISITS

COLLECTION OF LANGUAGE SAMPLES

The purpose of the home visits was to collect pre- and post-intervention language samples of each child at play in order to obtain the three dependent measures - total number of words, MLU and production time. Language Sampling was chosen as it is a major component of both clinical and research assessment procedures (Bloom & Lahey, 1978; Duchan & Lund, 1983) and has been compared favorably to standardized language tests (Blau et al, 1984).

Upon arrival at the child's home, I asked one of the parents to play with his/her child for fifteen minutes, after which I played with the child for the same period of time. This procedure was borrowed from Lund and Duchan (1988), who suggested that a preferred way to obtain a language sample was for the clinician to observe the child in interaction with the caretaker for 10-15 minutes, then to join in. All child-adult interactions were taped; however, the sample that was transcribed, and from which pre- and post-intervention measures were computed, contained only 100 consecutive child utterances. This number represented the minimum amount of child utterances needed to measure MLU (Brown, 1973). In order to ensure consistency and uniformity in the data collection procedures, each transcript included the last 30 utterances, produced by the child while playing with the parent (or sibling), followed by the first 70 utterances produced while playing with me (who presented the same play objects to each child - ball, figures, books, etc.). I chose to use the last 30 utterances produced by the child during the parent-child interaction to allow for a warming-up period; I chose to use the first 70 utterances while playing with me to get to know the children and to have a basis for comparing their language performance in interaction with me during the home visits with their verbal output during the intervention sessions.

Fieldnotes were written after each home visit while listening to the tape of the session. Particular attention was paid to the context in which the language sampling took place, and its possible impact on the child's verbal output. Subject factors were also considered, such as the child's physical and emotional state at time of testing, hearing status, specific language difficulties and sociocultural influences.

TRANSCRIPTION AND CODING OF LANGUAGE SAMPLES

A computer package entitled Child Language Data Exchange System (CHILDES) (MacWhinney & Snow, 1984) provided the data input, storage and scoring capabilities for the language samples. CHILDES allows for greater scientific rigour in the collection, transcription and coding of data than doing it manually. Computerized transcriptions of language samples have enabled researchers to share data thus advancing child language research. MacWhinney (1991) estimates that there are over sixty groups of researchers all around the world who are collecting and transcribing language data using the CHAT system.

Language samples were transcribed by an independent observer with experience in using CHILDES and myself, according to CHAT format specifications (see Appendix 4). CHAT is the acronym for Codes for the Human Analysis of Transcripts. Consensus (inter-rater) reliability on the content of the language transcripts was established by having the independent observer check 10%-15% of two of the pre-intervention transcripts that were prepared by myself. Percentage agreement was 85%.

PROCEDURES FOR DATA COLLECTION - INTERVENTION PERIOD

Data was derived from fieldnotes detailing the unfolding of each session, and from session data sheets documenting every response of the child.

Fieldnotes were written after each session while

listening to the audiotape of the session. The focus of interest was the children's verbal output. In particular, the effectiveness of certain intervention strategies was noted as well as other factors affecting output. Among the factors identified were physical setting, child-researcher relationship, play routine, role of the drum, and manner of presentation of the target phrases (spoken or melodic).

In addition, an overview of each session was achieved by creating session data forms (Appendix 3). Following a review of the audiotape of the session, every verbal response or utterance of the child, as well as the play context in which it was produced, was noted on these sheets. Three categories were created to correspond with each of the levels of the intervention: unison response (target is intoned or spoken in unison), imitative response (target is repeated after researcher) and conversational response (target or other intoned/spoken phrase is produced in response to researcher's question. A fourth category, spontaneous response, was added in order to account for the utterances that were initiated spontaneously by the child.

While not corresponding exactly with the dependent measures for total number of words and mean length of utterance, the number of responses, collected during the sessions, provided an indication of the amount of verbal output, and therefore a means of comparing children's output during the intervention process with their output before and after it.

PROCEDURES FOR DATA ANALYSIS - HOME VISITS

SCORING OF DEPENDENT MEASURES

CHILDES has become a standard tool for accurate and reliable analysis (1984). Reliability for the scores for MLU and total number of words was ensured through the use of the CHECK program, which was run on each transcript file several times until no error messages were reported. The CHECK program

verified data accuracy and the correct use of CHAT codes in preparation for the automatic scoring of the two dependent measures by the CLAN programs (CLAN is the anacronym for Computerized Language Analysis). The third dependent measure, production time, was calculated by listening to the taped language samples, each containing 100 consecutive child utterances, and determining the number of minutes it took to produce them in interaction with a parent or myself.

ANALYSIS OF DEPENDENT MEASURES

Two statistical tests were applied to analyze the three dependent variables - total number of words, mean length of utterance (MLU) and production time. A multivariate repeated measures analysis of variance (MANOVA) was calculated on each of the measures to determine whether the pretest-posttest gains between groups differed significantly. The Pearson product-moment correlation coefficient measured the degree of association between pre- and posttest scores.

PROCEDURES FOR DATA ANALYSIS - INTERVENTION PERIOD

ANALYSIS OF SESSION DATA FORMS

The number of responses or utterances within each category and the total number of responses for each session were computed. In addition, the relationship between the amount of verbal output at the different levels of intervention was examined. Increases in the length of the responses were also noted.

ANALYSIS OF FIELDNOTES

Fieldnotes were examined and coded for emerging themes in terms of the contextual factors that affected the children's verbal output. Among the factors identified were physical setting, child-researcher relationship, play routine, role of the drum, and melodic versus spoken presentation of the target phrases. When examining the setting in which the intervention

took place, the physical (home, school, or daycare; spacious vs. cluttered), functional and auditory features of each setting were considered. The child-researcher relationship was determined by the evolving relationship and its impact on the child's verbal output. With regard to the play routine, elements such as the nature and preference of the play routine as well as the role assumed by the child (initiator, follower, partner) were of interest. The effect of the drum on the quality (ie. clarity and rate of response) and quantity of verbal output was also considered.

Descriptive and quantifying data from the intervention period was generated in order to provide some answers to the following research questions: How did the children's verbal output evolve during the 12-week intervention period ? How did the children respond to the different levels of the intervention protocol ? What differences in verbal output could be observed between the four levels of response ? Was there a particular pattern of response that emerged ? What differences between the two groups could be identified ? To what extent did certain contextual factors, particularly the manner in which the target phrases were presented (spoken versus melodically intoned) have an effect on the quantity and quality of verbal output? What, if any, effect did the the drum have on the quality and quantity of verbal output ?

CHAPTER IV

FINDINGS

This chapter is divided into four sections. The first section addresses the factors affecting the collection of pre- and post-intervention language samples during the home visits. The second section examines the verbal output in the intervention sessions for both subject groups. The third section addresses the contextual factors influencing verbal output during the intervention process. The final section presents the pre- and post-intervention differences in verbal output, as it relates to the total number of words, mean length of utterance and production time.

In order to preserve anonymity, only the child's first initial will be used when making specific references: A^M, J^M, L^M and T^M are in the melodic group; E^S, J^S, R^S and V^S are in the spoken group. The superscript identifies the group to which the child belongs.

HOME VISITS

COLLECTION OF PRE-INTERVENTION LANGUAGE SAMPLES -

First home visit

EXCERPT 1: L^M

I enter the small, living room with six-year-old L^M and his mother, followed by his father and older brother. A couch, two sofa chairs and a television are all the furniture that is in the room. The father picks up the lone ball lying on the floor, rolls it to L^M and says, "Give me the ball". L^M replies, "No", "no way". After several minutes, his brother is asked to get some toys. He returns with crayons and a colouring book with all its pages coloured in. The father asks L^M to "choose the green one" and so forth. L^M takes the appropriate crayon and, after scribbling some lines on the back of the colouring book, puts the crayon back in its proper place.

Except for several instances of "no" and "no way", L^M remains silent during this activity. His father often reminds him to "sit up straight" or "be good".

A few moments later, I sit on the floor next to L^M. His eyes are fixed on the bag of play materials that are at my side but he does not reach out for it. I show him "Peter Parrot" (hand puppet). L^M motions for me to put Peter on my hand. Resisting my attempts to engage him in play, he repeats "No" several times with a twinkle in his blue eyes. I put Peter away and take out a red nylon case containing a tambourine. L^M reluctantly unzips the case, shakes the tambourine for three seconds and, after refusing to play a vocal imitation game with me, says "dow(n)" (he means "put away"). When I ask him to put the tambourine in the bag, he refuses and continues to shake it. "Put it away, c'mon", his father echoes my request.

Ten minutes later...

We look at a book together. L^M is interested. Despite his apparent difficulty in repeating certain sounds due to his apraxia (see glossary), he says "book", "apple", "cocoa", "cup", etc.

EXCERPT 2: A^M

Colourful fabric highlights the narrow hallway that leads to the living room. I follow 5 year-old A^M, her sister (ALY), and her sister's friend into the small, living room, filled with pictures and tapestries. Birthday cards and small figurines adorn a shelf. A^M's mother, father and 16-year old brother are already sitting on one of the two sofas. The girls move the coffee table so they can sit on the floor. A^M's sister is holding a pack of cards. "Play cards okay?", A^M suggests. Her sister asks, "Which game do you want to play?" "War", A^M quickly replies. There is a lot of laughing and playful teasing. Within this context, A^M produces a steady flow of phrases, especially commands, such as "do this", "ALY come here". When the game ends, I take the ball out of my bag and join in the play. "Do you know what this is?", I ask. A^M responds, "Play ALY..." We all play together. A^M repeatedly tells us what to do.

Analysis:

These two excerpts, taken from my fieldnotes during the first home visit, show striking differences, particularly in the way the father and sister interacted with L^M and A^M respectively. L^M's father was directive in his approach and concerned with the proper way of doing things. He chose the play contexts (ie. play with ball, colouring) and did not give L^M an opportunity to assume the role of initiator. Nor did he praise L^M or offer words of encouragement. In contrast, A^M's sister interacted with A^M on equal terms in a non-directive manner.

These two interactional styles were encountered in the home visits for both groups. Where the directive approach was observed with other children, the negative impact was not as pronounced as it was with L^M. The most common interactional style was one that combined a non-directive and directive approach (see Table 2).

Table 2

Interactional style of parent during collection of pre-intervention language sample

	Location	Parent (or sibling) at play with child	% (approx) of directed exchange	% (approx) of non- directed exchange
L ^M	living room	father	90	10
J ^M	den	mother	50	50
T ^M	den	mother	50	50
A ^M	living room	sister	25	75
E ^S	daycare classroom	educator	50	50
J ^S	playroom	mother	50	50
V ^S	living room	father	60	40
R ^S	living room	brother	25	75

It was interesting to note that, for those children exposed to a balanced approach (ie. relationship between the amount of directed vs. non-directed exchange approximately 50-50), the language sampling took place in a playroom with lots of toys, each child interacting with their mothers, who used effective verbal elicitation techniques to stimulate play (ie. J^s and his mother created a person out of "playdough", each taking turns adding one part until the body was formed). For those children, where the approach was primarily non-directive, the language sampling took place in a living room or den in the presence of other family members. These conditions existed for those that were exposed to a primarily directive approach as well. The one exception was E^s, whose language samples were obtained at daycare. This location was chosen because Hungarian was the main language spoken at home and her mother felt that speaking English at home might be confusing. She added that the daycare was E^s's "second home".

Differences in interactional style and play context had an effect on verbal output, particularly in the way it set up certain modes of response in the child. As previously seen in the opening excerpts, the directed approach of L^m's father limited L^m's opportunities to use different kinds of speech or to engage in a conversation. Instead he protested most of the time, often saying "no" and "no way" while colouring (non-interactional activity chosen and directed by his father). In comparison, A^m's bossiness while playing "war" with her sister elicited 2 and 3-word commands such as "play ALY", "pass it", "ALY, come here", "play cards, okay?".

These modes of response were present in both groups. In the case of J^s, collaborating with his mother to make a person out of "playdough" elicited phrases such as "my turn" and "help me please". For V^s, pretending she was a waitress (serving all kinds of plastic food and drink - doughnuts, chicken, hot dogs, coke, tea, etc.- to her mother and father) resulted in a variety of one-word utterances, such as "(ba)nana", "chi(ck)en" and "co(ke)". J^m pushed a plastic

dinosaur back and forth to his mother. He was animated and clearly having fun. This interactive play resulted in a variety of spontaneous utterances, including "ready", "go", "(hoo)ray" and "move back". As for R^s, he was basically on his own, moving from one object to the next and speech-babbling to himself. Intelligible output was limited to "hi, jeejee" ("talking" on phone to his cousin). Sporadic attempts by his brother to direct R^s's attention were unsuccessful.

I noted in my fieldnotes that, not only did the interactional approach of the parent or sibling set up certain modes of response in the children, but these modes of response were carried over in the way they interacted with me. A^m played cards with me and told me what to do. V^s took my order and served me tea and doughnuts. L^m resisted my attempts to play with him and continued to produce his stereotypic utterances, "no" and "no way". It was only during the last part of the language sampling, while looking at a book together, that L^m began to move out of an uncooperative mode and produce for the first time a variety of words. This was the case for the other children as well, except for J^m and R^s, who altered their mode of response when I joined in the play. Whereas J^m was animated with his mother, he did not respond verbally to me for the first five minutes. He seemed withdrawn and distrustful. According to his mother, he did not feel comfortable with females because of numerous hospital experiences and unpleasant encounters with nurses. Consequently, she did not feel that the language sample was representative of J^m's present level of speech. As for R^s, I noted in my fieldnotes that his brother did not attempt to structure an interaction around R^s's play preferences, nor make an effort to elicit any verbal responses. When I joined in, the change in mode of response resulted in the production of one and two-word utterances (ie. "bag", "boy", "madee der" (= mommy there), "fall down"):

The television is on but the volume is turned down. R^s rides his tricycle. His brother observes. After a short while, R^s rides to the

plastic telephone and "talks" to his favourite cousin. He then gets off the bike, runs to a corner of the room, picks up a book and begins to "read". Less than a minute later, he is at the VCR, trying to insert a tape (Barney). While "talking" and "reading", his speech is babble-like and unintelligible. When I sit down on the floor, he quickly sits down next to me and looks in my bag of toys. He takes out the playmobile figures, playing with them for more than five minutes and responding verbally with 1 and 2-word intelligible utterances, including "daddy", "walk" and "sit down".

COLLECTION OF POST-INTERVENTION LANGUAGE SAMPLES -

Second home visit

Post-intervention language samples were collected under similar circumstances with contextual factors, such as physical setting, interactional style and play activities, having a similar impact on verbal output.

There were, however, some differences, as seen in Table 3, that seemed to affect verbal output. In the case of E^s, the change was in the person who played with her before I joined in. This educator's repeated question "What's this ?" elicited only one-word utterances (ie. "egg", "juice", "{j}ello") while labelling pictures on puzzle pieces. In comparison, the playful interaction that was established with the first educator during the collection of the pre-intervention language sample, elicited steady output and the occasional two-word utterance ("help please", "did it!"). E^s 's limited output was also in contrast to the two and three-word utterances she produced with me (ie. "help please", "dad sleep", "sit down mom") while playing with playmobile figures during the post-intervention language sampling.

A difference between the first and second home visits was also seen with J^s and T^m. In the second visit, J^s's mother was ill. In my fieldnotes, I noted that J^s was unconcentrated and that his Mom had to prompt him several times before identifying flash cards. According to her, J^s normally did not

require any cueing. When I joined in, he immediately took everything out of my bag, refusing to put anything back. This conduct was not typical of his behaviour during the pre-intervention language sampling or during the intervention sessions. During this visit, three or four minutes passed during which there was little or no verbal output in comparison to the first home visit, where there were no such gaps. As for T^M, he was in fine form and very responsive during the second home visit in contrast to the first one, where he had a bad sinus infection. His illness might have affected pre-intervention scores, possibly accounting for the fact that, next to A^M, he had the largest post-intervention gains compared to the other children.

Table 3

Interactional style of parent during collection of post-intervention language sample

	Location	Parent (or sibling) at play with child	% (approx) of directed exchange	% (approx) of non- directed exchange
L ^M	living room	mother*	75*	25*
J ^M	den	mother	50	50
T ^M	his bedroom	mother	50	50
A ^M	parent's bedroom	sister	35*	65*
E ^S	daycare classroom	different educator*	75	25
J ^S	playroom	mother	50	50
V ^S	living room	father	40*	60*
R ^S	den	brother	25*	75*

*This indicates that there was a change from the collection of the pre-intervention language sample.

The most important difference was that all the children participated in twelve individual weekly language stimulation sessions since the first home visit, resulting in increased familiarity with me, as well as with certain play routines, established during the intervention. The effect of the familiarity was seen particularly with regard to the ease with which the children moved from playing with their parent (or sibling) to playing with me. The one exception was L^M, who did not want to stop playing with his mother. He reacted negatively to my joining in ("no", "away you"). However, once his mother's continued presence was assured - it took approximately three minutes to decide where she should sit - L^M was able to settle down and play with me.

As for the effect familiarity with certain play routines had, it was interesting to note that two children, T^M and J^S, were quite upset when they realised that the drum was not in my bag, as was reflected by their sighing and saying "drum" several times. That response might be understood in light of the fact that the drum had become an integral part of the intervention process, particularly in the way it structured the play activity and the speech patterns, regardless of group. I had decided not to bring the drum to the second home visit so that procedures for data collection were consistent with the first home visit, where the drum was not used.

INTERVENTION PROCESS

In this section, changes in the children's verbal output seen during the intervention process with regard to total number of responses, length of utterance, levels of response and clarity of production will be presented. These findings will then be analysed within the social-interactive play context in which the intervention process unfolded.

AMOUNT OF VERBAL OUTPUT DURING INTERVENTION PROCESS

The total number of verbal responses per session increased for all but one child (V^S), regardless of group, as illustrated in Table 4.

Table 4
Total number of responses per session

Melodic Group

Session	1	2	3	4	5	6	7	8	9	10	11	12
A^M	84	73	84	66	75	78	115	149	—	118	165	88
J^M	42	75	70	52	93	39	43	79	104	118	159	123
L^M	87	137	160	184	145	81	126	221	152	—	108	171
T^M	122	52	104	112	90	90	98	111	126	—	131	133

Spoken Group

Session	1	2	3	4	5	6	7	8	9	10	11	12
E^S	102	117	107	78	158	107	95	142	120	167	130	149
J^S	—	57	89	98	122	128	126	132	152	160	152	158
R^S	96	77	86	72	63	64	71	111	73	136	180	58
V^S	145	134	111	128	153	161	162	134	174	102	88	117

N.B. The dashes (—) indicate that the total responses were not available due to a problem with the tape recorder.

Of the four children who showed a steady increase, three were in the melodic group - A^M (session #4-#11), J^M (session #6-#12) and T^M (session #6-#12). The fourth child, J^S , was in the spoken group (session #2-#12). For three of the remaining four children, L^M , E^S and R^S , verbal output was more variable, although a general increase was apparent across sessions - L^M (87 responses in session #1 compared to 171 in session #12), E^S (102 responses in session #1 compared to 149 in session

#12) and R^s (96 responses in session #1 compared to 180 in session #11). In the last session, R^s produced only 58 responses; an unexpected room change affected verbal output in that he did not respond verbally for the first ten minutes of the session. For the fourth child, V^s, verbal output was less in session #12 than in session #1. A slight but erratic increase until session #9 was followed by a significant drop in sessions #10 and #11. Session #11 was unusually short (20 minutes instead of 30), thus accounting for the low verbal output (88 responses).

To summarize, three of the four children in the melodic group showed a steady increase in output, whereas three of the four children in the spoken group showed an increase that was more variable. This resulted in a slightly greater average increase in verbal output for the melodic group than for the spoken group (84-129 responses for the melodic group compared to 96-120 responses for the spoken group).

LENGTH OF UTTERANCE

While there was a general increase in total verbal output, there was also an increase in the length of utterances in both groups, as shown in Table 5. Most children produced 1-2-word utterances in the first session. During the course of the treatment, of the three children who improved the most, two were in the melodic group, A^M and T^M. By the last session, A^M produced an average of 3-4 word utterances with up to 7-word phrases spontaneously; T^M produced an average of 2-word utterances and up to 4-word utterances. The third child, J^s, was in the spoken group. He produced an average of 3-4 word phrases in conversational responses and up to 7 words in imitative responses (ex. "I see a little boy brushing teeth", session #8) by session #12.

The child who improved the least was L^M, whose neurologically-based apraxic condition made it difficult to sequence words or even parts of words (syllables). Some improvement was noted, however. At first, he had much

difficulty sequencing the two syllables in a word, such as "pee - tah" (peter) or "e - ee" (debbie). Throughout the course of treatment, he progressed from combining syllables to producing several two-word phrases by session #8 and even a few three-word phrases by session #12 (i.e. "no mama bye").

Table 5
Range of length of utterance (in words) during intervention process

Session		1	2	3	4	5	6	7	8	9	10	11	12
Melodic Group	A ^M	1-4	1-5	1-5	1-4	1-5	2-3	1-5	1-6	1-5	2-5	1-7	2-5
	J ^M	1	1	1-2	1-2	1-2	1	1	1-2	1-3	1-3	1-3	1-3
	L ^M	1	1	1	1	1	1-2	1	1-2	1-3	1-2	1-2	1-2
	T ^M	1-2	1	1-2	1-2	1-2	1-2	1-2	1-2	1-3	1-3	1-3	1-4
Spoken Group	E ^S	1-2	1-2	1-2	1-2	1-2	1-2	1-2	1-2	1-2	1-2	1-3	1-3
	J ^S	1-2	1-3	1-3	1-4	1-4	1-4	1-4	1-6	2-4	2-5	2-4	2-5
	R ^S	1	1-2	1-2	1-2	1-2	1-2	1-2	1-2	1-3	1-3	1-3	1-3
	V ^S	1	1-2	1	1-2	1-2	1-2	1-2	1-2	1-2	1-3	1-2	1-2

LEVEL OF VERBAL RESPONSES

An analysis of the session data forms revealed that two types of changes emerged with respect to the levels of verbal responses - unison, imitative, conversational and spontaneous (see Figures 3 & 4). First, regardless of group, the number of unison responses increased in the first few sessions then gradually decreased, never exceeding 20% of total responses during the course of the intervention. There were two exceptions. L^M (Graph 3, Figure 3) increased dramatically in unison responses from sessions #1-#3, followed by a decrease from sessions #4-#7. The number of unison responses peaked at

session #8 (110 unison responses compared to 19 unison responses in #7) then decreased and increased again. The other exception was R^S (Graph 7, Figure 4), whose initial decrease in unison responses was followed by a zigzag pattern of increases and decreases. Increases in unison responses at sessions #4, #7 and #8 were consistently related to the use of specific techniques, such as tapping fingers on the target objects ("I see cat") or nodding foreheads together ("up", "down", "ball", "kick ball").

The second change involved imitative, conversational and spontaneous responses. As the number of conversational and spontaneous responses increased, the number of imitative responses decreased. For example, A^M (Graph 1, Figure 3) showed a decrease in imitative responses from sessions #3-#8, as spontaneous responses increased. Similarly, in the case of V^S (Graph 8, Figure 4), imitative responses decreased as target phrases were produced spontaneously and in conversational speech. There was a steady increase in conversational responses until session #12. The relatively even distribution of responses at session #12 was in contrast to the huge gap between imitative responses and all other levels of response at session #1. In the case of T^M (Graph 4, Figure 3), imitative responses decreased from sessions #8-#11 while spontaneous and conversational responses increased. As was seen with the unison responses, this trend was found in both groups, with the exception of two children, one from each group (J^M and R^S).

Figure 3. Number of responses at each level of intervention for children in the melodic group

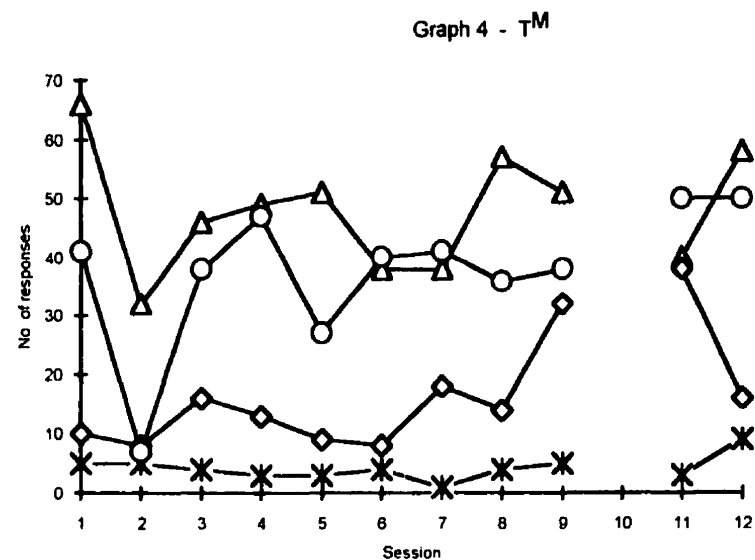
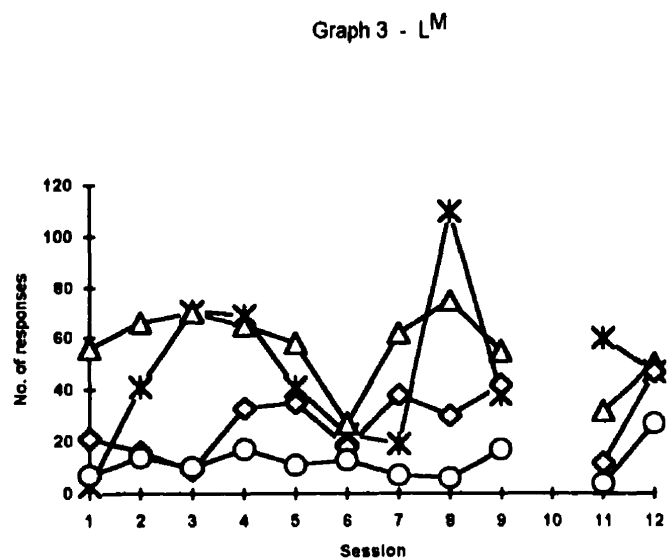
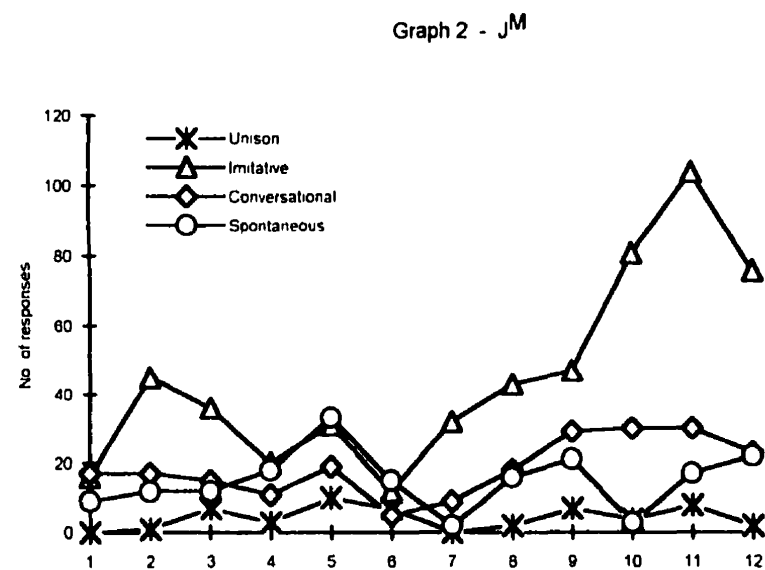
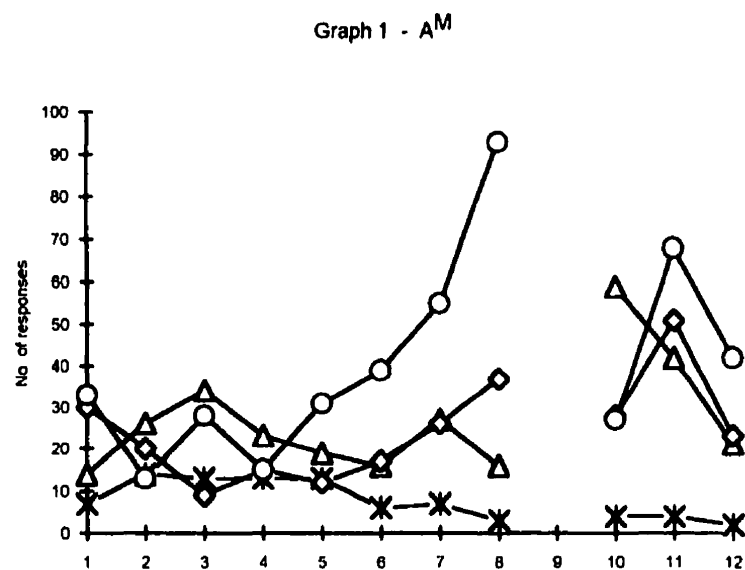
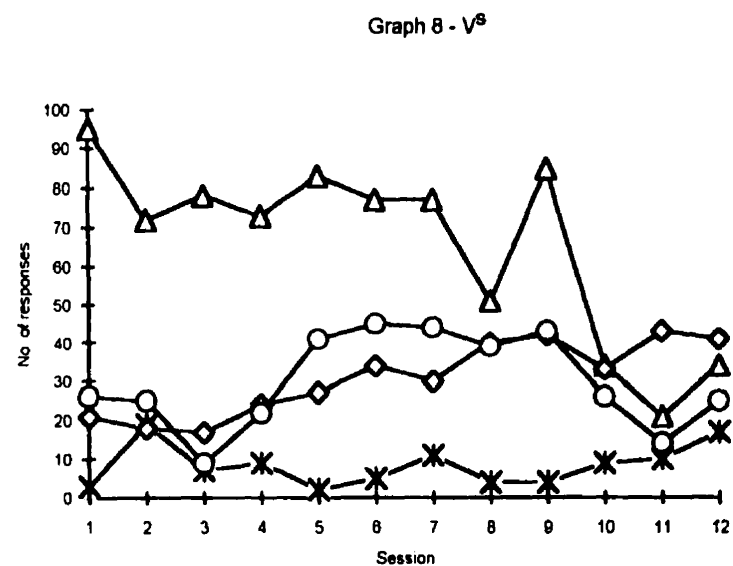
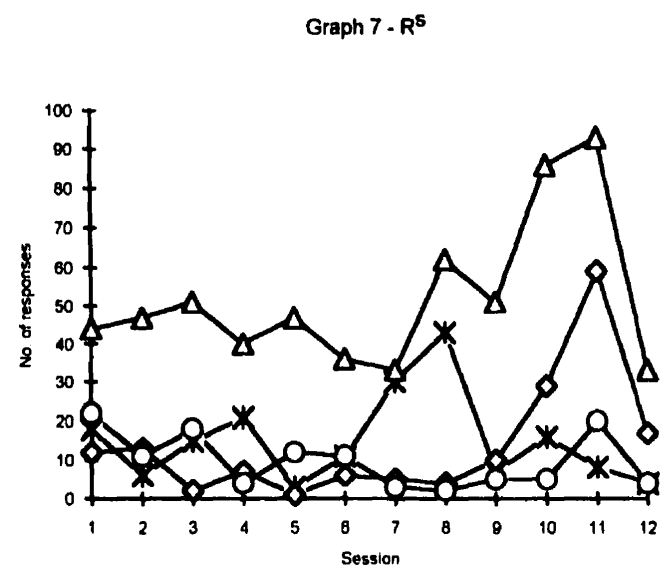
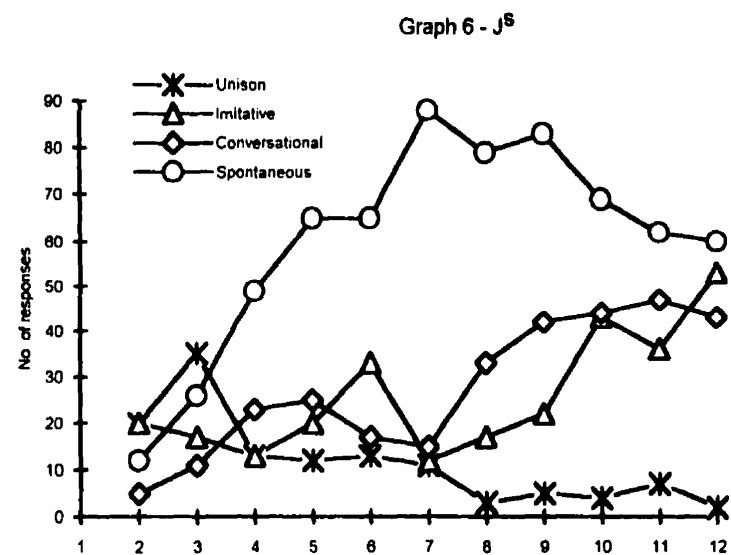
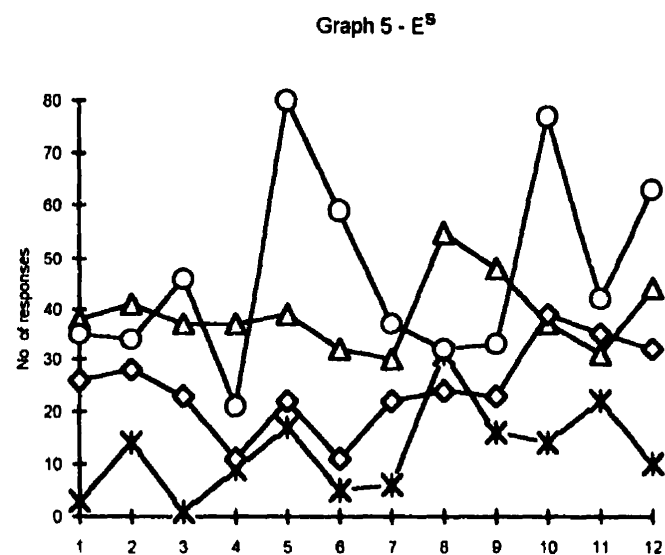


Figure 4. Number of responses at each level of intervention for children in the spoken group



CLARITY OF SPEECH AND RATE OF RESPONSE

Fieldnotes revealed that regardless of group, children's verbal output became increasingly louder and clearer, with instances of unintelligible utterances gradually decreasing. In comparison, an increased rate or speed of response was particularly apparent in the melodic group, but observed infrequently in the spoken group. Children in the melodic group would respond to my queries more quickly and with fewer prompts or cues.

CONTEXTUAL FACTORS AFFECTING VERBAL OUTPUT

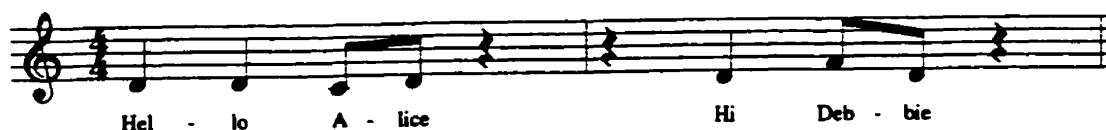
The following two excerpts were taken from fieldnotes midway through the intervention process.

EXCERPT 1 : A^M

A^M is looking out the dining room window as my car pulls up in front of the townhouse. When I arrive at the door, she and "baby" (a doll), are there to greet me. Her mother, who is in the basement, shouts "Hi". A^M takes my bag and carries it upstairs, leading the way to her parent's carpeted bedroom - a small, cluttered room with clothes and lots of knick knacks lying about. A^M heads for the only floor space at the foot of the bed and sits down. She takes the recorder out of the bag, plugs it into the wall, presses the "record" button. I sing "Hello ____" Without missing a beat, she responds "Hi Debbie". We repeat this musical greeting four times (see Figure 5) and with each repetition, her response is quicker and louder. Without wasting a moment, she takes the ball out of the bag. "What does baby want to do?", I ask. "Ball", replies A^M. I expand on her response and intone "Baby wants to play ball." Placing her mouth close to the recorder, she rhythmically chants, "Baby play ball please."

Figure 5. Musical greeting

A^M-session 7



EXCERPT 2: E^s

I approach the playground of the hospital daycare. It is recess and E^s is running in the snow, a big smile on her face. When she sees me, she walks towards me and we continue on together down the path to the door. E^s heads to her locker. As she slowly takes off her hat, mitts, boots and snowsuit, she babbles unintelligibly (wanting to tell me something). Seven minutes after getting her from recess, we enter the small office, belonging to the director of the daycare. There is little space for playing in this room, which is dominated by a desk piled with papers, shelves, a filing cabinet and several chairs. E^s goes to the desk, picks up a pad of paper and babbles something about not touching anything on the desk - "no touch it" is the only understandable phrase. The voices of children just coming in from recess distract her. She goes to the door, holds the knob and babbles, "I heh dah dee goh nee". I interpret it to mean something like "I have to go now" by the way she imitates the intonational contours and rhythmic stresses of the sentence. I ask her to sit down next to me. I have placed the figures on the floor. She approaches, but goes straight for the recorder, "Touch it", "no touch it", she repeats several times (stereotypic response whenever she feels the urge to press the "Stop" button on the recorder). Once again I try to engage her in play but this time she is off to the window. "Horsie, horsie", she says (referring to the RCMP officer on horseback who came to visit the daycare two weeks before). Approximately eight minutes after entering the room, E^s sits down next to me and puts the daddy and mommy in the car. She repeats my spoken models, including "Daddy sit" and "Mommy (in) car", but only after I have repeated them several times. I am somewhat distracted by the children's voices in the playroom nearby, however E^s does not seem to be bothered and is able to remain on-task for 5 minutes at a time.

The differences reflected in these narratives suggest three key factors influenced the children's verbal output: the physical setting, tape recorder and manner in which the target

phrases were presented (intoned vs. spoken).

A^M was at home waiting for me to arrive. E^S was at daycare playing outside with other children when I picked her up. Settling down to work in the director's office took eight minutes for E^S compared to no time at all for A^M. While the objects in the office stimulated E^S, they were a distraction, prompting unintelligible speech-babble and delaying on-task behaviour, particularly at the beginning of each session. The voices of children coming in from recess provided another distraction, resulting in less time spent producing intelligible verbal responses.

As for the tape recorder, it seemed to elicit quite different responses. A^M used it as a microphone, speaking loudly and clearly into it (telling me and "baby" what to do). In the session, from which the above excerpt was taken, 149 responses were recorded compared to 115 in the previous one. For E^S, the presence of the tape recorder seemed to recall previous negative experiences in the way it consistently elicited the stereotypic utterance "no touch it".

With regard to the manner in which the target phrases were presented, A^M was in the melodic group and E^S was in the spoken group. The musical greeting that evolved between A^M and myself focused her attention and elicited a quick and confident response. A^M did not miss a beat when greeting me ("Hi Debbie"). In comparison, my requests to E^S to sit down did not immediately grab her attention. She remained unfocused, distracted and inclined to speech-babble for the first ten minutes of the session. When she finally sat down, several models of the target were required before she would respond.

While specifics were not the same, the setting, tape recorder and manner in which the target phrases were presented, were factors that were present in all the sessions for A^M and E^S. These factors were also at work for the other children.

SETTING

It was found that the location of the room within the larger setting (home, school or daycare) was an important factor affecting output. Three children, A^M, T^M and J^S were at home napping or playing alone (or with an adult - mother, father or babysitter) just before I arrived. For these children, settling down to work typically required less than two minutes. In contrast, the other five children - E^S, J^S, V^S, J^M and L^M were at daycare or school, and were members of a peer group a fair distance from where the sessions took place. In the case of L^M and V^S, sessions took place in a basement office. Getting there from their respective classes took close to ten minutes. It involved walking down a long hallway to stairs (at this point, L^M would peek into each classroom, distracted by the novelty of walking in the halls while other children were in class), descending them, then walking along another corridor past several rooms. Once in the office, L^M and V^S would fidget and behave in a noncompliant manner for at least three minutes before settling down and responding verbally in a consistent manner. I noted in my fieldnotes that the disruption in their respective routines and the time required to get to the room (as well as its relative novelty) seemed to have a negative effect on on-task behaviour. As with E^S, this was especially apparent at the beginning of each session when it typically took these children five to eight minutes to settle down. For example, when I picked up V^S for session #10, she was sitting on a rug in a corner of the classroom, looking at a class photo album. This interruption seemed to affect her behaviour during the session in that she was unconcentrated and wanted to leave in the middle. Verbal output dropped to 102 responses from 174 responses in the previous session. For R^S and J^M, who attended a daycare, they had to walk upstairs to the room where the sessions took place. Whereas R^S happily left what he was doing (ie. puzzle, playing in gym) to come with me, J^M had difficulty making the transition, particularly in the first five sessions.

For three of the children, E^s, R^s and J^m, changing rooms in which the sessions took place also affected verbal output. In the case of E^s, whereas the change to a large classroom in session #4 produced less verbal output (78 responses compared to 107 and 158 in sessions #3 and #5 respectively), she was more attentive (ie. only one model of the target was necessary in contrast to previous sessions) and less likely to speech-babble. For J^m and R^s, a change in setting from daycare to home in session #11 resulted in a dramatic increase in total verbal output for that session - 159 responses for J^m (compared to 118 in #10) and 180 responses for R^s (compared to 136 in #10 and 58 in #12). In session #12, there was an unexpected room change to an open area near the front door of the daycare. This resulted in no verbal output at all from R^s for the first ten minutes of the session (see Table 6).

Table 6
Setting in which sessions took place

	Home	Daycare	School
A ^m	#1-5 sister's room #6-12 parent's room		
J ^m	#11 den	#1-12 except #11 upstairs playroom	
L ^m			#1-12 basement office
T ^m	#1-6 den #7-12 his room		
E ^s		#1-12 except #4 director's office #4 classroom	
J ^s	#1-12 playroom		
R ^s	#11 den	#1-10 upstairs playroom #12 open gym area near entrance	
V ^s			#1-12 basement office

TAPE RECORDER

The tape recorder played a notable role in eliciting clear and self-assured verbal responses, thereby assuming functions (ie. as a microphone) apart from its originally intended one, which was to tape the sessions for the purposes of analysis. For example, V^s often requested to hear an excerpt from the session, not only listening with heightened concentration, but responding to all of the target models, even the ones to which she did not respond during the actual recording of the excerpt! This phenomenon was observed in most of the children. As seen in the previous excerpt, E^s was the case where the tape recorder had a negative impact on verbal output.

MELODIC VERSUS SPOKEN PRESENTATION OF SPEECH PATTERNS

The third and only factor to effect a group difference was the manner in which the target phrases and questions were presented. As was the case with E^s in the earlier excerpt, a certain active tension was lacking in the spoken group between the spoken model and the child's verbal response, resulting in a reduced speed of response. For V^s, the spoken model did not seem adequate enough in focusing her attention or of reducing instances of the stereotypic utterance, "mamamama", which she seemed to use in order to block out my requests, causing a considerable delay in her response. Eliciting a response seemed far more effective when the target phrases were intoned. It was as if the intoned phrase invited or beckoned a response. The following narrative is a series of reflections that I wrote in my fieldnotes for the children in the melodic group - L^m, J^m, A^m and T^m :

The melodic motif seems to serve as a vehicle for the speech pattern, helping it to move forward in time and space, "carrying" it through to the end, and lending a particular creative tension to each play context. It is as if the melodic intoning of a word or a phrase within given parameters - melody, intensity, rhythm and tempo - creates a shared musical space for the child-adult interaction

that allows for playing, risking, and exploring within the "confines" of the rules.

In addition to eliciting speedier responses for all the children in the melodic group, the intoned presentation also stimulated the playful experimentation and transformation of the target models. Fieldnotes and session data forms revealed that all four children in the melodic group often modified the target phrases by extending them, changing a word (noun or verb), exploiting the musical elements of pitch and dynamics, even creating a new melodic motif (see Figure 6). In contrast, only one child, J^s in the spoken group, modified a target phrase. The model "Boy brushing teeth" became "I see little boy brushing teeth" in session #8. Table 7 shows the sessions in which modifications occurred.

Table 7
Modification of target phrases during sessions

		Sessions											
		1	2	3	4	5	6	7	8	9	10	11	12
Melodic Group	A ^M	x	x			x	x	x	x	x	x	x	
	J ^M	x		x	x			x	x			x	
	L ^M			x	x			x	x				
	T ^M	x	x	x	x						x	x	
Spoken Group	E ^s												
	J ^s										x		
	R ^s												
	V ^s												

N.B. "x" indicates that child modified target phrase at least once during the session.

Figure 6. Modification of target word or phrase

A^M-session 6

model A^M

Girl eat ba - na - na Deb - bie eat ba - na - na

J^M-session 2

question J^M

Where's the ball? Ball up ball ball ball ball

J^M-session 5

model J^M

Ball Ball ball ball ball ball

J^M-session 9

model J^M

I see duck Duck quack quack quack quack

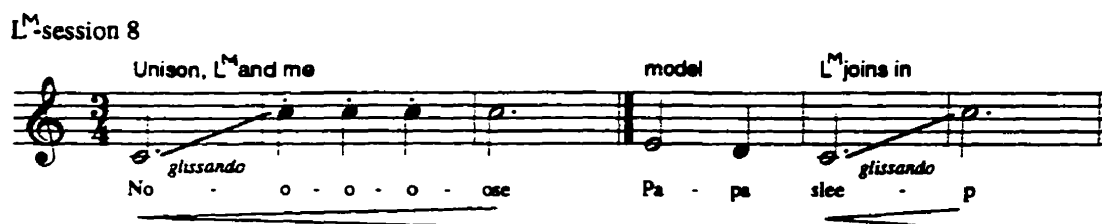
T^M-session 11

model T^M

Boy sit - ting Dad - dy Mom - my sit

The melodically intoned presentation of the target phrase also provided a structure within which the child and researcher interacted in a pleasurable and expressive way. This was particularly significant for L^M, whose difficulty in reproducing certain sounds could have resulted in considerable frustration. Instead, he tried hard to repeat words and complete phrases clearly and in tune. As with all the children in the melodic group, L^M enjoyed sound-imitation games and experimenting with the pitch, intensity and duration of a word (see Figure 7). He seemed to intuitively sense that I was enjoying the sounds we were making as much as he was. During such exchanges, L^M did not produce any stereotypic utterances (ex. "no", "no way").

Figure 7. Exploring pitch and intensity



For J^M, the melodic intoning of phrases was effective in easing him into a shared space that was non-threatening, novel and intrinsically motivating. Establishing a rapport with him in this way was particularly significant, in light of his mistrust of females in general. According to his Mom, he associated all females with the nurses who had "hurt" him in the past.

EXCERPT FROM SESSION #5: J^M

J^M is reluctant to come with me, so G. (a child care worker) offers to carry him upstairs. When we arrive at the room, I take J^M and G. leaves. J^M looks fearful and anxious and seems to be holding back tears.. Holding him in my arms, I walk towards the ten posters hanging on the wall. I improvise a song about each picture. J^M is attentive and begins to hum along. When I finish singing, he seems relaxed and so I put him down next to the playmobile

figures of a boy and a mommy and two "sleeping bags". He puts the figures to bed, then tells them to wake up and eat a snack. This play context elicits 1 and 2-word phrases such as "boy", "mommy sleep" and "eat orange". Several minutes later, when I intone "ball", J^M matches my pitch, intoning "ball", then he continues to intone the word six times to a motif he creates on the spot (Figure 6). After identifying pictures with the drum and reading a book, I put "Peter Parrot" (hand puppet) on, who praises J^M for his hard work and intones "Bye". J^M responds, "Ba-Bye", and continues --> "ba-tu" (= "thank-you"), developing this into a jazzy motif "tutudatu" which I repeat (Figure 8).

Figure 8. Call-and-response improvisation

J^M-session 5

Deb. J^M Deb. J^M Deb.

Bye ba - bye ba - tu* You're wel- come see you! Too Too Tut Bye
(*Thank you)

J^M Debbie repeats J^M

Too Too Tut Too Too Wa too tah too tah too

Debbie repeats J^M Debbie repeats

Wa tee tah tee tah tee tah

J^M's anxiety and minimal output at the beginning of the session was in contrast to his playfulness and vocal expressivity during the closing improvisation. The following three sessions began similarly and with each passing week, there was less "warming up" time required and increased verbal

output (39 responses in session #6 compared to 159 responses in #11).

In addition to illustrating the positive effect of our melodically intoned exchanges, the above narrative highlights two other factors that affected verbal output for all children, regardless of group - the child-researcher relationship and the play routines.

CHILD-RESEARCHER RELATIONSHIP

I observed that the children's growing familiarity with me resulted in growing assertiveness, playful teasing and increased motivation to communicate. In the case of T^M, he called me back to his room after session #7 was over, using 3 consecutive 2-word utterances, "Ah man, come here, no fair", complaining that I was leaving. In earlier sessions, he seemed to withdraw and become sad, not saying a word. J^S showed his growing assertiveness in session #8 when he expressed his desire to label the objects and say the 3-word target phrases all by himself, something he had never done before in previous sessions. Similarly, in session #9, he rejected my suggestion to look at pictures, using words (ie. "not this, no cat, book"), where once he would only have pointed to the object he wanted to play with, occasionally saying "this". This change was reflected numerically in total number of responses - 132 in session #8 compared to 152 in session #9). A^M responded loudly with a smile, "It's a bunny", in session #3, when I intoned "It's a pig". In session #7, acting silly, she blew into the microphone and whispered "caca", instead of intoning "hi Debbie!", as requested (84 responses in session #3 compared to 115 responses in session #7).

PLAY ROUTINES

The above narrative from J^M's fifth session described a core set of play activities that was typically used with all children, regardless of group. J^M enjoyed playing with the figures, reading a book and saying "bye" to Peter Parrot. Each

of these play contexts elicited consistent verbal output, and the more interested and involved J^M was in the play situation, the more inclined he was to speak. This was typical of all children with one exception, T^M. When playing with objects, such as a car (during the first home visit) or a plastic horse (session #4), T^M was drawn into his own world to the exclusion of any verbal communication. As with J^M, J^S enjoyed playing with the figures, but for him, pretend play was more than just physically manipulating the figures, it was also giving them a voice:

J^S makes the mommy, daddy, girl and boy "walk" up to the top of the "mountain" (J^S has turned the container upside down). They are hungry for a snack. J^S picks up the mommy and in a high pitched voice says, "I like banana". "Okay, eat banana", he responds in his normal voice (session #7).

Creating different scenarios with the figures (i.e. taking a walk, snacking, sleeping, taking a drive, etc.) sustained the interest of all the children and resulted in increased verbal output, regardless of group. In the case of E^S, most of session #10 was spent playing with the figures, and it was in this session that her total verbal output peaked at 167 responses (compared to 120 in #9 and 130 in #11).

According to fieldnotes, hiding and finding an object was another play routine that consistently elicited high interest and verbal output. Although the manner in which this game unfolded was unique for every child, as with most of the play contexts, it involved a ritualised sequence of target phrases that increased in length as the sessions progressed. In the case of V^S (session #3), I asked her what I should do with the ball. "Boot", she said, and put the ball in my boot. I modeled "Ball in boot". She repeated each word separately. Then I pretended to look for it, "Where's ball?" ("under chair?", "in pocket?"). V^S retrieved it from the boot. I modeled "Here ball", and then another hiding place was found and the game began anew. V^S responded well to the predictability

(repetition of targets) and novelty (new and unexpected hiding places) of this game, and by session #7, she began to repeat target phrases, such as "Where ball ?", "Here ball", "Get ball" in their entirety. As for J^s, he liked to hide the ball underneath him and give false clues as to where I might look. This play routine facilitated the production of up to 4-word phrases (ie. "Debbie, look in box").

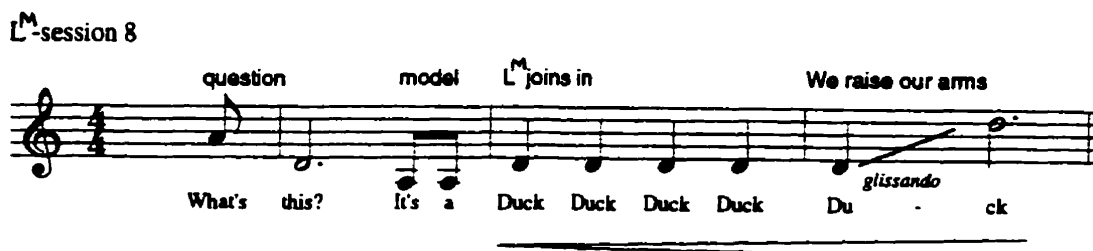
It was found that, within the context of particular play routines (ie. identifying pictures or "reading" a book), the drum was a key factor in eliciting the different types of response: Unison, Imitative, Conversational and Spontaneous.

Certain rhythmic techniques with the drum (or in certain instances, a body part, such as the pointer finger or forehead) were particularly effective in eliciting unison responses. For E^s (Graph 5, Figure 4), the rhythmic hitting of the drum, as words and phrases were explored for the first time in session #8 (ie. "sheep, sheep, sheep" J. J. J. & ; "toast and butter" J J J J &) elicited the highest number of unison responses. As for J^m and V^s (Graph 3, Figure 3; Graph 8, Figure 4), tapping with our pointer fingers on a picture or a puzzle piece in rhythm to the target word or phrase (ie. "dog"--> "dog here") elicited the highest number of unison responses in sessions #3 and #2 respectively. For R^s (Graph 7, Figure 4), tapping fingers on pictures ("I see cat") and nodding foreheads together ("up", "down", "ball", "kick ball") was effective in eliciting a high number of unison responses in sessions #4, #7 and #8.

In the case of L^m (Graph 3, Figure 3), there was an increase in unison responses in session #3 and particularly at session #8, when I played with the duration (holding sound), rhythm (hitting the drum), intensity (getting louder or softer) and pitch (slowly sliding up five notes {interval of a fifth} or eighth notes {interval of an octave}) of each word or syllable. For example, in session #3, I held the first vowel sound of a word (ie. "du_____" for duck), waiting for L^m to join in, at which point we got louder or softer with each

repeat of the word. This sequence was extended in session #8 to include a gradual increase in pitch and intensity, as we slowly raised our drumsticks until they were over our heads (Figure 9).

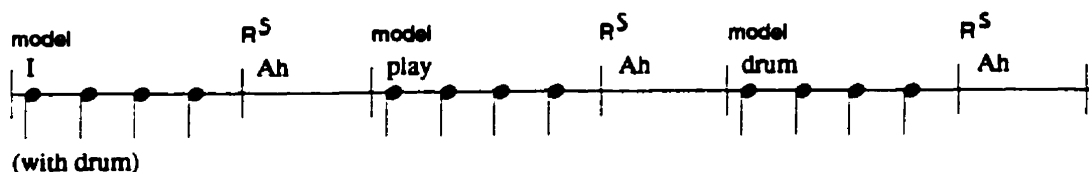
Figure 9. Technique used to elicit unison response



The drum was also effective in eliciting imitative responses in the way in which it established a physical boundary and encouraged turntaking. For example, in session #3, A^M and I each held a dolly, making it play the drum, as I modelled the target "I play drum". At the refrain ("LA lala LA LA"), we raised our dolls and made them dance. A^M then repeated the rhythmic pattern of the target by herself. By session #7, she was able to repeat the intoned phrase in its entirety. As with A^M, most children, regardless of group, began to imitate increasingly longer phrases when the drum was part of the play experience. J^S spoke his first 7-word phrase in session #11 when the drum was used; J^M and E^S intoned or spoke their first 3-word phrase with the help of the drum in sessions #9 and #11 respectively.

Using the same technique as I did with A^M for the phrase "I play drum" allowed me to observe the difference in the imitative responses of two other children, R^S and T^M, from the spoken and melodic group respectively. The technique consisted of using 4, 2 and finally 1 drum beat to reinforce each word. R^S was not able to go beyond uttering "Ah" after I modelled each word separately (Figure 10).

Figure 10. Technique used to elicit "I play drum" with R^S



In contrast, by session #7, T^M succeeded in repeating "play drum" loud and clear with the drum, by first repeating each word separately after 4 beats, then 2 and finally immediately after the model (Figure 11).

Figure 11. Technique used to elicit "I play drum" with T^M

Session 3

Session 5

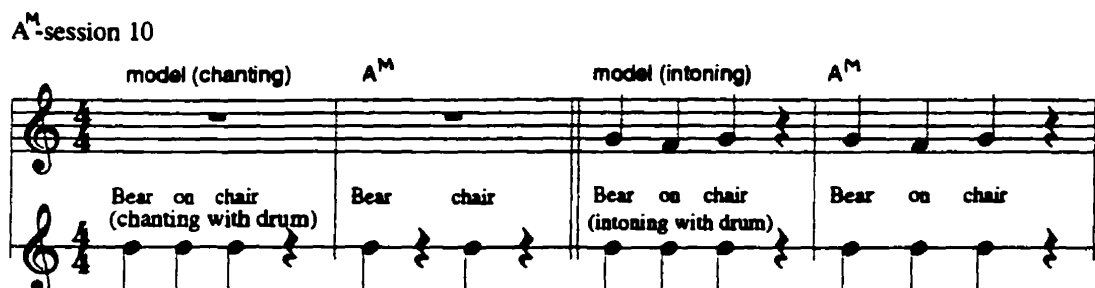
Session 6

Session 7

The figure displays four musical staves, each representing a different session (3, 5, 6, and 7). Each staff is divided into two systems. The top system of each staff contains a model (labeled 'model') and a response (labeled 'I', 'play', or 'drum'). The bottom system contains a drum accompaniment (labeled '(drum)'). The notation is in 4/4 time. In Session 3, the model is 'I play drum' and the response is 'I play drum'. In Session 5, the model is 'I play drum' and the response is 'I play drum'. In Session 6, the model is 'I play drum' and the response is 'I play drum'. In Session 7, the model is 'I play drum' and the response is 'I play drum'.

Similarly, with A^M (session #10), I noted a striking difference in her imitative responses when I first chanted, then intoned the phrase "Bear on chair" with the drum. Chanting the phrase elicited a hesitant, two-word response, whereas intoning it drew a speedier response that was louder, clearer and longer in length (Figure 12). Singing each word on a different pitch and drawing attention to certain ones by increasing intensity or pitch seemed to be effective in improving enunciation and increasing phrase length.

Figure 12. Chanting versus intoning "Bear on chair"



Furthermore, I noted in my session notes that the combined rhythmic and melodic stimulus also helped to reduce the tendency to run words into each other (slurred articulation). For example, by session #11, T^M intoned "move over" clearly and in tune, instead of "mohver". In comparison, the rhythmic element alone did not seem to be effective in the case of R^S, who, by session #10, was still saying "mumitting" instead of "mommy sitting", and "put kaway" instead of "put stick away".

In the case of T^M, the combined effect of the melodically intoned target and the rhythmic support of the drum resulted in his moving beyond merely imitating the intonational contour of my question to adding an answer onto it (Figure 13). A basic dialogue process was set in motion for T^M as imitative speech gradually began appearing in conversational speech.

Figure 13. From imitative to conversational response

T^M-session 12

For two children from the spoken group, J^s and V^s, and one child from the melodic group, J^M, the unelicited repetition of the last word or words of a question was often observed. They seldom went beyond just mirroring what the other person said.

Data also revealed that the use of the drum and a puppet facilitated role playing and conversational responses, regardless of group. For example, I would pretend to be "Super Bunny", "Peter Parrot" or Dolly, and ask the children questions, using the drum as a rhythmic support for the speech pattern. This technique was almost always successful in eliciting the desired response.

The drum was also an important factor in accounting for the inverse relation that was found between imitative responses and spontaneous responses. In both groups, it was effective in stabilising the use of longer target phrases, as well as in facilitating the spontaneous (internalised) use of these phrases within the context of play routines, where the child played the adult role:

J^s - SESSION #11:

Today, J^s is the "teacher". He places the drum and book close to him, making sure that I can see all the pictures. He models a 3-word target phrase (ex. "I see flower"). His rhythmic drum support is very articulated as is the clarity of each word. When I repeat the phrase, he nods his approval. We continue in this manner until the book is finished.

By the end of the intervention period, five of the eight children, J^s, R^s, A^m, J^m and T^m, were using target phrases spontaneously in self-initiated play contexts using the drum. For example, supporting the speech rhythms on the drum, A^m chanted clearly, "I see cat, you do it". I repeated the phrase and we continued in this manner until all the pictures were identified (session #12). The remaining three children, in contrast, rarely initiated play contexts with or without the drum, and there were few to zero instances of the spontaneous supporting of speech rhythms without my modelling.

As the children moved from using the target phrase imitatively to producing it spontaneously (or in response to a question), it was noted that two children, J^s and R^s, generalised the role of the drum as a supporter of speech onto other objects. For example, finding it difficult to remove the lid of the playmobile container, J^s said, "Debbie help me", as he shook it in rhythm to the speech pattern (session #7). In the case of R^s, while looking at pictures in a book during session #11 (which took place at home), he used a plastic tabletop instead of the drum to support his speech.

Finally, for most of the children, including all four in the melodic group, the drum was effectively used in sound imitation games and word improvisations as a break from "work" during the session or to close the session.

PRE- AND POST-INTERVENTION DIFFERENCES IN VERBAL OUTPUT

Measures for the three dependent variables, mean length of utterance in morphemes (MLU), total number of words and production time (in minutes), were obtained from pre- and post-intervention language samples, each containing 100 utterances, produced by the child while interacting with a parent or myself. The mean length of utterance, or MLU, measured the child's level of syntactic development. The total number of words indicated the amount of verbal output by the child. Production time was expressed by the number of minutes

it took to produce the language sample.

The scores for these dependent variables were then compared, using two statistical tests: a multivariate repeated measures analysis of variance (MANOVA) was calculated on each of the measures to determine whether post-intervention gains between groups differed significantly; the Pearson product-moment correlation coefficient measured the degree of association between pre- and post-intervention scores. Scores for each subject by group appear in Table 8. Means and standard deviations for each group appear in Table 9.

Table 8
Pre- and post-intervention scores for each subject

		Pre-intervention			Post-intervention		
		MLU	Total number of words	Production time	MLU	Total number of words	Production time
Melodic Group	A ^M	1.59 .801 (sd)	163	14.5 min.	2.18 1.337 (sd)	239	9 min.
	J ^M	1.39 .598 (sd)	140	33 min.	1.44 .516 (sd)	148	15 min.
	L ^M	1.12 .256 (sd)	116	14 min.	1.13 .230 (sd)	114	7.5 min.
	T ^M	1.26 .335 (sd)	134	14 min.	1.69 .771 (sd)	179	6.5 min.
Spoken Group	E ^S	1.37 .365 (sd)	147	23.5 min.	1.26 .610 (sd)	150	11 min.
	J ^S	1.18 .296 (sd)	125	9 min.	1.46 .655 (sd)	146	7.5 min.
	R ^S	1.13 .365 (sd)	134	22.5 min.	1.44 .589 (sd)	151	17 min.
	V ^S	1.17 .203 (sd)	119	13 min.	1.22 .438 (sd)	124	15 min.

Table 9
Means and standard deviations for each group

		Melodic Group (N=4)		Spoken Group (N=4)		Entire Sample (N=8)	
		Mean	SD	Mean	SD	Mean	SD
Total words	Pre	138.25	19.40	131.25	12.18	134.75	15.45
	Post	170.	53.11	142.75	12.69	156.38	38.60
MLU	Pre	1.34	.20	1.21	.11	1.28	.16
	Post	1.61	.44	1.345	.123	1.48	.33
Production time	Pre	21.13	9.10	14.75	5.66	17.94	7.80
	Post	10.00	3.85	12.13	4.59	11.06	4.08

The findings for each dependent measure were as follows:
 TOTAL NUMBER OF WORDS - The difference between pre- and post-intervention scores for both groups was slightly significant ($p = .057$), as shown in Table 10. All but one child produced a greater number of words in the posttest than in the pretest.

Table 10
Total number of words for entire sample

Source	SS	df	MS	F
Within groups	2035.90	6	339.65	
Time	1870.56	1	1870.56	5.51 *
Group by time	410.06	1	410.06	.314

* $p = .057$

MLU - Pre-and post-intervention mean scores for the entire sample (N=8) ranged from 1.28 to 1.48. Although the difference between the two groups was not statistically significant ($p = .060$), as shown in Table 11, post-intervention gains for the melodic group (1.34 to 1.61) were somewhat greater numerically than for the spoken group (1.21 to 1.33). It was also shown that children with high incoming MLU scores tended to have high MLU scores at the end of the intervention. This was reflected in the significant correlation (.738; $p < .05$) that was found between pre-and post-intervention scores for MLU.

Table 11
Mean length of utterance (MLU) for entire sample

Source	SS	df	MS	F
Within groups	.18	6	.03	
Time	.16	1	.16	5.36 *
Group by time	410.06	1	.02	.63

* $p = .060$

PRODUCTION TIME - There was a significant decrease in the amount of time required to produce 100 consecutive utterances for both groups ($p < .05$; Table 12), however the effect was greater for the melodic group than for the spoken group ($p < .05$; Table 13, Figure 14). There was also a significant correlation (.994; $p < .01$) between pre- and post-intervention gains for the melodic group. As illustrated in Table 8, it took half the time for the children in the melodic group to produce 100 utterances in the post-intervention home visit than in the pre-intervention home visit.

Table 12
Production time for entire sample

Source	SS	df	MS	F
Within groups	61.44	6	10.24	
Time	189.06	1	189.06	18.46 *
Group by time	72.25	1	72.25	7.06 **

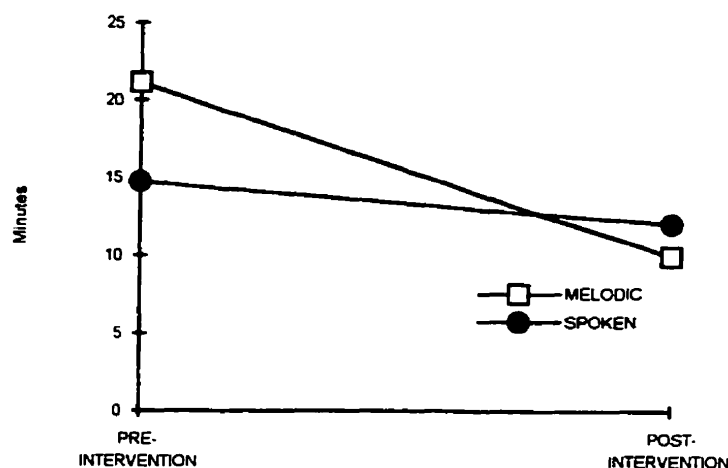
* $p < .05$ ($p = .005$) ** $p < .05$ ($p = .038$)

Table 13
Production time for the melodic group

Source	SS	df	MS	F
Within cells	41.84	3	13.95	
Time	247.53	1	247.53	17.75 *

* $p < .05$ ($p = .024$)

Figure 14. Pre- and post-intervention group means for production time



Finally, the coded transcripts of the pre- and post-intervention language samples revealed that there was a decrease in the number of unintelligible utterances for four of the children, regardless of group (Table 14).

Table 14
Number of unintelligible utterances from
pre- and post-intervention language samples

		Pre	Post
Melodic	A ^M	6	7
Group	J ^M	13	5
	L ^M	1	1
	T ^M	14	7
Spoken	E ^S	6	0
Group	J ^S	5	6
	R ^S	19	26
	V ^S	27	6

CHAPTER V

SUMMARY, DISCUSSION, CONCLUSIONS, IMPLICATIONS

SUMMARY

The present study examined the effectiveness of an adaptation of Melodic Intonation Therapy (MIT) in increasing the communicative speech of young children with Down syndrome. Eight children were matched on the basis of their mean length of utterance (MLU) and randomly assigned to one of two groups. Each child in the melodic group received twelve-weekly 30-minute individual sessions, carried out by myself. Each child in the spoken group received the same treatment in all respects except for the melodic component. More specifically, the only difference between the two groups was in the manner in which the target phrases, questions and cues were presented: they were spoken for children in the spoken group and intoned for those in the melodic group.

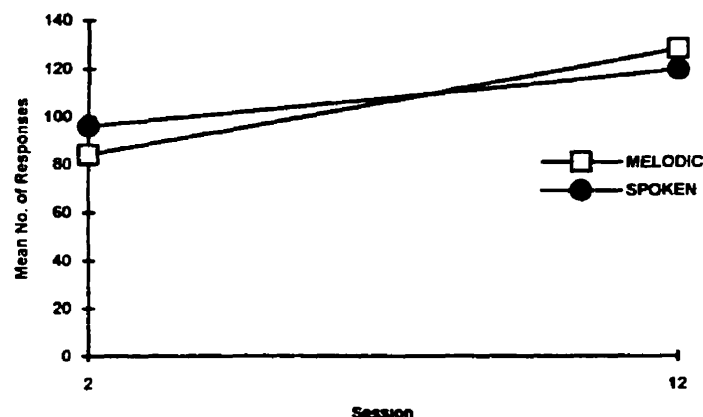
Data was collected from pre- and post-intervention home visits and from the twelve weekly intervention sessions. Scores for three dependent measures - total number of words, mean length of utterance and production time or rate of response (time required to produce 100 consecutive utterances), were obtained from the transcripts of pre- and post-intervention language samples of children at play, first with a parent and then with myself. Fieldnotes were written, following the two home visits and the weekly sessions, then examined for contextual factors, as they affected children's verbal output. Every verbal response during each session was noted and categorized according to the four levels of response: unison, imitative, conversational and spontaneous. The number of responses within each category, as well as the

total number of responses for each session, were then computed.

Data from the intervention process showed that the only factor which effected a group difference was the melodic versus spoken manner in which speech patterns were presented, whereas interconnected contextual factors, such as the physical setting, child-researcher relationship and the play routine influenced verbal output, regardless of group.

It was found that children in the melodic group were quicker to respond (increased rate of response) and experimented more with the target phrases by modifying, extending or transforming them. These observations were made less frequently with children in the spoken group. This group difference was expressed numerically by a slightly greater average increase in total number of responses for the melodic group than for the spoken group (see Figure 15).

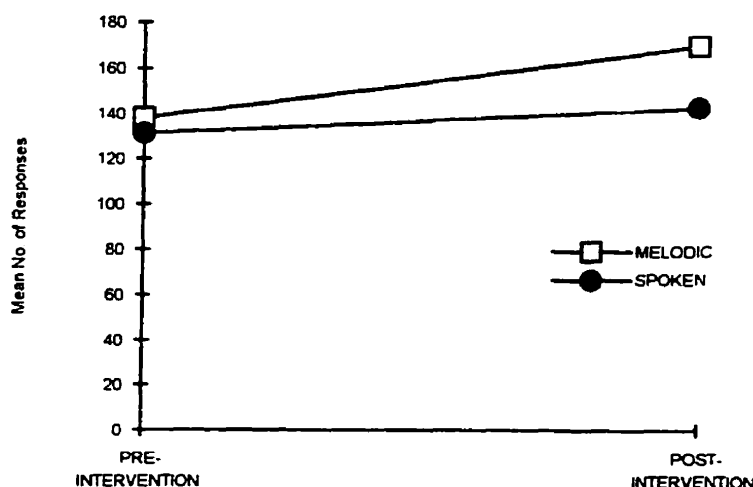
Figure 15. Group means for total number of responses during intervention process



A comparison of the pre-and post-intervention scores for the total number of words and production time revealed similar differences between the melodic and spoken groups. Whereas there was a marginal effect for total number of words for both groups ($p = .057$), this effect was largely attributed to the pre- and post-intervention gains for the melodic group, which

were greater than for the spoken group, as illustrated in Figure 16 (138-170 words for melodic group compared to 135-156 words for spoken group).

Figure 16. Pre- and post-intervention group means for total number of words

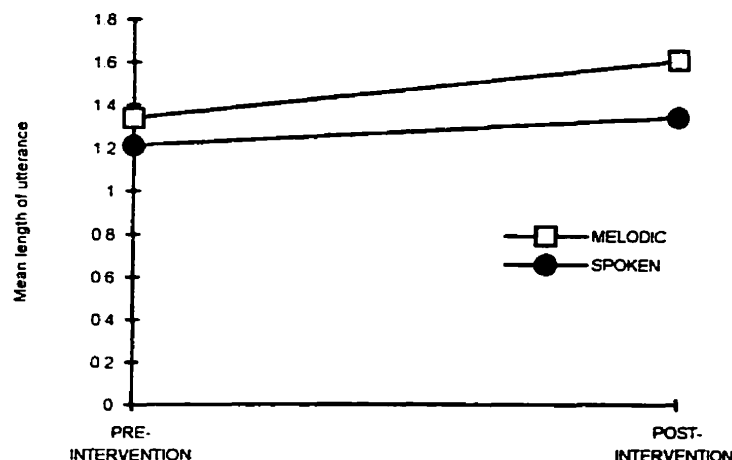


With regard to production time, although it took both groups significantly less time to produce 100 utterances in the post-intervention language sample ($p < .05$), children in the melodic group produced the utterances in a significantly shorter period than children in the spoken group, requiring half as much time than they did in the pre-intervention language sample (correlation coefficient of .994; $p < .01$).

As for MLU, while it was not measured each session, an indication that MLU was improving was reflected in the increases in range of length of utterance that was observed (Table 5). Two of the three children who improved the most were from the melodic group. Statistical data from the pre- and post-intervention language samples told a similar story. A marginally significant effect for MLU ($p = .060$) was found, which was almost entirely due to the post-intervention gains in the melodic group, as illustrated in Figure 17. As well,

the significant correlation that was found between pre- and post-intervention scores for MLU indicate that incoming MLU had an effect on the magnitude of the gains made.

Figure 17. Pre- and post-intervention group means for mean length of utterance (MLU)



DISCUSSION

MELODIC VERSUS SPOKEN PRESENTATION OF SPEECH PATTERNS

Findings from this study suggest that the MIT-intervention was effective in increasing verbal output and rate of response. Session data revealed that children in the melodic group were quicker to respond than children in the spoken group. They also experimented more with the speech patterns by modifying and lengthening them. Similarly, post-intervention scores revealed that children in the melodic group produced more words in less time than children in the spoken group. These findings support previous reports of MIT's effectiveness in improving speech production (Sparks et al, 1974; Marshall & Holtzapple, 1976; Krauss & Galloway, 1982). As well, data from both the weekly sessions and the pre- and post-intervention language samples showed that whereas a gradual increase in the length of utterance was found for both

groups, there was a slightly greater improvement in mean length of utterance for children in the melodic group than for those in the spoken group. From these findings, one can speculate that a larger group difference, or a delayed effect for the melodic group, might have been detected if language measures would have been taken several months after the end of treatment. Sparks et al (1974) found that syntactic growth began to appear post-MIT. Similarly, Miller and Toca (1979) described the case of a 3-year-old boy who began to show improvement in combining words one month post-MIT.

How can we account for these group differences in verbal output? Three possible explanations can be identified. Firstly, the melodic component might have added a dynamic dimension (musical dimension) to the play situations, possibly strengthening their influence on the children's total verbal output. I noted in my fieldnotes that the melodic component seemed to serve as a vehicle for the speech pattern, carrying it through to the end, and inviting a response. Intrinsic to the melodic pattern was a sense of structure and expression, which helped to create a playful space, allowing for pleasurable interactions and freedom in exploring the sounds of speech, much like the early pre-linguistic dialogues between mother and child.

Developmental researchers have recognised the central role that melodic intonation plays in the prelinguistic communication experiences between parent and child (Leung, 1985; Fernald, 1989). The child "sings" long before s/he speaks. At first, the child expresses its needs through the intonational patterns of its crying and cooing (Fernald, 1989). By the third month, the child begins to explore vowel sounds and to discover the satisfaction of hearing its own voice and communicating with another person. These early pleasurable communicative experiences provide a base for further language development. When consonants are added to the sound repertoire at about six months, the child's babbled utterances begin to include nonverbal prosodic patterns of

speech (Zoller, 1991). The first words appear by 12 months, followed by two-word utterances from 18 months.

A second explanation to account for the findings was the interplay of the drum and the intoned phrase. Data showed that when the drum was used to reinforce the rhythm of the intoned phrase (as was the case for the melodic group), there were group differences with respect to clarity and rate or speed of response. There were also numerous instances of the modification and transformation of target phrases. If one considers the rhythmic element as a cohesive force, highlighting and organising patterns (left hemispheric functions) and the melodic element as an expressive force, a source of emotional satisfaction (right hemispheric functions), then one might appreciate the bilateral stimulation and increased attention and motivation, resulting from the combined effect of drum and intoned utterance.

A third explanation to account for group differences in verbal output was that I enjoyed the experience of intoning phrases more than speaking them, feeling less restrained when interacting with the children in this way. This raises the issue of determining to what degree one can separate the effects of a particular intervention, in this case, MIT, from the perceptions and experience of the clinician, who is interacting with the child in what Bunt (1994) described as "a pleasurable joint activity".

Music, particularly its prosodic elements, speaks to the emotions. Damasio and Damasio (1977) distinguished the sort of verbal language processing, which enables one to sing the lyrics of a song, from the processing necessary for uttering the same words outside a musical context. The latter process involves a more analytical construction and is generated by left hemisphere function, while the former process is most probably generated by the right hemisphere and is closely related to emotional experience and expression. The pleasure and emotional satisfaction in actively engaging in a music-based experience cannot be overlooked.

CONTEXTUAL AND SUBJECT FACTORS AFFECTING VERBAL OUTPUT
Intervention process

Analysis of the session fieldnotes revealed that, within the larger social-interactive play context in which the intervention process unfolded, there were certain interconnected factors affecting the children's verbal and intoned responses, regardless of group. It was noted that the physical setting, the child-researcher relationship and the play routine affected total output (as expressed by the total number of responses). These findings support the view of developmental theorists and researchers, who have long recognised the important influences of the sociocultural and play contexts on speech development (Vygotsky, 1978; Conti-Ramsden & Snow, 1990). Language is acquired through the dynamic interactions with people and objects in the child's environment (McLean & Snyder, 1978). In the early years, the physical and the social world seem to intertwine much more closely than has been assumed, as the child communicates with another person about a "shared world" (Uzgiris, 1981). As a "facilitator" of language, the adult's role is to manipulate the child's physical, social and linguistic environments in order to stimulate language (Bloom & Lahey, 1978; Vygotsky, 1986).

The role of play has also been considered by developmental theorists including Piaget and Vygotsky. Piaget's belief that the frequency of speech is in proportion to that of imaginative play (1959) is consistent with present findings that children's verbal output increased while creating different scenarios with playmobile figures, such as taking them for a walk, giving them a snack or putting them to bed. In Vygotsky's view, play with another person provides the child with the first opportunities for social, cognitive and linguistic growth. He wrote, "As in the focus of a magnifying glass, play contains all developmental tendencies and is itself a major source of development" (Vygotsky, 1978, p.102).

As for the physical setting, it was found, that for those children who were seen at school or daycare, taking them from a peer group context to another room some distance away, had a negative effect on on-task behaviour and subsequently verbal output. Bryant and Graham (1993) noted that there is no evidence to suggest that individual therapy is superior to group therapy, and that furthermore there is possible stigmatization by peers, that is, children that are being taken out of class may be labelled as stupid or backward by their classmates.

There were two other notable findings. Data revealed that most children, regardless of group, showed an increase in the length and clarity of response, particularly when the drum was used as part of the play routine to support the rhythm of the speech patterns. Evidence of the effect of the drum was also seen in the pre- and post-intervention language samples, where the number of unintelligible utterances decreased for four of the children, regardless of group (see Table 14).

The drum also influenced change within the different levels of response (Unison, Imitative, Conversational and Spontaneous) and might have accounted for the inverse relation that was found between imitative responses and conversational and spontaneous responses. These findings provide further evidence of the important role of imitation in speech development (Tudge, 1990); more specifically, words that were once imitative would gradually come to be used spontaneously (Bloom et al, 1974). Scarpa (1990) underlined the importance of imitation and repetition in the development of conversational skills. The move from imitative to conversational speech was seen with one child, T^M, during the intervention period. This basic dialogue process was described by Scarpa as the interplay between mirroring what the other person says (specularity) and adding something on (complimentarity).

Finally, it was found that, by assuming a function (ie. as a microphone) apart from its originally intended one, the

tape recorder facilitated articulate responses. This did not happen, however, during the collection of the pre- and post-intervention language samples, where the tape recorder went largely unnoticed.

CONTEXTUAL AND SUBJECT FACTORS AFFECTING VERBAL OUTPUT

Collection of pre- and post-intervention language samples

Examination of the context in which the language samples were collected allowed me to appreciate to what extent statistical data was limited in its ability to give the full picture, and to what extent variability in the children's scores was a result of various subject factors (often at work at the same time) affecting verbal output. These included sociocultural influences, such as parental attitude and interactional style. For example, it was illustrated how a primarily directive approach limited the child's role to that of a follower, whereas a balance between a non-directive and a directive approach allowed for the child's participation as a partner. In the case of L^M, the primarily directive approach of his father limited L^M's verbal output, which was reflected in the pre-intervention language scores. Children's medical conditions might also have affected verbal output: two children, J^M and T^M, were undergoing audiological testing at the time of the study; three children, J^M, T^M and J^S had tubes inserted in their ears to reduce fluid build-up¹; two children, J^M and V^S wore hearing aids, but not all the time; one child, L^M, had speech motor sequencing problems (also known as expressive apraxia). Finally, the child's emotional and physical state (determining variables such as sickness, time of day, etc.) affected verbal output at the time of the language sampling. In the case of J^S, his mother's illness

¹ Middle ear effusion or otitis media can lead to conductive hearing loss.

during the post-intervention language sampling appeared to have had an inhibiting effect on his verbal output. Whereas his total verbal output increased from 57-158 responses over the course of the twelve-weekly sessions, this increase was not at all reflected in the outcome scores. As for T^M, he had a sinus and ear infection during the pre-intervention language sampling and this might have affected language scores, particularly with regard to the magnitude of the gains made.

CONCLUSIONS

Based on findings from this study, it can be concluded that:

1. The Melodic Intonation Therapy (MIT) intervention had an effect on the children's total verbal output and rate of response. It also encouraged the experimentation of the target phrases.
2. MIT was an effective method for stimulating verbal speech in the way it mirrored early language development by exploiting the prosodic characteristics of speech.
3. The interplay of the drum and the intoned phrase might have accounted for the marginal differences between the melodic and spoken groups with regard to MLU and clarity of production (speech intelligibility).
4. Children's incoming mean length of utterance (MLU) had an effect on the magnitude of the gains made; children with high incoming MLU tended to have high post-intervention scores and the opposite was also true. All the subjects in this study had incoming MLU of 1.6 or less, which might have accounted for the gradual improvement that was observed.
5. Contextual factors, such as the physical setting, child-researcher relationship and play routine affected children's verbal output during the intervention sessions, regardless of group.

6. The drum played a key role for all children in increasing the length and clarity of response. It was also an important factor in effecting change within the levels of intervention, particularly with regard to the inverse relation that was found between imitative speech and conversational and spontaneous speech.

IMPLICATIONS FOR FUTURE RESEARCH

Present findings of a significant correlation between pre- and post-intervention MLU measures are consistent with those of Sparks et al, 1974, who found that subjects, who made the greatest gains in phrase length, produced some stereotyped jargon at the outset of treatment, and subjects, who made moderate gains, had produced little or no verbal output. These results have implications for establishing criteria for MIT candidacy in young children. For example, if incoming MLU is less than 1.5, a longer treatment period would be needed in order to determine more precisely the impact of MIT on the syntactical development of young children with Down syndrome, particularly in light of child language data that suggest that the move from one-word to two-word utterances can take a relatively long time (Brown, 1973). Children with a higher incoming MLU (1.5-2 or more) might benefit more from Melodic Intonation Therapy with respect to syntactic growth. Helfrich-Miller (1980) suggested that the child with an MLU of 3 or 4 would be a good candidate for MIT. In order to establish the durability of gains made, language samples might be taken during and after the intervention at regular intervals.

It would also be important to identify more precisely the contextual factors at work during the intervention process and during the collection of pre-and post-intervention language samples (ie. play context, evolving child-researcher relationship, physical setting, subject differences) and how these factors potentially affect verbal output. This study has exposed some of the dangers of using spontaneous language

sampling as a measure of verbal competence as well as the need for understanding the various contextual and subject factors affecting verbal output at any given moment. Perhaps, it would be important to match children on the basis of several variables, including MLU, total verbal output and oral-motor abilities, instead of only one variable such as MLU (ie. L^M was the only child with expressive aphasia, which limited his capacity to combine not only words but also the syllables in a word).

With regard to the recording of the language sample, while audiovisual documentation would allow for the examination of other variables of expressive language (ie. gestural expression), its very presence would be distracting and therefore a potential confounding factor. For example, one child might "act out", while another might become withdrawn in the presence of a video camera. In a study of autistic children and their mothers, Warwick (1988) found that the video camera hampered physical and psychological space. Parents felt more relaxed to react spontaneously without the video camera. In the present study, it was found that a small tape recorder was unobtrusive and easily hidden from sight, thus maximising the naturalness of the child-adult interactions during the two home visits. It was interesting to note, however, that during the intervention sessions, the tape recorder became a play object (ie. microphone), influencing verbal output.

Finally, an aspect worthy of investigation, is the role of imitation in MIT, more specifically, the trend from imitative speech to conversational and spontaneous speech.

IMPLICATIONS FOR CLINICAL PRACTICE

Findings from this study have implications for clinicians, both music therapists and speech-language pathologists, for the implementation of Melodic Intonation Therapy with young children. Firstly, in determining when to

begin MIT treatment, present data suggests that MIT is an effective method for facilitating the verbal output of young children, who are at least at the stage of uttering one word, and for promoting syntactic growth in children whose mean length of utterance is greater than 1.5. These results are supported by child language data that suggest a close relationship between the vocabulary spurt, occurring between 18 and 24 months, and the beginning of two-word utterances (Fowler, 1990).

As well, evidence of the potentially disruptive and delaying effect of removing children from their daily school or daycare routine in order to treat them individually, raises the issue of the effectiveness of "pull-out" programs. According to Bryant and Graham, there is a trend favouring in-class therapy programs. Three advantages have been stated: 1) the learning environment is more naturalistic, with normal children possibly serving as effective peer models (Humpal, 1990)¹, 2) the use of the therapist's time is cost-effective and 3) there is a chance to model and train staff. In light of the above-stated benefits, the implementation of inclusion programs, where the child works with peers within the context of the group, might warrant future consideration.

This study also revealed that the play routine was an important factor affecting verbal output, and that within the context of certain play situations, such as reading a book or role-playing with a puppet, the drum played a key role for all children in increasing the length and clarity of response, as well as in effecting change within the different levels of response. These findings have implications not only for the implementation of MIT with children, but also for the development of early language intervention strategies in general, particularly with regard to the choice of play

¹ Bryant and Graham (1993) suggested that in a group of four children, two may be normal. However it would be necessary for them to have been involved in an integrated program for at least six months prior to the onset of treatment.

materials (ie. ball for physical play, playmobile figures and toy phone for imaginary play, hand puppets for role-play) and the use of a drum (or a body part used rhythmically - clapping hands, tapping index finger on target object, etc.) to reinforce the rhythm of the speech patterns.

Furthermore, findings that imitative responses gradually appeared in conversational and spontaneous speech underline the importance of imitation in language development and have implications for effectively choosing words and phrases¹ as the target of language stimulation. The most appropriate ones would be those that create a minimal discrepancy between what the child already knows and the next level of development - in Piagetian terms, phrases should be of "moderate novelty" (Bricker & Carlson, 1981); in Vygotskian terms, phrases should be in the zone of proximal development² in order to maximize potential (Tudge, 1980).

IMPLICATIONS FOR EDUCATIONAL PRACTICE

The present study also has implications and applications for educators and parents, particularly in light of the movement towards inclusive education³, as a result of the passage of Section 15(1) of the Canadian Charter of Rights in April, 1985, assuring all children the right to a public education (Winzer, 1990).

¹ For ideas on target phrases and play contexts in which to practice them, refer to "It Takes Two to Talk", by A. Manolson (1992, pp.62-28).

For ideas on how to set speech patterns to music, refer to Hoshizaki (1983, ch.10, pp.90-95) and Marshall & Holtzapple (1976).

² Vygotsky termed the difference between the child's actual developmental level and immediate potential for development as the zone of proximal development (Tudge, 1990).

³ The notion of inclusion has been replacing the concept of mainstreaming, as it more accurately describes the need for all children to be included in all aspects of community and school life (Bryant & Graham, 1993)

The key to successful inclusion is an interdisciplinary approach to education with a focus on each child's abilities not disabilities (Darrow, 1990).

Music is a powerful integrating force in its ability to bring children of varying levels of functioning together in a fun and stimulating atmosphere. As a multisensory stimulus, music is easily accessible, capable of provoking different responses on many levels simultaneously (i.e. auditory, kinaesthetic, tactile, visual). Music-based experiences can stimulate and maintain the interest of the special needs student while offering opportunities for furthering the musical development of the group as a whole.

As a music-based language stimulation strategy, MIT can be a fun and effective way for children of varying abilities to work together. Within the context of a small group, children with speech delay can improve verbal communication skills, while their normal peers can help to reinforce the language learning that takes place. Furthermore, increased sensitivity to the melodic and rhythmic aspects of speech as a result of MIT (ie. improved auditory discrimination, rhythmic imitation and vocal projection) can ensure the children's successful participation in integrated music classes, in particular, choral groups.

The notion that music may increase bilateral cerebral arousal levels, possibly through the mediating role of the right hemisphere (Morton et al, 1990) has particular implications for MIT's potential effectiveness in improving concentration, memory and on-task behaviour. Moreover, MIT might be particularly effective with young speech-delayed children, who are not motivated to communicate because of repeated experiences of failure to meet the verbal expectations of those close to them (as was the case for L^M).

In order to maximize the effectiveness of the MIT intervention, clinicians, parents and educators might work together in determining the target phrases and preferred play situations. If the speech therapist is the primary therapist,

it would be important to consult the music therapist regarding the melodic intonation of speech patterns. Once the phrases and play contexts have been established and treatment has begun, clinicians might involve the parents and teachers (ie. first by modelling then by training them) in order to reinforce the language learning that is taking place. Previous studies underlined the need for parental input in order to consolidate gains (Marshall & Holtzapple, 1976; Sparks & Deck, 1994).

Dunst (1986) asserted that "we should no longer focus on the question of whether early intervention works but rather on how it works" (as reported in Thurman & Widerstrom, 1990). Before a better understanding of the effects of MIT on expressive verbal speech can be established, specific applications of the method must first be examined. By restricting the present investigation to children with Down syndrome, this study represented a first step in that direction. Future MIT research might help to determine the generalizability of the adaptation of MIT, as implemented in the present study, to other child populations with language delay and its practicability to an integrated (or inclusive) group instructional setting.

APPENDIXES

APPENDIX 1

FORMS AND LETTERS

LETTER SENT TO PROFESSIONALS AND ACTIVE PARENT MEMBERS OF
ASSOCIATIONS FOR THE HANDICAPPED FOR FURTHER DISTRIBUTION

Dear Parents,

ARE YOU INTERESTED IN HAVING YOUR CHILD PARTICIPATE IN TWELVE
LANGUAGE STIMULATION SESSIONS IN THE FALL ?

I am looking for young children with Down syndrome (ages 2-8)
to participate in a research study. This study will examine
the effect of a language stimulation programme, known as
Melodic Intonation Therapy, on the development of expressive
speech in children with Down syndrome. The study will consist
of twelve fun and stimulating sessions for your child.

Please contact me at before June 20th.

Sincerely,

Debbie Carroll
Graduate student, McGill University

LETTER SENT TO PARENTS WITH ENCLOSURES

September 19, 1993

Dear

Thank you for agreeing to have T. participate in my research project examining the effectiveness of a language stimulation method, known as MELODIC INTONATION THERAPY. This intervention has already been shown to be beneficial for children with speech delay.

The project will involve two home visits (one in September, the other in December for approximately 45 minutes each) to observe your child at free play. It will also consist of 12 weekly 25- minute language stimulation sessions for your child (time and place to be confirmed). During these sessions, your child will be asked to imitate and initiate speech patterns that are consistent with his current level of speech development. Puppets, pictures and body actions will be used in fun and pleasurable ways to reinforce the meaning of the speech patterns.

In order to effectively plan these sessions, I will need some information regarding your child's present level of language production and comprehension. Kindly fill out the enclosed language profile form, checklist and short questionnaire by the first home visit on September 27th.

Please be assured that any information that you provide and any data collected during the study will be held in strict confidence. At no time will your child's name be mentioned. You will be free to withdraw your child at any time during the study.

Thank you for your cooperation. I look forward to meeting you and T. on Monday, September 27 at 5:45 p.m.

Sincerely,

Debbie Carroll,
Graduate Student,
McGill University

INFORMED CONSENT

I acknowledge that I have been informed of, and understand the nature, purpose and procedures of this study, and I freely consent to have my child participate. I have also been informed of my right to withdraw my child at any time during the study.

Date _____

Signature of parent _____

Telephone number _____

LANGUAGE PROFILE FORM

(adapted from "It Takes Two to Talk" by A. Manolson, 1992)

NAME OF CHILD :
NAME OF PARENT :
DATE :

PLEASE USE THE CHART BELOW TO RECORD YOUR CHILD'S EFFORTS TO
COMMUNICATE (GESTURES, SOUNDS, SIMPLE WORDS, TWO OR MORE
WORD PHRASES) DURING THE WEEK PRIOR TO THE FIRST HOME VISIT.

My child says and/or does	My child means	Why s/he communicates *

* MY CHILD COMMUNICATES IN ORDER TO :

- | | |
|----------------------------|----------------------|
| 1. protest | 6. label or describe |
| 2. request actions/objects | 7. answer |
| 3. get attention | 8. ask questions |
| 4. to imitate | |
| 5. greet | |

LANGUAGE COMPREHENSION CHECKLIST

PLEASE CIRCLE THE WORDS THAT YOUR CHILD CANNOT IDENTIFY
OR UNDERSTAND:

OBJECTS

<i>Food</i>	<i>Household Objects</i>	<i>Outside Objects</i>	<i>Toys</i>
apple	tub/bath	tree	bus
milk	bed	rain	truck
juice	TV	dog	train
soup	sofa	cat	book
banana	table	plane	ball
water	chair	car	doll
cookie	room	bus	
	light		
	floor		
<i>Body Parts</i>	<i>paper</i>	<i>Clothing</i>	<i>Important People</i>
head	cup	sock	Daddy
hand	dish	shirt	Mommy
legs	spoon	coat	siblings
eyes	brush	shoe	baby
hair		hat	child's name
nose			Grandma
foot			Grandpa
toes			name of pets

WORDS THAT DESCRIBE

hot more all gone dirty my nice did it

WORDS THAT EXPRESS FEELINGS

kiss/hug tired happy sad

SOCIAL WORDS

oh-oh hi,hello bye-bye okay nite-nite no yes

ACTION WORDS

brush	blow	dance	cry	wipe	cry	open	kiss
stop it	giddiup	come	peek	touch	run	walk	come
sleep	push	drink	clap	close	wash	sing	
roll	hug	gimme	read	help	pour	eat	

LOCATION WORDS

here there down up

QUESTIONNAIRE

1. What toys and games excite your child's interest ?

2. What books, songs and other activities capture and hold your child's attention ?

3. What foods does your child prefer ?

4. Is there anything special that I should know about your child ?

APPENDIX 2

ADAPTED MIT PROTOCOL

ADAPTED MIT PROTOCOL

N.B. Symbols used are: (C) child, (R) researcher, (MM) mime or movement, (D) drum, (P) puppet, (V) visual representation of target phrase

MELODIC GROUP**Level One - Unison response**

Stimulus: Once the target word or phrase has been elicited, (R) shows (C) the (V), (R) models the target twice then signals (C) to join in with (MM)

Response: (C) and (R) intone target phrase with (MM)

Progression: (C) should imitate the (MM) but may or may not imitate the words, as long as there is an attempt at singing the melodic pattern of the target phrase. Discontinue phrase if there is no attempt to respond vocally.

Level Two - Imitative response

Stimulus: (R) signals (C) to listen and watch, (R) models the target phrase with (P), supporting the rhythm of the speech pattern on (D)¹, (R) then signals (C) to repeat it. (R) cues (C) for initiation of response if necessary.

Response: (C) repeats phrase with (D)

Progression: Discontinue phrase if (C) consistently fails to produce the target after more than 4 models of the phrase.

Level Three - Conversational response

Stimulus: (R) intones question (i.e. Where's the ball ?)

Response: (C) replies with appropriate phrase with (MM)

Progression: Discontinue phrase if (C) fails after more than 3 cuings to produce the desired target phrase.

¹ The drum and hand puppet may or may not be used, depending on the play context.

ADAPTED MIT PROTOCOL**SPOKEN GROUP**

The same protocol was followed as with the melodic group but without the melodic component of singing or intoning the target phrase. The (R) modeled the target phrase by saying it, starting at Level One.

Level One - Unison response

Stimulus: Once the target word or phrase has been elicited, (R) shows (C) the (V), (R) models the target twice then signals (C) to join in with (MM)

Response: (R) and (C) say target phrase with (MM)

Progression: (C) should imitate the (MM) but may or may not imitate the words as long as there is an attempt at approximating the sounds of the words. Discontinue phrase there is no attempt to approximate the sounds of the words.

Level Two - Imitative response

Stimulus: (R) signals (C) to listen and watch, (R) models the target phrase with (P) supporting the rhythm of the speech pattern on (D), (R) then signals (C) to repeat it. (R) cues (C) for initiation of response if necessary.

Response: (C) repeats phrase with (D)

Progression: Discontinue phrase if (C) consistently fails to produce the target after more than 4 models of the phrase.

Level Three - Conversational response

Stimulus: (R) asks a question (i.e. Where's the ball ?)

Response: (C) replies with appropriate phrase with (MM)

Progression: Discontinue phrase if (C) fails after more than 3 cuings to elicit the desired target phrase.

APPENDIX 3

SESSION DATA FORM

SESSION DATA FORM

NAME OF CHILD: _____

DATE: _____

SESSION: _____

Play context	Target word or phrase	Model	Unison	Imitative	Conver- sational	Spont- aneous

APPENDIX 4

CHAT-CODED LANGUAGE TRANSCRIPT

EXTRACT FROM A CHAT-CODED LANGUAGE TRANSCRIPT

*CHI: alysh(a) sit dere [: there].
 *ALY: sit there?
 *CHI: yeah.
 *DEB: come close to the +/.
 *CHI: xxx.
 *MOT: come close there to alysha.
 *DEB: keep it down # ask her a question like # [/] like take the ball and xx it say what should I do?
 %add: to ALY
 *ALY: what to do andy with the ball?
 *CHI: do this.
 %com: CHI imitates the action of throwing the ball
 *ALY: what to do with the ball what do I do with it?
 *CHI: roll it!
 *ALY: roll it?
 *CHI: yeah.
 *CHI: like dat.
 *CHI: no.
 *CHI: do this.
 *ALY: roll straight [?].
 *DEB: yeah say what else +/.
 *ALY: andy you throw it # hmm?
 *CHI: in guy [: sky]!
 *ALY: in the sky?
 *CHI: yeah!
 *MOT: you ask alysha shall I throw it or pass it # <or roll it> [>] ?
 *CHI: xxx [<].
 *CHI: <pass it> [>].
 *MOT: <no you ask her> [<].
 *ALY: pass it.
 *MOT: no you ask alysha.
 *CHI: pass [?] alysha.
 *CHI: yeah.
 %com: all laugh and whisper
 *ALY: roll it pass it?
 *CHI: xx.
 *ALY: in the sky okay.
 *DEB: okay # what should I do # hmm who should I throw it to?
 *CHI: (a)lysha.

REFERENCES

- Anonymous (1994). Assessment: Melodic intonation therapy. Report of the Therapeutics and Technology Assessment Subcommittee of the American Academy of Neurology. Neurology, 44, 566-568.
- Ayres, A.J. (1979). Sensory integration and the child. Los Angeles, CA: Western Psychological Services.
- Berlin, C.I. (1976). On: Melodic intonation therapy for aphasia. Journal of Speech and Hearing Disorders, 41, 298-299.
- Blau, A., Lahey, M. & Oleksiuk-Velez, A. (1984). Planning goals for intervention: Testing or language sampling ? Exceptional Children, 51(1), 78-79.
- Bloom, L. & Lahey, M. (1978). Language development and language disorders. New York: John Wiley.
- Bogdan, R.C. and Biklen, S.K. (1991). Qualitative research for education: An introduction to theory and methods. Newton, Mass: Allyn & Bacon.
- Bordens, K. & Abbott, B. (1991). Research designs and methods: A process approach (2nd ed.). Mountain View, CA: Mayfair.
- Bricker, D.D. & Carlson, R. (1981). Issues in Early Language Intervention. In R.L. Shiefelbusch and D.D. Bricker (Eds.). Early language: Acquisition and intervention, Language intervention series, Volume VI. Baltimore, Maryland: University Park Press.
- Brown, R. (1973). A first language: The early years. Cambridge MA: Harvard University Press.
- Bryant, D.M. & Graham, M.A. (Eds). (1993). Implementing early intervention. New York: The Guilford Press.
- Campbell, D.T. & Stanley, J.C. (1979). Experimental and quasi-experimental designs for research. Boston: Houghton Mifflin.
- Carroll, D. (1989). Music therapy and the language-delayed child. Proceedings of the 16th Annual Conference of the Canadian Association for Music Therapy.

- Carroll, D. (1992). Designing a research study in music therapy - From field observations to research proposal. Proceedings of the 19th Annual Conference of the Canadian Association for Music Therapy.
- Cartwright, J. & Huckaby, G. (1972). Intensive preschool language program. Journal of Music Therapy, 9, 137-146.
- Cicchetti, D. & Beeghly, M. (Eds.). (1990). Children with Down syndrome - A developmental perspective. Cambridge: University Press.
- Clunies-Ross, G.G. (1979). Accelerating the development of Down syndrome infants and young children. Journal of Special Education, 13(2), 169-177.
- Clynes, M. (Ed.). (1982). Music, mind and brain: The neuropsychology of music. New York: Plenum Press.
- Cohen, N. & Masse, R. (1993). The application of singing instruction on the speech production of neurologically impaired persons. Journal of Music Therapy, 30, 81-99.
- Cohen, N. (1994). Speech and song: Implications for therapy, Music Therapy Perspectives, 12(1), 8-14.
- Conti-Ramsden G. and Snow, C.E. (1990). Children's language: How it develops and how it is used. In Conti-Ramsden G. and Snow, C.E. (Eds.). Children's Language Volume 7. Hillsdale, New Jersey: Lawrence Erlbaum Associates.
- Cornwell, A. & Birch, H. (1969). Psychological and social development in home-reared children with Down Syndrome American Journal of Mental Deficiency, 74, 341-350.
- Damasio A.R. & Damasio, H. (1977). Musical faculty and cerebral dominance. In M. Critchley & R.A. Henson (Eds.). Music and the brain: Studies in the neurology of music. Southampton: Camelot Press.
- Darley, F.L. (1982). Aphasia. Philadelphia: W.B. Saunders, Co.
- Darrow, A. (1990). Beyond mainstreaming - Dealing with diversity. Music Educators Journal, 78, 4, 36-39.
- Ditson, R. (1961). A study of the effects of moderate background music on the behaviour of cerebral palsied children. Bulletin of the National Association for Music Therapy, 10 (6).
- Duchan, J. & Lund, N. (1988). Assessing children's language in naturalistic contexts. Englewood Cliffs, New Jersey: Prentice-Hall, Inc.

- Fernald, A. (1989). Intonation and communicative intent in mother's speech to infants: Is the melody the message ? Child Development, 60, 1497-1510.
- Fey, M. (1986). Language intervention with young children. Boston, Mass.: College-Hill Publication.
- Florey, L. (1971). An approach to play and play development. The American Journal of Occupational Therapy, Vol.25 (6), 275-280.
- Fowler, A.E. (1990). Language abilities in children with Down syndrome: Evidence for a specific syntactic delay. In D. Cicchetti & M. Beeghly (Eds.), Children with Down syndrome - A developmental perspective. Cambridge: University Press.
- Gates, A. & Bradshaw, J.L. (1977). The role of the cerebral hemispheres in music. Brain and Language, 4, 403-431.
- Goodglass, H. & Calderon, M. (1977). Parallel processing of verbal and musical stimuli in right and left hemisphere. Neuropsychologia, 15, 397-407.
- Gottsleben & Tyack (1974). Language sampling, analysis & training.
- Graham, R. (1988). Barrier-free music education: Methods to make mainstreaming work. Music Educators Journal, 76, 1, 29-33.
- Harding, C. & Ballard, K. (1982). The effectiveness of music as a stimuli and as a contingent reward in promoting the spontaneous speech of three physically handicapped preschoolers. Journal of Music Therapy, 19, 86-101.
- Helfrich-Miller, K. (1980). The use of melodic intonation therapy with developmentally apraxic children. Paper presented at the convention of the American Speech and Hearing Association, Detroit, Michigan, November, 1980.
- Hodapp, R.M. & Zigler, E. (1990). Applying the developmental perspective to individuals with Down syndrome. In D. Cicchetti & M. Beeghly (Eds.), Children with Down syndrome - A developmental perspective. Cambridge: University Press.
- Hoskins, C. (1988). The use of music to increase verbal response and to improve expressive language abilities in preschool language-delayed children. Journal of Music Therapy, 25, 73-88.
- Hoshizaki, M.K. (1983). Teaching mentally retarded children through music. Springfield, Mass.: C.C. Thomas Publishers.

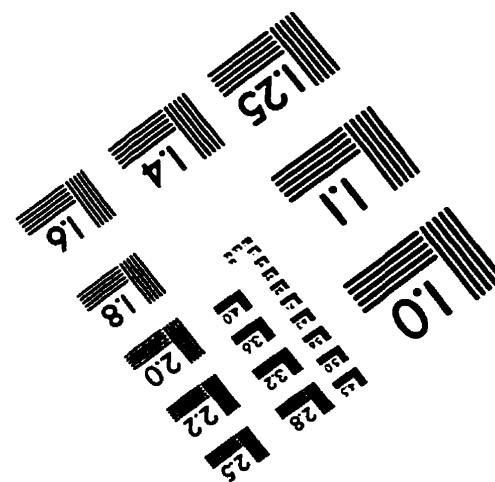
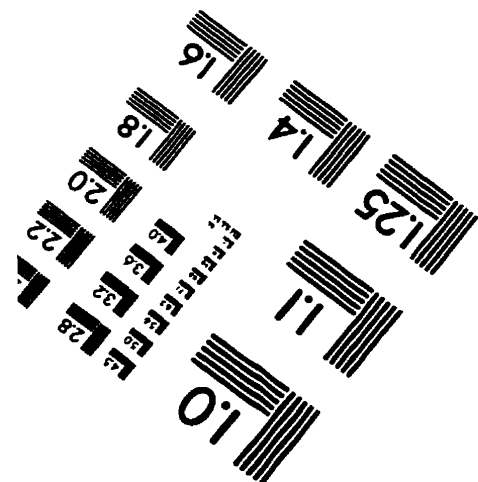
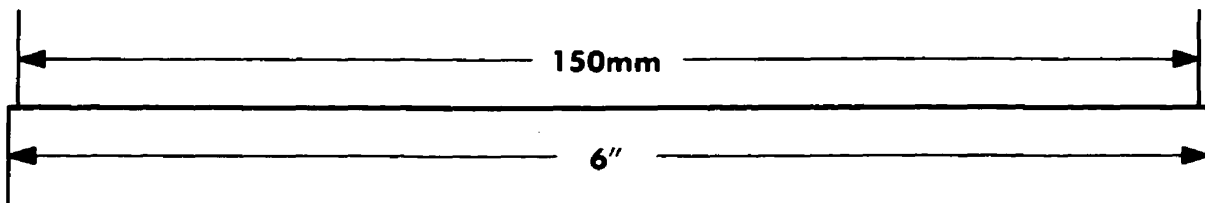
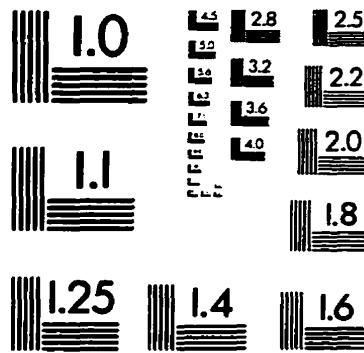
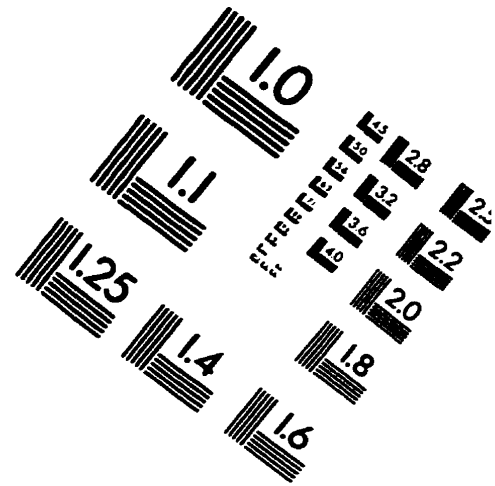
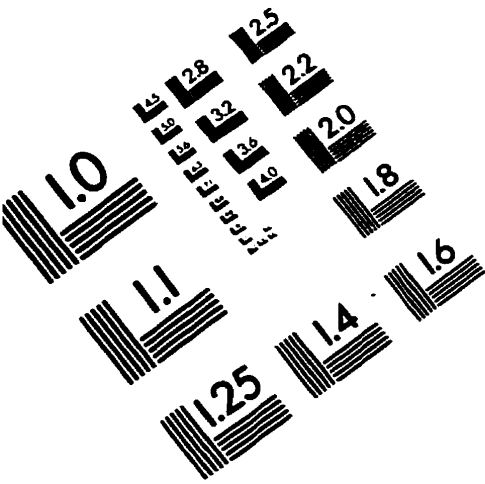
- Humpal, M.E. (1990). Early intervention: The implications for music therapy. Music Therapy Perspectives, 8, 30-35.
- Irwin, C.E. (1971). The use of music in a speech and language development program with mentally retarded Down's syndrome children. Unpublished thesis. Tallahassee, Florida: Florida State University.
- Jellison, J.A. & Gainer, E.W. (1995). Into the mainstream: A case study of a child's participation in music education and music therapy. Journal of Music Therapy, 22(4), 228-247.
- Kazdin, A.E. (1980). Research design in clinical psychology. New York: Harper & Row Publishers.
- Krauss, T. & Galloway, H. (1982). Melodic intonation therapy with language-delayed apraxic children. Journal of Music Therapy, 19, 102-113.
- Lathom, W., Edson, S. & Toombs, M.R. (1965). A coordinated speech therapy and music therapy program. Journal of Music Therapy, 2, 188-120.
- Leung, K. (1985). Enhancing the speech and language development of communicatively disordered children through music and movement. Paper presented at the annual convention of the Council for Exceptional Children, Anaheim, CA., April, 1985.
- Lott, T.L. & McCoy, E.E. (Eds.) (1992). Down syndrome: Advances in medical care, New York: Wiley-Liss, Inc.
- Lunt, I. (1973). Rhythm and the slow learner, Special Education, 62, 21-23.
- Luria, A.R. (1966). Speech and the development of mental processes in the child. London, England: Staples Press.
- MacWhinney, B. (1991). The CHILDES project: Tools for analysing talk. Hillsdale, New Jersey : Lawrence Erlbaum Associates.
- Mahoney, G. & Snow, K. (1983). The relationship of sensorimotor functioning to children's response to early language training. Mental Retardation, 21, 248-254.
- Manolson, A. (1992). It takes two to talk: A parent's guide to helping children communicate. Toronto, Ont.: A Hanon Centre Publication

- Marshall, N. & Holtzapple, P. (1976). Melodic intonation therapy: Variations on a theme. In R.H. Brookshire (Ed.), Clinical Aphasiology, Proceedings of the Conference, Minneapolis, Minn.: BRK Publishers.
- Martin, J.G. (1972). Rhythmic (Hierarchical) versus serial structure in speech and other behavior. Psychological Review, 79(6), 487-509.
- McLean, J.E. & Snyder-McLean, L.K. (1978). A transactional approach to early language stimulation. Merrill, Communication Development and Disorders Series.
- Merriam, S.B. (1990). Case study research in education: A qualitative approach. San Francisco, Calif.: Jossey-Bass Publishers.
- Michel, D. (1974). Development of music therapy procedures with speech language disorders. Journal of Music Therapy, 14, 74-80.
- Miles, M.B. & Huberman, A.M. (1993). Qualitative data analysis: An expanded sourcebook. Newbury Park, Calif.: Sage Publications.
- Miller, J.F. (1992). Development of speech and language in children with Down syndrome. In T.L. Lott & E.E. McCoy (Eds.). Down syndrome: Advances in medical care, New York: Wiley-Liss, Inc.
- Miller, S.B. & Toca, J.M. (1979). Adapted melodic intonation therapy: A case study of an experimental language program for an autistic child. Journal of Clinical Psychiatry, April, 1979, 80-82.
- Nadel, L. (1992). Learning and cognition in Down syndrome. In T.L. Lott & E.E. McCoy (Eds.). Down syndrome: Advances in medical care, New York: Wiley-Liss, Inc.
- Naeser, M.A. & Helm-Estabrooks, N. (1985). CT scan lesion localization and response to melodic intonation therapy with nonfluent aphasia cases. Cortex, 21(2), 203-223.
- O'Boyle, M.W. & Sanford M. (1988). Hemispheric asymmetry in the matching of melodies to rhythm sequences tapped in the right and left palms. Cortex, 24, 211-221.
- Piaget, J. (1959). The language and thought of the child. London: Routledge & Kegan Paul.
- Piaget, J. (1969). Judgment and reasoning in the child. London: Routledge & Kegan Paul.

- Preuss, J.B., Vadasy, P.F. & Fewell, R.R. (1987). Language development in children with Down syndrome: An overview of recent research. Education and Training in Mental Retardation, 22(1), 44-55.
- Rogers, A., & Fleming, P.L. (1981). Rhythm and melody in speech therapy for the neurologically impaired. Music Therapy, 1, 33-38.
- Romski, M.A. (1980). Melodic intonation therapy: Application to a childhood motor sequencing impairment. Paper presented at the convention of the American Speech and Hearing Association, Detroit, Michigan.
- Ross, E.D. & Mesulam, M. (1979). Dominant language functions of the right hemisphere? Prosody and emotional gesturing. Archives in Neurology, 36, 144-148.
- Scarpa, E.M. (1990). Intonation and dialogue processes in early speech. In G. Conti-Ramsden and C.E. Snow (Eds.). Children's Language Volume 7. Hillsdale, New Jersey: Lawrence Erlbaum Associates.
- Seybold, C.D. (1971). The value and use of music activities in the treatment of speech-delayed children. Journal of Music Therapy, 8, 102-110.
- Sparks, R.W., Helm, N. & Albert, M. (1973). Melodic intonation therapy for aphasia. Archives of Neurology, 29, 130-131.
- Sparks, R.W., Helm, N. & Albert, M. (1974). Aphasia rehabilitation resulting from melodic intonation therapy. Cortex, 10, 303-316.
- Sparks, R.W. & Holland, A.L. (1976). Method: Melodic intonation therapy for aphasia. Journal of Speech and Hearing Disorders, 41, 287-297.
- Sparks, R.W. & Deck, J.W. (1994). Melodic intonation therapy. In R. Chapey (Ed.), Language intervention strategies in adult aphasia, Baltimore, MA.: Williams & Wilkins.
- Spiker, D. (1990). Early intervention from a developmental perspective. In D. Cicchetti & M. Beeghly (Eds.). Children with Down syndrome - A developmental perspective. Cambridge: University Press.
- Swift, E. & Rosin, P. (1990). A remediation sequence to improve speech intelligibility for students with Down syndrome. Language, Speech, and Hearing Services in Schools, 21, 140-146.

- Thompson, K.P. (1990). Working toward solutions in mainstreaming. Music Educators Journal, 78, 4, 30-35.
- Thurman, S.K. & Widerstrom, A.H. (1990). Infants and young children with special needs- A developmental and ecological approach (2nd ed.). Baltimore, MA.: Paul H. Brookes Publishing Company, Inc.
- Tudge, J. (1990). Vygotsky, the zone of proximal development, and peer collaboration: Implications for classroom practice. In Moll, L. (Ed). Vygotsky and education: Instructional implications and applications of sociohistorical psychology, (pp.155-172). Mass.: Cambridge University Press.
- Uzgiris, I.C. (1981). Experience in the social context: Imitation and play. In R.L. Shiefelbusch and D.D. Bricker (Eds.). Early Language: Acquisition and intervention, Language Intervention Series Volume VI. Baltimore, Maryland: University Park Press.
- Vygotsky, L.S. (1978). Mind in society: The development of higher psychological processes. Cambridge, MA: Harvard University Press.
- Vygotsky, L.S. (1986). Thought and language. Cambridge, MA: The MIT Press.
- Walker, J. (1972). The use of music as an aid in developing functional speech in the institutionalized mentally retarded. Journal of Music Therapy, 9, 1-12.
- Warwick, A. (1988). Questions and reflections on research. Journal of British Music Therapy, 2(2), 7-11.
- Winzer, M. (1990). Children with exceptionalities - A canadian perspective (2nd ed.). Scarborough, Ont.: Prentice- Hall Canada, Inc.
- Zoller, M.B. (1991). Use of music activities in speech-language therapy. Language, Speech and Hearing Services in Schools, 22, 272-276.

IMAGE EVALUATION TEST TARGET (QA-3)



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