MOTHER-CHILD INTERACTION: SCAFFOLDED INSTRUCTION AND THE LEARNING OF PROBLEM-SOLVING SKILLS IN CHILDREN WITH DOWN SYNDROME

Miranda D'Amico ©
Department of Educational Psychology and Counselling
McGill University
Montréal, Québec

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ABSTRACT

This study examines the effects of maternal teaching style on the developing problem-solving abilities of children with Down Syndrome. Mothers were divided into two groups of three each, mothers with positive expectations versus mothers with negative expectations. Mothers and children were videotaped while the mother taught the child to construct a small pyramid from 21 interlocking blocks and again when the child attempted the task independently. The tapes were coded and analyzed to examine maternal instructional style and subsequent independent child performance. Mothers who were considered to have positive expectations towards their children used appropriate scaffolding behaviors significantly more often than the mothers who were considered to have negative expectations towards their children. The children of mothers who were effective scaffolders were significantly more adept and independent problem-solvers than the children whose mothers were not effective scaffolders. The more contingent the mother's instructions were, the more independent and successful the child appeared. Scaffolding is discussed in terms of its benefits for instructing children with Down Syndrome.

RÉSUMÉ

Ce projet de recherche examine les effets de la méthode maternelle d'enseignement sur les aptitudes à résoudre les problèmes qui se développent chez les enfants qui souffrent du syndrome de Down. Les six mères ont été diviseés en deux groupes de trois: les unes dont les attentes étaient positives, les autres, négatives. Les mères et leurs enfants ont été enregistrés sur magnétoscope pendant que la mère enseignait à l'enfant comment construire une petite pyramide de cubes s'emboîtant les uns sur les autres, et aussi pendant que l'enfant essayait la tâche independamment. Les cassettes ont étés codées et analysées afin d'examiner le style d'enseignement maternel et la performance subséquente de l'enfant travaillant seul. Les mères dont les attentes envers les enfants étaient considérées positives faissaient preuve d'un comportement d'échaffaudage approprié plus souvent que les mères considérées négatives envers leurs enfants. Plus les instructions de la mère répondaient au comportement de l'enfant, plus l'enfant était indépendant et plus il réussissait. Le système d'échaffaudage est discuté en termes de ses avantages dans l'enseignement aux enfants qui souffrent du syndrome de Down.

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This thesis is lovingly
dedicated to my children

Gabriel

and

Cassandra

Welcome, my dears!
Have a great life!

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CHAPTER ONE

Introduction

During the past two decades considerable progress in the biomedical and behavioral sciences has brought forth new and more effective approaches in the care and education of children with "special needs" (Pueschel et al., 1986). Children with Down Syndrome[1] has been one group of "special needs" children who have benefitted from these more effective approaches. The stereotyped picture portrayed in the past of the "short, obese, unattractive individual, with open mouth and protruding tongue, severely retarded and stubborn," is certainly not a true description of the child with Down Syndrome as we are now beginning to know them (Pueschel & Canning, 1986).

A great deal has been written about the poor communication skills and low levels of educational achievement of children with Down Syndrome. The various explanations which have been given range from those that state that children with Down Syndrome have an intellectual deficit resulting in lower levels of educational attainment to others that state that these children progress at a slower rate therefore resulting in comparatively poorer achievement.

As is the case with other children, the mother is generally the first teacher with whom the child has early and consistent contact. A number of studies have investigated the assertion that parental expectations due to early knowledge of the conditions of Down Syndrome affects parent-child interactions. Research suggests that parental response to the diagnosis of Down Syndrome is always one of overwhelming shock and disbelief (Pueschel, 1986). As a result of this, the research to date suggests that differences in communication style arises initially between a mother and child as a result of initial lack of maternal responsiveness, followed by a period of adjustment.

Berger and Cunningham (1981) and Jones (1977, 1979, 1980), have found that young infants with Down Syndrome engaged in less turn taking in social interactions with their mothers; that is, their vocalizations were less tuned in with their mothers' talking, and they tended to clash more frequently with their mothers' vocal stimulation than did the normal babies. Cardoso-Martins and Mervis (1985), have found that maternal speech to 2 year old children with Down Syndrome was simpler, lower in mean length of utterances, and used more single word responses than was the speech of mothers of comparison children.

In Jones' (1980) study, mothers of infants with Down Syndrome tended to be more directive in their interactions, whereas mothers of the "normal" children tended to be more interactive, and relied more on activities initiated by the infant. Brooks-Gunn and Lewis (1984) and Crawly and Spiker (1983) reported that maternal sensitivity was found to increase as the child's mental maturation also increased. Moreover, Affleck, Allen, McGrade, and McQueeny (1982) found that mothers who perceived their developmentally disabled infants as more active were more likely to engage in more optimal developmental practices at home than were those mothers who perceived their disabled child as passive. The above studies indicate differential behavior characteristics of infants with Down Syndrome and of their mothers when compared to normal infants[2] and their mothers. The above studies also suggest that differences in communication styles between mothers and their children might be as a result of mothers' perceptions or expectations of what their children can or cannot do. To date however, there has been little research to delineate the specific conditions in which positive or negative patterns occur and the effects of early mother-child interaction patterns on the cognitive development of children with Down Syndrome.

It is possible that this difference in parental response to Down Syndrome may affect not only communication styles, but also patterns of mother-child interaction for these two group of parents. It may be that one group of parents, for example those who perceive their children in a more optimistic light, have a more effective interaction style than the other, this giving rise to more effective teaching strategies than those employed by pessimistic parents.

One available theoretical framework arises from the work of Wood, Bruner, and Ross (1976)[3] , who, basing their ideas on Vygotsky's[4] "zone of proximal development," have proposed a theory of scaffolded instruction. Related research (Wood & Middleton, 1975)[3] has shown that some mothers are better at this process than others. The major idea behind this research is that to the extent that mothers consider their children damaged or inadequate as potential learners, they will tend to use rigid teaching strategies that are not contingent upon their children's behavior. They may be working from some sort of plan or system that detracts from their taking into consideration the degree of success of their children's efforts during instruction.

Effective scaffolding, that is, giving the child just the needed encouragement and support and no more, is particularly useful in the analysis of patterns of mother-child interactions because the degree to which it is used can be described and quantified, thus making accurate comparisons among mothers and their children possible. Observing interactions between mothers and their children with Down Syndrome from this perspective may increase the understanding of the kinds of situations which influence maternal teaching styles and the subsequent effect of these on children's initiative taking and learning. In addition, the results of this study may provide important suggestions as to how parents may improve the effectiveness of their teaching interventions by the building of positive expectations leading to more positive results, especially where children with Down Syndrome are concerned.

CHAPTER TWO

Literature Review

Down Syndrome

Down Syndrome is a condition which has provoked a great deal of scientific inquiry since it was first described as a clinical entity well over a century ago (Stratford & Lane, 1985). Initially, the research on Down Syndrome was almost entirely within the medical perspective, and it still remains one of the unsolved mysteries of human reproduction. Although questions in the domain of medical research are fundamental to the well-being of individuals with Down Syndrome, less emphasis has been placed on their social and emotional development, on self-identity and self-awareness and on success in cooperating with others (Stratford & Lane, 1985).

Down Syndrome is hardly a new disease. Evidence of its antiquity can be found in the form of a ninth-century Saxon skull that has the same dimensions as the skull of a typical modern patient with Down Syndrome; in addition a variety of artistic renditions dating from the 15th century depict infants whose facial features are characteristic of the syndrome (Patterson, 1987). The syndrome however, was not formally described until 1866, when John Langdon Down, a physician at the Earlswood Asylum in Surrey, England, published the first comprehensive description of the disorder. Dr. Down was a fervent follower of Charles Darwin, and like him believed in a racial theory of varying levels of evolutionary perfection in humans with Caucasians at the top. He called these children "mongoloid" because of their slanted eyes and flat-bridged noses. He felt that their inferiority resulted from their own individual pre-natal development having somehow been interrupted before normal completion, and therefore having been arrested at the inferior "mongoloid" level. His account observed that certain mentally retarded patients have a distinctive constellation of physical symptoms, such as notably epicanthic folds of the eyes, flattened facial features, unusual palm creases, muscular flaccidity and short stature.

For many years Down Syndrome was a disease of unknown origin, seemingly random in its occurrence. Many theories were proposed, including ones that linked babies who had Down Syndrome to endocrine gland malfunction or to tuberculosis or syphilis in the parents.

In 1909, G. E. Shuttleworth of the Royal Albert Asylum in Lancaster England suggested that the disorder was the result of "uterine exhaustion". He based his theory on the observation that a substantial number of children with Down syndrome are the last born members of large families. Shuttleworth's ideas were not entirely unreasonable: babies with Down Syndrome often are the last of a long line of children; however its occurrence is now attributed to the increased age of the mother rather than the number of children she produces. It was not until the 1950's that Joe Hin Tjio and Albert Levan of the Institute of genetics in Lund, Sweden, determined that the correct number of chromosomes in humans was 46, and this led to the establishment of the link between Down Syndrome and chromosomal abnormality. It was observed that many individuals with Down Syndrome had three copies of chromosome 21 in their cells rather than two, for a grand total of 47 chromosomes rather than 46. This condition is known as trisomy (Patterson, 1987). Another form of chromosomal abnormalities associated with Down Syndrome are translocation in which the child has the usual 46 chromosomes, but a part of one is broken and the broken part is fused to another chromosome; yet a third type, called mosaic, is thought to be due to an error in one of the initial cell divisions resulting in some cells with 47 chromosomes and other cells with the normal number of chromosomes, thus, mosaic (Pueschel, 1986). The incidence of Down Syndrome in any population is about 1 out of 1,000 live births (Nash, 1988).

As general health and environmental conditions have improved for all, better health care and an increased life-expectancy has been observed for those with Down Syndrome. This has resulted in increased interest in the area of life possibilities outside the purely medical. There is now more concern with educational and social aspects of Down Syndrome (Lane, 1985). These new interests make it clear that although knowledge of the biological or genetic aspects of this condition is important (if rudimentary), attributing all types of behavior exhibited by people with Down Syndrome to inherent genetic differences is probably a great oversimplification. Consideration of the environmental factors, including the methods by which individuals with Down Syndrome have been studied and dealt with, would undoubtedly increase our knowledge about the condition. It is still not possible to alter the genetic structure of particular individuals, but we certainly can change the way we treat them. It seems unfortunate that so much effort has been expanded on the causes, and so little on how to make the most of the lives of people with this condition. To date, research findings have by and large been based on individuals who had been raised in institutions or in other repressed and restricted environments, without taking into consideration the powerful effects that these conditions naturally impose. Although chromosomal anomalies undoubtedly exist, this fact alone does not necessarily explain fully the various types of behavior usually associated with the syndrome. In fact, research based on the correlations between clusters of certain genetic characteristics reveal little if anything about social and educational development of children with Down Syndrome (Stratford & Lane, 1985).

Progress to understand the origins of Down Syndrome has been made. However parents and teachers alike remain unsatisfied because they want to improve the outlook of these children by trying "to get something done". They are looking for practical information, for guidelines as to what they might actually do to enhance optimal development.

As Booth (1985) states: " The history of our knowledge about Down's Syndrome and our treatments of and attitudes towards people with the condition do not constitute a story of the triumph of science over superstition. Myths and prejudices may be prevalent today as in the past and, whereas some old ones may be flagging, others have been introduced to take their place" (pg.3).

The literature on children with Down Syndrome contains very little information regarding their likely attainments in the area of educational skills, and that which exists is generally pessimistic. According to Buckley (1985), this state of affairs is mainly a result of the fact that until recently the care and training of individuals with Down Syndrome were undertaken for the most part in institutions where the emphasis was on health care and social skills training. However, changes are taking place, and laws concerning the schooling of exceptional children throughout North America are now requiring that these children be educated in the "least restrictive environment" possible. Children with Down Syndrome were largely excluded from public schooling until 1976 when Public Law 142-94 was introduced in the United States. Similar laws and regulations were enacted in Canadian provinces. But traditions are strong. Even today, many school boards, schools, and other child-centered institutions find ways around the application of these laws. However, there has been enough compliance to allow us to compare the centuries-old practice of institutionalizing children with Down Syndrome with the recent innovation of such children being brought up within normal family contexts and attending ordinary schools. As a result, we are discovering that these children can learn more than was generally believed.

Children with Down Syndrome were for a long time thought to be incapable of mastering basic reading, writing, and number skills (Buckley, 1985). Until the early 1970's the only accounts of the educational attainments of children with Down Syndrome were in the individual life histories of individuals with Down Syndrome written by their parents (Buckley, 1985). One of the earliest accounts published was a case study by Butterfield in 1961, about a man born in 1924 who was said to have an IQ of 36 at age 12 and of 28 at age 36. He lived with his mother, and was running their home entirely on his own in 1955 when she was in the hospital for 6 months. He did all the housework and shopping. He paid the bills, and supplemented their income by making and selling cards, pens, and potholders. He wrote, played the piano, and listened to music in his spare time. This man had been excluded from school and had been entirely educated by his mother. However, as soon as his mother died, he was "committed to the state institution for the mentally retarded" (Butterfield, 1961). Butterfield entitled the paper " A provocative case of over-achievement by a mongoloid". Of course, over-achievement is a logical impossibility as a notion applied to those who achieve more than we expect they can. It might be wiser to question the appropriateness of our expectation in such cases than to apply the label "over-achiever". It is more likely that our expectations were too low than that someone achieved more than they were able to do!

A similar example of "provocativeness", is found in <u>The World of Nigel Hunt</u>, based on a diary published in 1966. Nigel who had Down Syndrome, typed the diary himself. Nigel's father wrote the foreword for the book, and in it he described the skeptical and unhelpful attitudes of the 'experts' they encountered.

The above examples of higher than expected achievements may be instances of the possible. Such instances do not necessarily mean that every other person with Down Syndrome can achieve the same things, but they show that some individuals when given the opportunity <u>can</u> do more than has been expected of such people in the past.

The lack of an educational emphasis for children with Down Syndrome was matched by the predominance of medical research. Even psychological research emphasized the measurement of IQ. Results from intelligence tests in the first half of the century suggested that the majority of children with Down Syndrome functioned in the severely retarded range (Engler, 1949); results from the second half of this century suggest that children with Down Syndrome have an IQ of less than 50, thus placing them in the category labelled "severe mental handicap", a more recent euphemism (Gibson, 1978). Why would we then want to educate children with such limited ability?

In his extensive review of the literature, Gibson (1978) states that:

> The orthodox position has been that Down's Syndrome individuals do not profit much from academic study, although a few are observed to develop reading and writing skills. Many Down's Syndrome children are exposed to traditional academic training simply because it has parent status value. The outcome is frequently an increase in stress levels for the child and a decline in self regard without any useful educational gain. Dedicated parents or teachers have had some success with the brighter Down's Syndrome child, probably because they have made intuitive adjustments in teaching to accommodate the disability profile of the syndrome and the individual.

Gibson seems to be saying that having too high expectations can result in stress and low self-esteem, and seems to dismiss instances of success as exceptional. He is not alone in holding such low expectations of the educability of persons with Down Syndrome. A physician in charge of the reproductive genetics unit in a university hospital was quoted as saying "You show me just one mongoloid that has an educable IQ.... I've never seen one who is educable in my experience with over 800 mongols" (Restak, 1975, p.92).

To return to reality, we know that it is simply invalid to use tests such as IQ tests which were designed to measure the capacities of one group to assess another group who may have had different experiences and have a different range of interests and abilities (Booth, 1985). Even if these tests were used to enable one to make generalizations about the group of people with Down Syndrome, this still would not imply that such statements are true of all individuals with Down Syndrome. When we apply generalizations to individuals, we seem to be saying that what is true in general should also be true for each individual. This according to Booth (1985), is the reduction of the individual into a clinical entity, or a 'positivist fallacy' where we emphasize the similarities between members of the category; such an emphasis tends to obscure our sensibility to their differences. Unfortunately, there are still many who believe that intelligence tests directly measure inborn qualities. Suffice it to say here that the measurement of individual human intelligence is at best a somewhat crude process which becomes even less reliable as an indicator of individual potential when applied to handicapped children, who were not included in the norming sample (Stratford & Lane, 1985).

The notion that all individuals with Down Syndrome are the same needs to be replaced by the knowledge that individual differences are as common in children with Down Syndrome as they are in other children; "...there is a popular impression that all mongols are affectionate, exuberant, happy, biddable and musical. It is probably safer to say that mongols are individuals like the rest of us and are not obliged to be any of these things" (Eden, 1976).

Although it may not actually be stated, Stratford (1985) claims that there is an often implied acknowledgment that parents of children with Down Syndrome belong to some identifiable group; however we know that parents have their individual differences too. A study by Frazer and Sadouvnik (1976) looking at the learning behavior of children with Down Syndrome claimed that parents who themselves had high IQs had children with higher IQs. They seem to interpret this in support of evidence that superior parental intelligence is genetically based and transmitted, rather than taking into account the quality of the child's educational experiences or good and appropriate teaching.

In a discussion on the prevention of disability, one psychologist advocated that parents of a child with Down Syndrome should be given an exaggerated version of the difficulties they might face as a deliberate professional policy. "You can make enough certain statements to make parents face the practical issues, like the time, emotional draining and social stigma with which parents will have to contend. Like the educational decisions and conflicts with authority... I think it's the responsibility of professionals to spell out the consequences of having such a child more bluntly than may actually be the case " (Booth & Statman, 1982b, p.193). Perhaps one logical outcome of such an attitude would be to ignore instances of the possible to conceal examples of high achievement of persons with Down Syndrome. The price of taking steps to avoid "false hopes" in parents may be the stunting of the development of these children.

Although the level of attainments which might be reached by children with Down Syndrome varies considerably, we know that good teaching and a favorable environment can be very influential in promoting cognitive development and in creating opportunities for these children to benefit from their individual learning strengths. Appropriate educational treatment may help in addressing their specific weaknesses. As Stratford (1985) states:

> To regard all Down's children as possessing identical rates of growth and development and similar temperaments and personalities is to deny them both the opportunity of benefiting from their individual learning strengths and the help they may need in specific weaknesses (p. 153).

Language and Communication: Mother-Child Interactions

With regard to children with Down Syndrome, it has traditionally been held that their language development follows the same immutable path as for all such children, but that there is a delay of cognitive and motor development of about two years in childhood (Hanson, 1985). It is further held that once these individuals enter adolescence, there is a decline of the cognitive skills they had acquired previously. This view does not take into account that children or adults with Down Syndrome are subject to varying ranges of environmental opportunities, and that interactions with these opportunities are influenced by diversity in motivational and temperamental characteristics (Gunn et al., 1981; Bridges and Cichetti, 1982). Once again, we reiterate that children with Down Syndrome are individuals who vary enormously among themselves, just as other children do.

Past research on children with Down Syndrome has tended to group these children together, with little regard for such information as to whether they were institutionalized or living at home, or to the basis for subject selection. Furthermore, much misinformation concerning Down Syndrome does not seem to have been updated since Langdon Down attempted a description of the characteristics and features of children with Down Syndrome more than a century ago. A misunderstanding of the characteristics of the syndrome has hindered the development of children with Down Syndrome.

"Because of my tongue, it's usually thick. It's very hard for my speech to come through clearly... sometimes its stuck and I can mumble. People don't understand me, " explained David the teenager with Down Syndrome in the "Man Alive" television programme *David* (CBC, 1979). This description coincides with that by Langdon Down, a hundred years earlier, who reported "thick and indistinct" speech as characteristic of the syndrome. However, it would be incorrect to conclude from this that an accurate description of Down's Syndrome speech has been available for the past century (Gunn, 1985). David's agreement with Down's description is restricted to the "clinically obvious", and as such gives a very limited view about the characteristics and correlates of both speech and language that might be associated with his personal speech problems.

Children with Down Syndrome are particularly at risk for language learning problems for reasons beyond those usually associated with cognitive deficits (Miller, 1987). First, there is an associated increase in the frequency of middle ear infection, which is frequently associated with delayed language acquisition in any child (Brandes & Elsinger, 1981; Downs, 1980). Frequent ear infection can result in hearing loss, which is also associated with language learning problems. Second, some of the deficits in motor coordination associated with Down Syndrome may adversely affect the synchrony of motor movements required of the speech production system, including respiration, phonation, and articulation of the palate, tongue, lips, and jaw (Bless, Swift, & Rosen, 1985). Third, cognitive deficits specific to Down Syndrome may result in learning problems beyond those commonly associated with intellectual handicaps (Miller, Chapman, & MacKenzie, 1981). And, fourth, there can be inappropriately decreased expectations for performance in individuals with Down Syndrome which frequently result in learned incompetence or lack of appropriate experience (Coggins & Stoel-Gammon, 1982). Separately, any one of these factors can result in problems in language acquisition and communication; taken together, they represent what Miller (1987) has called "a formidable puzzle to unravel in order to understand the forces affecting language growth in this population" (p. 233).

Attempts to characterize the language performance of individuals with Down Syndrome have evolved over time, resulting in several competing points of view over the past 25 years (Miller, 1987). A major issue is whether the language of these individuals is quantitatively or qualitatively different (i.e., merely delayed or actually deviant relative to usual linguistic development). This controversy according to Miller is derived in large part from different ideas about the relation between language and cognitive skills; the view of quantitative differences is consistent with the idea that development in language is directly contingent on developments in cognition. Such a view predicts that language skills are always consistent with cognitive development or mental age, and never advanced or delayed relative to nonverbal mental age development (Graham & Graham, 1971; Lackner, 1968; Lenner, Nichols, & Rosenberger, 1964). In addition, quantitative differences argue for similar cognitive structures, with learning rate as the primary problem, which results in language learning being characterized as "slow motion" normal development. On the other hand, the qualitative view of language development in individuals with Down Syndrome argues that their development is somewhat "deviant", as predicted by mental age, compared to the synchrony of development of chronological age, mental age, and language in normal children (Newfield & Schlanger, 1968; Semmel et al., 1967). However, until now, although several studies have supported the "deviant" view (qualitatively different), the majority of research has supported the position that language in children with Down Syndrome follows the same course and sequence as that of other children, but at a slower rate (i.e. quantitatively different) (Miller & Yoder, 1974; Ryan, 1975; Yoder & Miller, 1972).

Both of these views recognize that cognitive development is essential for language development; both of these views however, oversimplify the complexities of the language itself and of the acquisition process, viewing it as something that is unidimensional and static over time (Miller, 1987). Neither considers the role of social factors, the impact of language on cognition, or the influence of specific linguistic capabilities on language development; all of these are prominent ideas in current theories of language development and communication (Bates & McWhinney, 1979; Slobin, 1985; Wells, 1980). Recent research surveying the relation between language and cognition has suggested a correlational link, in which language development proceeds generally at the rate of cognitive development, but depending on environmental events, may be slightly ahead of or behind cognitive skills (Cromer, 1981; Finch-Williams, 1984; Leonard, 1978; Miller, Chapman, Brandon, & Reichle, 1980). Such a view regards language as developing within an interactive context, where the child's environment plays a large role in language acquisition, which includes providing both quality and frequency of language and nonverbal experiences leading directly to increasing knowledge of the world (Miller, 1987). Thus, the many sources of variance imply that the course of language development will not necessarily follow the same immutable path for all children with Down Syndrome (Gunn, 1985).

But cognitive development is not the whole story. Kamhi and Johnston (1982) found that frequency differences among linguistic characteristics were due to social and motivational behaviors rather than deficits in cognitive or linguistic abilities. The findings of this study are important because they identify different underlying processes for different language characteristics, where frequency of use of specific linguistic forms is attributed to social aspects of the conversational context or to motivation, and not necessarily to delay or differences in linguistic/cognitive knowledge. Keeping this in mind then, one should regard language and communication skills as a social as well as a cognitive process, where the many sources of variance add to the complexity of the language system as it is used in speaking and listening (communication) (Miller, 1987).

Communication During Infancy: Mother-Child Interaction

Considerable interest has been shown in the pre-speech period as the precursor to spoken language and to communication (Gunn, 1984). This interest is fostered by the recognition that language is a system for coding communication and that language development always takes place in social contexts, or more specifically in naturally-occuring settings where social interactions routinely occur. With this perspective, speech is seen primarily as a vocal-motor method of expressing a language. The child's first words are not necessarily the child's first attempts to express the language nor are they the first acts of communication. Since the most salient and regular communication for the baby and toddler are likely to be with the mother, many studies have focused on mother-child interaction. It has been suggested that these interactions expose the child to the speech of the culture, to the conversational conventions for turn-taking and pausing, and to the meaning and function of certain acts, objects and events (Stern, 1977; Gunn, 1984). Although some research has established that the rudiments of intentional behavior are reflected in early infant communications, other studies have attributed the apparent turn-taking role to the mother's skill in monitoring her infant's behavior (Schaffer, 1977; Hayes, 1978; Kaye and Fogel, 1980). Mothers watch their babies continuously during one-to-one interaction so that the probability of eye contact is enhanced and their skill in filling in the gaps between the infants vocalizations creates the impression of conversation. According to Bruner (1975), a mother's response to her infant's signals (looking, vocalizing, smiling, etc.) invests these behaviors with purpose. They are treated as intentional requests for action or information. It is presumed to be within this context that the child learns to communicate intentionally, and to "crack the linguistic code."

There is a small body of literature describing the linguistic and social mother-infant interactions of infants with Down Syndrome. Certain differences have been observed between mother-infant interactions of infants with Down Syndrome and those infants who are not developmentally delayed. The infants with Down Syndrome are reported to be delayed in vocalization, eye contact, and smiling, and have a dampened intensity of emotional expression (Emde and Brown, 1978; Berger and Cunningham, 1981). In this research, it has been suggested that the vocal exchanges during mother-infant interactions show less turn taking for Down's Syndrome dyads. Mothers of infants who are not considered to be developmentally delayed vocalize much more often with their children. Vocalization is seen by researchers to be a forerunner to conversation between mother and child, and is also seen as being important because it occurs at a time of high mutual involvement between the mother and infant (Stern, 1977; Thomas, 1981). From this work, it is observed that the quality of mother-child interactions has a direct and positive bearing on the linguistic development of a child with Down Syndrome. There is some evidence that children with Down Syndrome learn concepts in a similar sequence and in an analogous manner to that of "normal" children but at a later chronological age. Emde and Brown (1978) and Stone and

Chesney (1978), have reported that early interactions are not only important to the cognitive development and the acquisition of communication skills, but are also a contribution to the affective development of children. Research studies have suggested that most infants who have Down Syndrome proceed through the normal stages typical of attachment but at a slower rate (Blacher and Meyers, 1983). One implication of these findings is that mothers change their expectations and methods of interaction to what they think is their child's mode of functioning. For instance, a mother will work harder to find the level of stimulation which will make the baby smile if she believes that smiling is important for her baby's development, and if she believes that the baby is capable of responding at that level at that particular time. However, if she has been led not to expect it, she may not work to provoke it.

A study by Chapman (1981) reviewed in detail the role of mother-child interaction on language development in the second year of life. Her conclusions were based on the observation that input plays a demonstrable role in language development when it is specifically contingent upon a child's initiated actions and utterances. Chapman went on to say that it is the linguistically responsive environment, rather than the linguistically stimulating one, that should accelerate language acquisition and communication in the 1- to 2- year-old child. The crucial operating principle for the mother seems to be: "Pay attention to what the child is doing and saying" (p.224). Another way of putting this is to say that the mother's linguistic interaction should be contingent on the child's behavior. These interactions, however, are not usually consciously intended by the mother as language development lessons. Newport et al. (1977) concluded that they were intended to control the child's behavior 'right now', while Snow (1977) suggested that the mother's intention was to maintain a 'conversation'. All the same, the mother's language does seem to be related to some aspects of the child's language development; on a coarse scale, "more language input from adults is related to more and better language in children" (Bates et al., 1977).

Most research on acquisition of mother-tongue has been directed to children who are not developmentally delayed, and very few studies have dealt with children who have Down Syndrome. In a comparison between children with Down Syndrome and non-retarded children, certain features of maternal language acquisition were found to be different for the two groups of children. The children who had Down Syndrome were exposed to shorter, more frequent utterances, to incomplete sentences, and sentences in the imperative mode. Mothers were found to adapt their language to the linguistic capabilities of their non-retarded children much more readily than mothers responding to children who had Down Syndrome (Gunn, 1982); the interactive behavior of the former appears to be more contingent than that of the latter. The study suggested that maternal speech did not increase in complexity when mothers of children with Down Syndrome interacted, because they were responding to their child's language competence as they perceived it in the light of their negative expectations, rather than responding to the actual competence of their children. What these studies do not report is the possibility that these mothers lacked confidence in their children's ability to initiate and sustain discourse. This explanation of lack of confidence on the part of the mothers is based on what they have been told to expect generally from their mentally handicapped children rather than focusing on the extent of their children's capabilities. In other words, being led to have low expectations may influence the perception system of the mothers. If inadequately low expectations are limiting the optimum development of children with Down Syndrome, this is clearly one aspect of their experience that could be changed for the better.

Each mother should respond to what her particular child can do, rather than being blinded by expectations of the performance of children with Down Syndrome as a general category as suggested by folklore or stereotype. As the child's performance changes whether because of learning or maturation, so should the mother's interactive behavior. However, Mahoney (1983) found that mothers' speech input to young children with Down Syndrome did not change over the course of 10 months and was unrelated to the child's behavior. In other words, it was not contingent. Glaser, Schwethelm, Haffmer, and Mahoney (1984) found mothers of children with Down Syndrome produced 79% of their directives toward mother-initiated activities and only 21% of their directives in relation to child-initiated activities. Significantly more directives were successful in changing or facilitating child activities if the activities were child initiated rather than mother initiated. In the above study, mothers continued to be successful when they followed the child's lead.

Most of the research on communication and language development of persons with Down Syndrome has been directed towards children or adolescents; not many reports are concerned with the language of adults with Down Syndrome (Gunn, 1985). The few studies that have been conducted suggest that although spoken language may be restricted, even the 'severely retarded' may be competent in some aspects of communication. For example, a study conducted by Price-Williams and Sabsay (1979) investigated the communication style of nine men with Down Syndrome who had been institutionalized for periods from 29 to 49 years, whose language varied from unintelligible one-word utterances to complete sentences; these men were found to be communicating successfully during their daily routines. Leudar et al. (1981) also found that adults with Down Syndrome in a training center were capable of communicating appropriately with both acquaintances and strangers, and that these adults obeyed the "rules of conversation".

To some extent, the general literature surveyed indicates a lack of early maternal responsiveness to communicative interactions (Miller, 1987) of their children with Down Syndrome. This view is supported by a study of how mothers respond to their handicapped children, including children with Down Syndrome (Brooks-Gunn & Lewis, 1984). This research indicated that prior to the onset of intelligible speech, mothers and children with Down Syndrome appear mismatched in their communicative interactions. Some insight may be provided here by Coggins and Stoel-Gammon (1982), who found that parents of mentally retarded individuals decrease their expectations for performance on any given task when it comes to these children, and that this in turn frequently results in a lack of appropriate experience, resulting in learned incompetence. In the case of children with Down Syndrome, early knowledge of the condition, and the bleak picture about the prognosis that is sometimes given to parents, may well affect proper parent-child interactions by creating inappropriately low expectations and also focussing the attention of the parent on the Down Syndrome stereotype rather than on the actual behavior of the particular child.

If we are to have the information we need to advise parents properly, more research is needed on the way in which mothers of children with Down Syndrome interact and communicate with their preschool children. Also, more information concerning the type of advice parents receive from "experts" regarding their children's learning potential is needed, because such advice undoubtedly influences the expectations of parents for their childrens' ability to learn. Expert advice may be one important source of negative expectations on the part of parents, and it is known that expectations often influence subsequent behavior. Springer and Steele (1980) interviewed parents of children with Down Syndrome, and found that they had been given a fairly negative picture by their medical advisors; although the greater number of these parents had indicated that they had not just passively accepted the depressing clinical picture given to them, one cannot assume that this type of early "counselling" is totally without effect. Unfortunately, any parent who is told by a representative of a respected profession that their child will never walk, talk or learn in any reasonable way will very likely be less inclined to encourage such developments (Springer & Steele, 1980). If these parents then turn to research articles, reports or textbooks, they are likely to find that this information is once again dreary and unpromising, presenting them once again with a poor prognosis.

A review of the literature suggests that the teaching style and the communicative abilities of the mother are extremely important aspects to consider when studying the processes involved on how children learn. It has been shown that mothers who employ the contingency rule, that is, whose helping behavior is triggered by the child's need, at that precise moment, lead their children to become more efficient and independent problem-solvers (Wood, 1980). It has also been shown that parents tend to be more directive toward handicapped children than to non-handicapped children. One of the possible reasons for this might be that in such situations, mothers may perceive their handicapped children to be less capable at solving problems than they actually are. Moreover, the inappropriate responses some mothers have towards their children may well be as a result of the type of information they received following the birth of their child.

The research conducted in this study arises out of the above ideas. Although the children with Down Syndrome involved in this study are only at the preschool age level, we believe that the findings which emerged from this research have implications for the learning and problem-solving strategies employed by individuals with Down Syndrome throughout their lifetimes. The mother's perception of the competence of her child's abilities and the teaching strategies she uses during her child's early years may have deep and long-term effects on her child's developing problem-solving abilities. This is especially so in the case of children with Down Syndrome where mothers' perceptions may result in the kind of interaction and communication that give rise to feelings of incompetence on the part of these children that may persist throughout later life. Cognitive and linguistic development are cumulative. There is no age at which communication competence ceases to be important, and any gains in knowledge and self-respect are valuable throughout the life-span (Gunn, 1985).

Social Processes and the Developing Child: Culture, Communication and Cognition

The importance of early experiences for subsequent development is not only an unchallenged assumption (Hanson, 1985), but is supported by much research.

Two major theoretical assumptions underlie much of the developmental work exploring the relationship between early experience and later development: (1) social stimulation is considered a crucial precursor of human competence; (2) reciprocity, or contingent social interaction , is seen as the essential aspect of this social stimulation that promotes human competence. Most theory and research suggests that early in life, the home environment to which the child is exposed and the developmental status of the child interact to produce subsequent cognitive functioning (Overton, 1973; Coates & Lewis, 1984).

During the last decade, there has also been a growing interest in social interaction with young children, and this has made researchers aware of the need to consider the social context in which these cognitive skills develop. Infants begin learning from the people around them, their social world, and their culture, all of which strongly influence what occurs to them and what is attended to by them

(Vygotsky, 1962; 1978). The ways that infants respond to the people and objects around them include the use of language and communication skills. Russian psychologist Lev Vygotsky (1978) attributed a special role in cognitive development to the social environment of the child. The theoretical framework adopted in this study recognizes the usefulness of a dialectical interpretation of development, such as Vygotsky's, and such as has long been accepted in the Soviet Union (Cole & Scribner, 1978; Luria, 1979; Vygotsky, 1978). The social aspect has recently been given more serious consideration by Western academics in a variety of areas, including intelligence testing (i.e.Campione, Brown, Ferrara, & Bryant, 1984; Day, 1983), memory (i.e. Rogoff & Gardener, 1984), problem-solving (i.e. Wertsch, 1978; Wertsch, McNamee, McLane, & Budwig, 1980; Wood et al., 1976), and more recently, parenting styles (Pratt, Kerig, Cowan, & Cowan, 1988).

The examination of children's problem-solving abilities has been central to the study of early cognitive development. Of particular interest is Vygotsky's theory of cognitive development, which arose from his attempts to formulate a theory of psychology based on the foundation of Marxist thought. Central to Vygotsky's theory is the notion that cognitive functioning arises from social interaction between the adult and the child. In order to understand the ontogenesis of cognitive functioning, it is necessary to examine the way in which children's social interaction with more experienced members of their culture leads to the mastery and internalization of that culture. In this regard, Vygotsky (1962; 1978) reviewed a number of major theoretical positions and postulated yet another.

In one, he described a view of the process of child development as independent of learning. Here, it is assumed that learning always comes after development and that it does not play a role in development. Such a view implies keeping the child in a "healthy" state so that biological unfolding occurs optimally. In another, he outlined a view of learning as development. Here, it is assumed that development is essentially an accumulation of all the skills and knowledge that are learned as a result of experience. Vygotsky rejected both these positions and stated that both learning and development are interrelated from the first day of a child's life. He argued that all higher planning and organizing functions in development appear twice, initially on the interpersonal plane of social interaction, and subsequently on the intrapersonal plane of individual cognitive functioning, following a process of gradual internalization (Pratt et al., 1988).

> An interpersonal process is transformed into an intrapersonal one. Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first between people (interpsychological),and then inside the child (intrapsychological). This applies equally to voluntary attention, to logical memory, and to the formation of concepts. All the higher functionings originate as actual relations between human individuals (Vygotsky, 1978, p. 57).

Vygotsky argues that first and foremost, human beings are social creatures, and therefore all psychological processes are essentially social processes in origin. When children learn for example, they always do so in the context of interaction with others in the first instance, and of internalization in the second. The concept of internalization is central to Vygotsky's theory; it entails the view that children first experience active problem-solving in the presence of adults or adult-child "teaching interactions", and gradually come to perform these functions independently. The process of internalization is cumulative. Initially, complex tasks must be accomplished by such a problem-solving dyad, with the adult assuming the directive and organizing function (guiding the child's activity). The child's role at this stage may be simply to enact the specific behaviors assigned to him or her by the adult "tutor" or on occasion a knowledgeable peer. Gradually, however, as the child becomes more skilled, he or she takes over more and more of the goal-oriented, planning aspects of the task from the adult who corrects or supports the child when the child fails or falters. Thus, developmental progress from other-oriented regulation to self-regulation is an important outcome of the social interaction of mother-child dyads (Wertsch, 1978; Wertsch et al., 1980).

Within this context, Vygotsky suggested that learning by children proceeds most effectively when tutoring occurs in what he termed the "zone of proximal development" which is

> the distance between the actual developmental level as determined by individual problem solving and the level of <u>potential development</u> as determined through problem solving under adult guidance or in collaboration with more capable peers. The zone of proximal development defines those functions that have not yet matured but are in the process of maturation, functions that will mature tomorrow but are currently in an embryonic state. These functions could be termed the "buds" or "flowers" of development rather than "fruits" of development (Vygotsky, 1978, p.86).

According to Tharp and Gillimore (1988), in contemporary neo-Vygotskian discussions, the concept of the zone of proximal development has been extended to a more general statement, in which the "problem solving" of the preceding quotation is understood to mean performance in other domains of competence (Cazden, 1983; Rogoff & Wertsch, 1984). "There is no single zone for each individual; for any domain of skill, a zone of proximal development can be created" (Tharp & Gallimore, 1988, p.31). Thus, children can acquire a variety of skills with proper assistance either provided by the parent, the teacher, the adult, the expert, or the more capable peer. By this assistance "learning awakens a variety of internal developmental processes that are able to operate only when the child is interacting with people in his environment and in cooperation with his peers. Once these processes are internalized, they become part of the child's independent developmental achievement" (Vygotsky, 1978, p. 90).

According to Vygotsky, at any given point in development there are certain problems that children are on the verge of being able to solve, and that they can be assisted to solve. They can benefit from some structure, clues, and reminders that help them to remember details. A teacher can suggest steps to be followed, and can encourage them to keep trying. Of course children can already solve some problems independently, whereas others are beyond their grasp even if every step is explained. The zone of proximal development is that time-span within which the child is unable to solve a problem alone but can succeed under adult guidance or in collaboration with a more advanced peer (Wertsch, 1984). This is the time-span during which instruction is useful and can accelerate learning.

This theory suggests a method of teaching wherein students should be presented with challenges, but where support and help are also present. Support may come from other students or from the teacher. Sometimes, the best teacher is another student who has just solved the problem, perhaps even with difficulty. Such a student is more likely to be operating in or near the learner's zone of proximal development and may be able to explain the situation in terms that his peer will be able to focus on and understand.

When the adult-child dyad do not share a common definition, they must redefine the situation until "intersubjectivity" exists between them. Intersubjectivity can be defined as commonality of the definition of meanings by two or more interactants; the greater the intersubjectivity, the more likely the interactors are to interpret one another's meanings as they were intended. Intersubjectivity is often negotiated in Vygotsky's terms through semiotic mediation, that is, mediation through signs, especially linguistic signs. By representing objects and events in speech in certain ways, the adult can attempt to negotiate a new level of intersubjectivity. In responding to the adult, the child may join in the process and set up bilateral negotiation. Any disruption in communication between the adult and the child will lead to difficulty in achieving intersubjectivity and, subsequently, will make it difficult for the adult to diagnose effectively the child's zone of proximal development. The negotiations involved in the achievement of intersubjectivity are not always necessarily undertaken by means of speech. Rogoff, Makin, and Gilbride (1984) discuss mechanisms of joint attention, such as joint eye gaze, that are important in the formation of intersubjectivity between adults and infants as young as 4 months of age. According to Rogoff et al., (1984), such mechanisms help lay the groundwork for children's participation in subsequent zones of proximal development by allowing the adult and child to "calibrate the appropriate level of participation by the child, where the child is comfortably challenged" (p. 43).

In explaining the notion of the transition from interpsychological to intrapsychological functioning, Vygotsky attributed a crucial role to speech. He was mainly concerned with the social activity of speech, and included many aspects of communication in addition to language systems. Vygotsky asserted that one of the primary reasons for adults and children to participate in social interaction is to engage in communication and mutual regulation; in this context he proposed his notions of egocentric and inner speech.

Piaget's (1929; 1962) notion of egocentric speech described this as a manifestation of a child's immature and self-centered understanding of the world; he argued that as the child becomes socialized, this peculiar speech form disappears. Vygotsky (1962), in contrast, viewed egocentric speech as the bridge between external interpsychological functioning and internal intrapsychological functioning. Egocentric speech according to Vygotsky has its origins in earlier forms of social speech: "the scheme of development is first social, then egocentric, then inner speech" (p.19). The child's earlier communicative interactions involving "other-regulation" by adults lay the foundation for later "self-regulative" capacities of egocentric speech. For Vygotsky then, egocentric speech is the transition from overt verbalized thought to inner speech, and the reason for its appearance is that the internalized self-regulative function of speech is still not completely differentiated from its earlier social functions. Unlike Piaget, who argues that egocentric speech dies out as a result of the child's socialization, Vygotsky believed that "it does not simply atrophy but 'goes underground', i.e., turns into inner speech" (1962, p. 18).

Vygotsky's dialectical perspective of cognitive development is central to the current research orientation of a number of contemporary Western researchers, including Jerome Bruner, David Wood and Courtney Cazden.

Closely linked to Vygotsky's zone of proximal development model is the notion of "scaffolding". Bruner (1975), basing his research on observations of children in naturalistic settings, has identified a number of features of infant-parent interactions which help ensure that the infant is brought to attend to and participate in the "same" experiences as the adult. These early shared intersubjective experiences are seen as the foundation or basis for the development of mutual understanding and eventually of language itself. Intersubjectivity involves sharing perceptions, conceptions, feelings and intentions and, it has been stated, is largely achieved through the use of scaffolding (Wood, 1980). After carefully observing mothers who provided a supporting framework for their young children in problem-solving tasks in naturalistic settings, Wood, Bruner, and Ross (1976) were able to offer a description of scaffolding:

> Scaffolding is a process that enables a child... to solve a problem, carry out a task or achieve a goal which would be beyond his unassisted efforts. This scaffolding consists essentially of the adult "controlling" those elements of the task that are initially beyond the learner's capacity, thus permitting him to concentrate upon only elements that are within his range of competence (Wood et al., 1976, p.90).

Wood and Middleton (1975), have studied the process of scaffolding systematically by presenting mothers with a construction problem to teach their children. In this series of studies, mothers of preschool children were asked to teach their children to assemble a construction toy which can be made up of 21 blocks of wood. This task was initially beyond the children's abilities of completing it alone, without assistance. Wood and Middleton (1975) examined the scaffolding process as a hierarchical measure of the tutors' or mothers' interventions. By asking the mothers to teach their children how to construct a pyramid from the blocks, they are able to measure and describe the mothers' levels of intervention, and to determine the degree to which they are contingent on the child's actions.

Wood and Middleton (1975) represent the levels of intervention on an ordinal scale, from level 1 to level 5 where the mothers increasingly take over and control the act of construction in question at higher levels, and where the child's contribution is greatest at the lower levels.

At level 1 the mother simply tries to encourage the child (verbally or by gestures) to enter into the task activity, or to persist with it. She might say, "What are you going to do now?" or " Would you like to make something with the blocks?". In brief, Level 1 is defined as general verbal instructions (encouragement).

At level 2 the mother attempts to establish certain guidelines in order to assist the child's search for the pieces to be assembled. She might say "I think you need the very big blocks", or "Get the littlest ones." Here, the defining characteristic of this level is that the mother identifies critical features of the pieces but takes no part in the actual search for them. Level 2 interventions include non-verbal and verbal expressions which may communicate meaningful guidelines to the child.

At level 3 the mother actually intervenes in the selection of the pieces of the toy and indicates which are appropriate by saying "You need the little one.", "There." and so on. Here, the mother is leaving the child with the task of operating with the material indicated, or of ignoring the suggestion.

At level 4 the mother picks up the appropriate pieces of the toy and prepares for its assembly, leaving the child to perform the act of putting them together and piling.

At level 5 the mother actually assembles the pieces of the toy and proceeds to complete the task while the child is merely looking on.

As we proceed then from levels 1 to 5, the mother takes over and increases her control of the act of problem-solving, or of the particular task in question. The contingency rule of scaffolding suggests that the most successful mothers would be those whose response is contingent upon the behavior of the child. That is, mothers who are good scaffolders are those who are most likely to act in accordance with two rules of teaching, the first being that any failure by a child to bring off an action after a given level of help should be met by an immediate increase in help or control, and the second that after success, the tutor (mother) should offer less help than that which preceded success (Wood and Middleton, 1975).

In order to determine the degree to which the mother is sensitive to her child's behavior during any instructional session, several measures are tabulated. So, for example, the more difficulty a child has in achieving a task, the more directive the interventions of the mother should be, if the mother is following the contingency rule. Within this context then, Vygotsky and Bruner view "adults" as having a central role not only in the instructional process but also in helping children to learn problem-solving strategies. However, they note that not all adults are equally adept at performing this role.

The concept of scaffolding emphasizes both the child's readiness to learn and the importance of adult assistance. Vygotsky, Bruner, and Wood's notion of readiness for learning takes into account the zone of proximal development and scaffolding; it turns out to be less stringent than most developmental theories and more specific to individual learners and the social situation in which they find themselves. Over the years, their research, has viewed adults as having a central role not only in the instructional process but also in helping children to learn problem-solving strategies.

Statement of the Research Questions

The major idea behind the research in this dissertation is that mothers who consider their children less than able problem-solvers or who consider their children as poorly developed problem-solvers or who consider them as inadequately equipped to be potential learners, would tend to use a rigid, non-contingent teaching approach. Such a teaching approach does not take into consideration the degree of success of their children's efforts during the instruction period. Research cited above suggests that parents of children with Down Syndrome tend to consider their children "defective", and, in accordance with this belief, they are more directive and controlling in interactions with their children. In addition, to the extent that some of these mothers hold negative instead of positive expectations toward their children, they will be even more directive. Of particular importance here is the theory of scaffolding, as a context for the analysis of mother-child interactions. Wood and Middleton's pyramid is an instrument that enables us to examine the interactive effects of positive or negative expectations of mothers on the quality of the scaffolding they provide for their children. Observing interactions between mothers of children with Down Syndrome and their children in the light of scaffolding theory may increase the understanding of the kinds of situations which triggers this directive maternal behavior and the subsequent effect on children's initiatives and responses. In addition, the theory of scaffolding may provide important insights leading to improved intervention strategies when a child is diagnosed with Down Syndrome.

There are four main objectives of this study, each of which is embodied in a research question, as follows:

1. Do mothers of children with Down Syndrome engage in processes similar to scaffolding when teaching their children to solve problems?

2. Are these processes similar to those utilized by mothers whose children do not have Down Syndrome when teaching their children problem solving?

3. Are mothers of children with Down Syndrome who hold relatively negative expectations[5] toward their children likely to intervene frequently, regardless of their child's response to a task? Are they likely to use directive strategies?

4. Are mothers of children with Down Syndrome who have relatively positive expectations[5] toward their children likely to intervene less frequently than those with negative expectations? Are they then less likely to use directive strategies?

It has been suggested that compared to those with negative expectations, mothers with positive expectations tend to offer just the appropriate level of help needed (Wood & Middleton, 1975).

CHAPTER THREE

Methodology

A pilot study was conducted in the greater Montreal area prior to the actual undertaking of the present study. This preliminary study used a smaller number of cases but was otherwise identical to the proposed study in terms of objectives and methodology, with the exception that it was conducted in part to determine whether the difficulty level of the chosen task, that is, the wooden pyramid, was appropriate for children with Down Syndrome. Prior to the actual investigation, various professionals made suggestions, mainly to the effect that to ensure children with Down Syndrome would be able to complete the task, they should be about two years older than those who had participated in the Wood and Middleton studies, in order to correct for "mental age."

Material

An informal interview was conducted before any actual problem solving situation was engaged in. The purposes of this interview were to establish rapport with the mother and child, to gather developmental and educational information on the children involved, to assess the mothers sensitivity to their children's learning abilities, and to determine what type of information those mothers of children with Down Syndrome had received following the birth of their children (see Appendix A).

The questions in this research required the selection of some means of measuring how mothers teach their children to solve problems. As a result of reference to the research literature on assisted problem-solving (Wood, 1980; Wood, Bruner, and Ross, 1976; Wood and Middleton, 1975; Wood and Middleton, 1974), a task in the form of a wooden pyramid that can be constructed from 21 interlocking pieces, devised by Wood, (1974) investigating the interactions between mothers and their children during problem-solving situations was chosen for the present study (see Figure 1 and Figure 2 respectively). As Wood (1974) and others have shown, the task is both entertaining and challenging to four and five year old children. Moreover, typical behaviours of three, four, and five year olds in constructing the pyramid have been documented. This device has also been shown to be sufficiently complex to be sensitive to changes that take place in the children's problem-solving performance over short time-spans.

Wood and Middleton (1975) describe the task as follows: "The specially designed construction toy illustrated in Figure 1 was the task put before the children. These combine to form a pyramid which stands 9 inches high and has a square base with 9 inch sides. There are six levels in the pyramid. The very top one is simply a block with a circular depression in the bottom. This stands on top of the whole structure. Each remaining level has the following logical structure: it is composed of four equal sized blocks which are formed of two locking pairs. The pairs fit together by a hole and peg arrangement. Each of the two pieces of one pair has a half-peg, which, when oriented correctly, provides the connecting peg between the pairs. Similarly, the other pair has two pieces each with a half-hole. Each pair is itself joined by pegs and holes which are exactly the same dimensions as those formed when the two pairs are made. The blocks are designed so that all pegs would fit into all holes. In addition to pegs and holes, each level has a shallow round depression in its base and a matched elevation on its top. These can only be formed by putting the two appropriate pairs together in the correct orientation, since each block possesses one quarter of each of these connectives. This feature was added to permit piling of the blocks" (p.183).

The task of assembling the pyramid according to Wood et al., (1976) is 'fun' and 'interesting', and "one that is within easy reach of a child's skills and one that is continuous in its yield of knowledge" (p.91). This device proved to be ideal for the purposes of this study.

Subjects

The main focus of the research was on the observed interactions of mother and child under conditions of the mother attempting to teach the child how to construct the pyramid. The reason for focussing on the mothers is that, although in our present day society both mothers and fathers take an active role in child-rearing and child-caring, the realities of life are usually such that the mother is still the primary child caregiver, and tends to spend more time with the child especially during the years from birth to entry into formal schooling.

Demographic variables such as the socio-economic status of the parents and the age, sex, birth order and background history of the child, including the cause of Down Syndrome, whether mosaic or trisomy, were part of the information gathered from the mother (see Appendix A). Table 1 describes the various characteristics of the children and their families.

Six children were involved in this research, four boys and two girls. Four of the children were French speaking, and two of the children were English speaking. All of the children were from the greater Montreal area and attended neighboring preschool programs in addition to special preschool programs in various social services centers (Centres D'Accueil). Children with Down Syndrome for so long have been labelled and perhaps even libelled as possessing certain shortcomings. These have been interpreted as meaning that these children are somehow "ineducable and incompetent". The Centres D'Accueil offer various levels of assistance to the community in the form of prevention and remediation of problems. The focus of these special preschool programs is on early intervention, and one of these is stimulation with an emphasis on parent involvement where certain psychomotor and language exercises are repeated at home. Four of the children began these preschool programs around the age of two, one child began the program at nine months, and one child at three years of age. The four children who began special preschool programs around two years of age did so as a result of the information their parents began to seek out after they had done some initial investigation on the problems faced by children with Down Syndrome. Most of the parents said that the advice they had received from the various sources they had requested help from after reading and calling various children's centers, was that the age of two is usually chosen as the time to begin prevention and remediation programs for children with mild intellectual handicaps. Several studies have demonstrated that it is during the second year of life that differences in cognitive abilities of children become more apparent; prior to twelve months of age, measurable cognitive deficits have not been reliably detected (e.g. Golden, Berns, Bridger and Moss, 1971; Ramey and Campbell, 1979).

Table 1

Distribution of Socio-Economic Status Factors for Mother-Father Participants

Child's Assigned Name	**Mother Tongue**	**Mother's Education**	**Father's Education**	**Parent's Employment**
Paul	Fr	H. S.	H. S.	F
Pat	Fr	H. S.	H. S.	F
Mike	Fr	H. S.	H. S.	F
George	E	H. S.+	H. S.	M/F
Maggie	E	H. S.+	H. S.+	M/F
Betty	Fr	H. S.	H. S.	M/F

N= 6 (4 boys; 2 girls)

Children were given pseudonyms

1) "E" means English speaking
"Fr" means French speaking

2) "H. S." means high school
"H. S.+" means college or other post secondary schooling

3) "F" means father only employed
"M/F" means mother and father employed

The children ranged in age from 4 years 4 months to 5 years 4 months of age, with a mean age of 4 years 10 months. All of the children involved in the study were from intact two parent families in which three of the mothers worked outside the home and three were housewives. Four of the mothers were high school graduates while two mothers held undergraduate university degrees. With regard to birth order, one child was an only child, one child was the youngest of three children, one child was the second born of three children, and three children were the younger of two children, (see Table 2). All of the children were able to communicate with their mothers, that is, they understood their mothers demands and the mothers understood their children's demands, with the possible exception of "Pat", who did not begin the preschool program until he was three years old. In his case the level of language was noticeably poorer than that of the others.

Consideration at the beginning of this study was given to the administration of some form of nonverbal or verbal 'intelligence' tests as a criterion for matching the children on measures of mental ability; however, such testing was rejected. First of all, the focus of the study was not a "two group approach" for example, severe versus mild Down Syndrome comparison. Second, the usefulness of IQ testing of young children in general, and especially of children with

Table 2

Distribution of Child and Family Status Factors

for Participating Children

Child's name	**Child's age at time of testing**	**Birth order of child**	**Age at which child began preschool program**
Paul	5 yrs./ 2 mo.	2 of 3	2
Pat	4 yrs./ 8 mo.	2 of 2	3
Mike	5 yrs./ 4 mo.	2 of 2	2
George	4 yrs./ 6 mo.	1 of 1	2
Maggie	4 yrs./ 5 mo.	2 of 2	9 months
Betty	4 yrs./ 4 mo.	2 of 3	2

Average age of children at
time of testing = 4 yrs./ 10 mo.

Down Syndrome, was questioned. Instead, mothers and preschool personnel provided the investigator with information about the child's abilities and developmental progress, and the information suggests that the children are quite comparable. In addition, a toy which required problem-solving skills analogous to those needed to build the pyramid was used at the beginning of each testing session, and their response to this task demonstrated that they were all capable of solving puzzles of this kind, the opinions of the experts notwithstanding.

There was some inconsistency with regard to when and by whom the mothers had been initially told that their children had Down Syndrome. Most of the mothers received information about their children's condition within one to two days of the birth; however one mother was not informed until a week after the child was born, and then by phone.

Relatively little has been written about parents and families of children who are physically or intellectually handicapped. The views that can be gleaned from the literature include the following: that parents of the handicapped are themselves somehow different from other parents because of their offspring; that it is axiomatic that to have a handicapped offspring is to feel that disaster has struck; and that the best that a parent of such a child can do is to institutionalize that child (Gottlieb, 1980). A brief description of what parents were told, and by whom, follows:

Paul was a day old when his mother was told by a pediatrician that he had Down Syndrome. The information that she was given was that her child was "mongoloid", that he was mentally retarded, and that he might have life-threatening medical problems, but that it was too soon to know. She was then asked to call and tell her husband, and told that he, the pediatrician, would return later to answer their questions. When they were all together, the additional information provided by the pediatrician was that the family had the option of giving the baby up for adoption or of placing the baby in one of "several institutions". The parents decided to leave Paul in the hospital to be cared by nurses for one extra week while they decided on whether to keep him, or place him in an institution.

Pat's mother was informed that he was a slow baby in terms of his reflexes and inability to respond with sucking when food was placed in his mouth. He was sent home two days after he was born, and once he was at home his mother said he was quite difficult to look after. Pat wouldn't eat and he cried a lot. His mother said that she knew something was wrong with him but, that she couldn't quite figure what. A week after Pat was born, she received a phone call from the pediatrician at the hospital where Pat had been born, telling her that her son's result had come in, and that he was "mongoloid", which "basically meant that he was mentally retarded" and that she and her husband should come in to see him so that they could discuss the possible alternatives for the baby. Pat's mother said her husband took the news very badly and that his first reaction was to suggest that the baby be placed in an institution, and that if this was not possible, she should "stop feeding the baby". This negative attitude on the part of the father lasted for several months during which he constantly advised her to "stop feeding the baby". As a side note, Pat's mother said that her husband was not present at the birth of the child, because "he did not think it was his place to be there".

Mike was also a day old when his mother was told that her child had Down Syndrome. Her obstetrician waited for the father of the baby to be present because he wanted to tell them both at the same time. The initial information that they were given was that the child was "mongoloid", which meant that he was mentally retarded, that he would not live past the age of 20-30 years, and that he would most probably have additional medical problems. He told them that they could put up the child in one of several institutions of which he provided the names, and that should they decide to keep the child he'd try to find a pediatrician for them who was familiar with the syndrome. The couple decided to leave their child in the hospital while they visited various institutions for physically and intellectually handicapped children. Mike's mother said that she was extremely appalled at what she saw in these institutions and became increasingly concerned about her child's well-being. On the parent's initiative, the child was kept in the hospital for **one** month.

(The implications of such early separation for so long undoubtedly has implications for mother-child bonding, but this does not seem to have been given much consideration). Her decision to keep her child came one day when she went to see him in the nursery and one of the nurses told her that most children with Down Syndrome fared much better psychologically and physically at home and that she should give her baby that chance. She was encouraged to bring the baby home and to treat him as she had treated her other child, and it was suggested that if she than found the task too difficult or unbearable, the option of putting her child into an institution would still be available. The nurse also provided them with information about various Centres D'Accueil they could call to get more information or meet other parents in similar circumstances.

George was a day old when his mother was told that her child had Down Syndrome. Her obstetrician waited for the father of the baby to be present because he wanted to tell them both at the same time. George's mother said that both her husband and she were devastated, since just the day before, when George was born, they were given the news that their child had scored a perfect 10 on the APGAR scale and that he was perfectly healthy. The information which they were given by their doctor was that their child was mentally retarded, that he would most likely have additional medical problems, and that individuals with this syndrome died much younger than most people. They were also informed that various options were available to them should they wish to give the child up for adoption.

Maggie's mother, who is a special education teacher, realized that her daughter had Down Syndrome the minute she saw her, and this was confirmed by the obstetrician a few hours after her child was born. The day after Maggie's birth while her father was present, both parents were told that their daughter had Down Syndrome, which meant that she was first of all "mentally retarded" and secondly, that her lifespan would be significantly lower than that of "normal" children. This information was given to Maggie's parents by the obstetrician, who also added information on the possible choices available to the parents should they not want to keep their baby. Maggie's mother said there was never any doubt that the child would be going home. Two days later they left the hospital together.

Betty was a day old when her mother and father were informed by a pediatrician that she had Down Syndrome. The information that the pediatrician gave Betty's parents was that she was mentally retarded, that she might have other physical problems and that Betty would not live an average life-span. The parents were also told that should they not want to keep their child they could put her up for adoption or institutionalize her. The one significant difference in Betty's example was that her mother shared a room in the hospital with another woman who had a baby. Betty's mother said that after she and her husband had a good cry in their hospital room, the woman who shared the room with her told them that they should not despair, since she had a child with Down Syndrome who attended school and who was doing very well. That night the woman asked her husband to bring her daughter in, so that she could see how similar to other children their daughter was going to be. This experience undoubtedly influenced their decision to keep the child.

In the descriptions to the parents of the participating children cited above, there was some consistency with regard to the medical prognosis that the parents were given and to the long term consequences of having a child with Down Syndrome. All were told that their children might have additional medical problems, all were told that their children would have a shortened life-span, all were told that their children were "mentally retarded", all were given the option of giving their children up for adoption, all parents were presented with a very bleak picture of their children's future, and most were not given a very optimistic or realistic outlook of their children's future (except for Betty's mother who encountered another mother who had an older child with Down Syndrome).

> "Some of you know what its like to look forward to the birth of your child with eagerness and anticipation, a child with whom to share your world and your life and then be told after the birth that your hopes and **expectations** have just been shattered by some chromosomal accident. It is a grief process because there is a real grief over the loss of the child you expected and grief over the devastation of your dreams and hopes...(Martz, 1964, p.34-35).

To be told is devastating enough; however, all of the mothers said that the outlook was made even bleaker because of the kind of information they got from 'professionals' who are 'supposed to know better'. Frustrations were plentiful most said, because, most of their questions could not be answered. Thus, for some of them started the long trek of finding the "right pediatrician" or the "right family doctor", one who could help them with their children's special needs. Also most of the books to which they had access presented very pessimistic prognoses. Their experiences were similar to those of an author and mother of a child with Down Syndrome who recalls a sad experience after her child was born as she started to look for information on the syndrome.

> "She obtained a textbook on 'Mongolism', an abysmally discouraging study of unfortunate and almost subhuman people accompanied by even more bleak photographs. She carefully hid this book from her family so that they, too, would not know her anguish. She soon found out that they, in turn, were reading it and hiding it, each perhaps hoping that this terrible affliction would somehow be made right" (Canning, 1978, p.65, as cited in Canning & Pueschel, 1986).

In addition, these mothers said that the standard medical literature and advice offered them little information regarding the etiology of the syndrome. Some blamed themselves for the longest time. One mother at the time of testing said that to this day she wonders if maybe her child's problem occurred due to the fact that when she was pregnant by only a few weeks "she took an aspirin. I know it sounds illogical, but everything else still does not make sense to me. Why did this happen to my child? I was healthy, I already had a healthy child, I was not old, so why did it happen? Maybe I did something that I don't remember during my pregnancy, even though they (physicians) tell me that is impossible!" During their long search for information on what would help their children, they at times became increasingly frustrated, and they began to look for information elsewhere. The majority of them have said that they tried some therapies for which no evidence as to their effectiveness exists as yet. These therapies included, among others, various multivitamin supplements (megavitamins), injections of natural materials (herbs), very intense muscle-skeletal exercises called the Philadelphia method, and acupuncture. According to a very recent and extensive study of case histories of individuals with Down Syndrome, one of the common findings was that "it would appear from this sample that alternative therapies are used with a significant number of infants and children with Down Syndrome" (Van Dyke et al., 1990, p. 208).

Expectations

Recent surveys on language and cognitive development in children with Down Syndrome have suggested that these developments proceed generally at the same level as that of other children, but somewhat slower (Cromer, 1981; Finch-

Williams, 1984; Leonard, 1978; Miller, Chapman, Branston, & Reichle, 1980). These surveys have also suggested that the child's environment plays a central role in both language acquisition and cognitive development by influencing both quality and frequency of language and nonverbal experiences leading directly to increasing knowledge (Miller, 1987). Lastly, these studies have also suggested that language and cognitive development might be delayed in children with Down Syndrome as a result of problems beyond those associated with Down Syndrome (Miller, Chapman, & MacKenzie, 1981). One other possible explanation according to the above studies is that there can be decreased expectations for performance of individuals with Down Syndrome, which frequently leads to learned incompetence or lack of appropriate experience as a result of the decreased experience and not the syndrome (Coggins & Stoel-Gammon, 1982).

One of the research questions of the present study focussed on mother's expectations towards her child's abilities at present and in the long run, in terms of learning potential and educability. Mothers were evaluated to have relatively positive or negative expectations towards their children based on the information they gave the researcher of the present study. Mothers were asked to answer specific questions based on their child's perceived level of competence. For example, "Have your expectations concerning your child been met by your child's performance in everyday tasks and his/her interactions with other people?";

"Have you noticed a difference between what you were told to expect from your child to what your child can actually do?" (see Appendix A). Once again, based on the information the mothers provided in terms of what they expected their children to accomplish, the mothers were divided into two groups: mothers who were considered to be relatively optimistic versus mothers who were considered to be relatively pessimistic towards their children's abilities.

In addition, in terms of maternal or even parental expectations, it is argued that the kind of early information parents receive about the learning potential of their children (although the greater number of parents indicate that they do not passively accept such a "depressing clinical picture"), is not totally without effect (Springer & Steele, 1980). The mother then in this case, may interact with her child in accordance with the information received and more specifically with those expectations, and in turn her child responds by achieving or behaving to the mothers' expected level. This may then result in a "self-fulfilling prophecy". Those who are expected to achieve more do so, and those who are expected to achieve less do achieve less.

How parental expectations may affect the child's performance however, remains an open question. One possibility is that the child's perceptions of parents' expectations may mediate the effect of parental beliefs on performance (Kit-Fong Au & Harackiewicz, 1986). That is, parental expectations may have little effect unless they are communicated to the child. Yet, perceived parental expectations might be rather tangential. For instance, parental expectations may alter parental behavior, which in turn affects performance, regardless of the child's perception, starting a self-fulfilling mechanism.

In the information that was obtained from the mothers, we kept in mind the possible influences of additional complicating or handicapping conditions. Clearly, cognitive functioning will be affected by physical or sensory handicaps. Concentration and stamina, possible auditory deficits and impaired language were carefully noted. Individual differences were given special attention in all our analyses.

Determining with certainty the exact nature of what someone hears or understands is technically impossible, since there is no way to get inside an individual's mind; attempts to do so are usually made from the behavior of the individual involved and from the information the individual gives. There is an old adage that "actions speak louder than words." The mother who professes great expectations for her child but approaches the problem-solving situation in a very directive and intervening manner, who doesn't wait for her child to act or think, is giving a very different picture of herself and of her expectations towards her child. However, we could not use these actions as a basis for characterizing the optimism or pessimism of the mothers since we were relying on them to identify scaffolding behavior.

Procedure

The aim of this research was to examine the relationship between tutorial styles of mothers of children with Down Syndrome and how these are related to the developing problem-solving strategies of these children. In this study the mother's tutorial style is conceived of being analogous to the independent variable, and the child's problem solving strategies resulting as the dependent variable. Because such developments usually take place before formal schooling begins, and because they happen normally in ordinary settings such as the home, the children were not brought into the laboratory; instead, since the investigation concerns usual behavior, observations were made in the home environment. Although there is a large body of research on children with Down Syndrome, there are very few studies which deal with descriptions and observations of these children in the usual circumstances where they learn to solve problems.

Prior to the actual study, each mother was interviewed individually with her child. At that time, the purpose and procedure of the study were outlined. Mothers were told that a study on child development was being conducted, and that the emphasis was on children with Down Syndrome. The investigator of the study wished to observe and videotape the child playing with the mother. In addition, each mother was interviewed to obtain information concerning the family's socioeconomic status and the child's developmental history. Another purpose of the interview was to establish rapport with the mother and child. (see Appendices A and B respectively). During these meetings confidentiality was assured.

The initial phase of each observation session involved a period of free play, where the child was encouraged to play with and enjoy a favorite toy. One purpose of this session was so that the child could relax in the presence of the researcher and the videotaping equipment; another purpose was to obtain a sample of mother and child interaction in their own home under relatively ordinary and usual conditions. During the second part of the free play session, the mother and child were asked to play with a toy requiring some problem solving strategies somewhat analogous to those that would later be needed to assemble the wooden pyramid. This toy was a wooden jig-saw puzzle provided by the researcher.

Following this free play session, the child was asked to go to another room so that the mother alone could be shown the wooden pyramid, and that she could become familiar with constructing the pyramid without the child watching. While the child was occupied with something else, the investigator addressed the mother as follows: "This is a toy which has been designed for your child's age. Let me show you how it fits together. You see there are five levels of this top piece. Each level fits together this way (here the investigator assembled one level). All of the other levels are the same. Would you like to put the other levels together yourself?" The mother was then left to assemble and disassemble the toy a few times. The investigator then continued: "We want you to help your child put the blocks together. However, before you begin to teach your child, leave him/her for about five minutes just to play wit the blocks. You can teach your child how to assemble the toy in any way you like. We have no idea how mothers might do this, so just be as natural as you can and try whatever you think might work in helping your child. When you have taught him/her once, and the pyramid has been completed, disassemble the toy while your child is not in the room, and scatter the pieces of the toy in front of him/her. You may then encourage your child to assemble the toy without your help." For purposes of comparability, these instructions given to the mothers in this study resembled almost exactly those given to the mothers in the Wood and Middleton (1974; 1975) studies.

In the second phase of the study, the mother was asked to join her child and, accordingly, what Wood and Middleton (1975) referred to as "the experimental session" began. The child was at first shown what the assembled pyramid looked like, to see, but not to play with. At this point the child was asked to leave the room and the pyramid was once again disassembled. The child was not shown the pyramid being disassembled because the reverse pattern might suggest how to solve the problem. The child was then asked to enter the room once again and he was left alone, for up to five minutes, both to get settled into the situation and to become familiar with the blocks. Following this, the mother then had the opportunity to intervene in any way she wished. The length of the instruction session was determined by the amount of time the mother and child required to complete the pyramid. After the mother and the child had constructed the pyramid together, the child was supposed to be given the opportunity to try to construct the pyramid independently, although in practice, some mothers intervened more than was necessary, as we shall see in the section on results.

Total testing time including free play, instruction, and post-instruction ranged from 32 minutes 6 seconds to 45 minutes, with a mean duration of 38 minutes and 50 seconds (see Table 3). Some of the variability in testing time may be accounted for by the time involved in the initial free play between mothers and children. The final phase of the study took place during a separate meeting at which time the mother and the investigator viewed the videotape together. The investigator asked the mother how closely the taped session resembled interactions the mother might have with her child under more usual circumstances. In addition, viewing the videotape together permitted the mother to raise and

Table 3

Mean Duration of Test Activities in

Minutes and Seconds

Activity	**Minutes and Seconds**
Free Play (Investigators Puzzle)	9:35
Free Play (Pyramid)	4:10
Instruction	10:05
Post-Instruction	15:00
Total Duration	38:50

answer questions about sequences of behavior. This collaborative viewing of the videotape was itself videotaped to enable the researcher to obtain indicators of the mother's attitudes and interactions toward her child, particularly vis-a-vis the child's problem-solving behavior as it related to her tutorial style. Having such a videotape gave the researcher the added opportunity of analyzing the mothers interactions very carefully, and repeatedly if necessary, the mother's interaction with her child and the child's performance with the task. It was also possible to use the videotaped session to elicit statements from the mother that were viewed as attitudes and opinions toward her child.

Data Collection

A number of modes of data collection were utilized, including questionnaires, interviews, observational techniques such as the audiotaping of interviews, and the videotaping of the teaching sessions. The reason for videotaping was to capture as much as possible not only the verbal interactions between mother and child, but the non-verbal communication as well. Each taping session was dated and numbered.

A situation such as this where an adult is helping a child perform a task may be viewed as a shared activity. The mother's teaching style can range all the way from slavish adherence to a pre-ordained plan which does not take into consideration at all the child's performance, to one in which all of the mother's activities are directly dependent on the child's needs at any given moment. Two important measures were extracted from the videotapes of the first phase: first, the degree to which the mother is sensitive to the child's behaviour during the instruction phase in terms of the timing and manner of her intervention, and second, the degree to which the mother's interventions are related to the child's success in completing the task in a reasonable amount of time. The tapes were scored according to a coding system devised by Wood 1974; Wood and Middleton, 1975; and slightly modified by Jamieson, 1989. This was done by the investigator and another observer who was trained to interpret the behavior and interventions of the mother towards her child.

The purpose of the second scorer was to give some indication of the degree to which the investigator and another person agree in terms of recording of interaction events. The present thesis adheres to Wood and Middleton's (1974; 1975) methodologies and for that reason the procedures employed resemble closely those of the original studies. However, where departures in procedure, analysis and the type of population employed are made, the intention is to provide additional information not only on the task and the theory behind it but, most importantly, on children with Down Syndrome. Videotaping the data made repeated study and analysis of the same events possible.

Coding System

In analyzing the task of assembling the pyramid, the most obvious unit is an individual act of construction. It takes a minimum of twenty (20) of these acts (units, events, or sequences of activity) to assemble the 21-piece pyramid. However unless the child can construct the pyramid alone, without any wrong moves, the mother will intervene; hence it is expected that there will be more than 20 events noted. Furthermore, mother interventions can be directly related or not to the child's need of the moment. Therefore, not only will the fact of the mother's intervention be recorded, but the level at which she intervenes will be measured. These interventions will be scored according to one of five categories, each representing a different level of intervention, as follows: (Wood and Middleton 1974; 1975; Jamieson 1989).

Level 1. General verbal instruction: the mother simply tries to encourage the child (verbally or gesturally) to enter into the task activity. She might say, What are you going to do now?" or "Would you like to make something with the pieces?"

Level 2. The mother attempts to establish guidelines which assist the child's search for the pieces to be assembled. For example, she might ssay "I think you need the very big piece" or "Get the little ones". The defining characteristic of this level is that the mother identify critical features of the pieces but take no part in the actual search for them.

Level 3. The mother actually intervenes in the selection of the pieces of the toy and indicates which are appropriate by saying "You need that one over there". Here, the child has the choice of working with the pieces indicated or of ignoring the suggestion.

Level 4. The mother picks up the appropriate pieces of the toy and lines them up for its assembly, leaving the child only to push the blocks together.

Level 5. The mother actually assembles the pieces of the toy and proceeds to complete the task while the child is merely looking on.

Level 0. The child who either in a self initiated act or in response to maternal instruction makes an inappropriate construction, the mother may loop back to any of the five levels. In order to determine the degree to which the mother is sensitive to her child's behavior during the instruction session, several measures were tabulated. The first thing which was noted was whether or not the mother's level of intervention was contingent on the child's previous response: that is, when the child succeeded, did the mother offer a more appropriate, less directive level of help when next intervening? If her child failed, did she accordingly offer more help? Of concern here was whether or not the mother was following the rule that her interventions should be contingent upon the child's actions. Secondly, in order to determine if the mother's intervention was at the most appropriate level, the number of times a mother used each level of intervention and the frequency with which each of these lead to success on her child's part was also calculated. Thirdly, the length of time required for the child to complete the assembly of each unit of the pyramid both in the instructional and performance sessions was noted. Finally, where the mother's level of intervention was not contingent on the child's previous response, whether this was somehow related to her own estimate of her child's ability: that is, are the interventions of mothers who have lower estimates of their children's competence less likely to be contingent on the child's behavior than that of more optimistic others? Are they more directive? Do they give their children the opportunity to learn how to try?

In the above description of levels, intervention refers to the mother's tutorial behavior, which is recorded at the five levels: response refers to the child's behavior in assembling the pyramid following an intervention. The recording of these events is done according to a form which has been developed for this study (for an example, see attached form in Appendix C and Appendix D respectively). It notes the time that the event starts, the event number, the intervention event, the construction event, the independent child activity, and the degree of completion of each layer of the pyramid.

Time that the event starts. At the moment that the mother or child takes an initiative in selecting or arranging pieces of the pyramid, and event will have begun.

Event number. The event number simply refers to the act of assembling any two pieces of the pyramid together. It is one of the twenty steps.

Intervention event. An intervention event is initiated by the mother when she directs her child either by word or by some non-verbal gesture toward some activity. Interventions can be terminated either if children make a different selection of blocks or in any way changes the material with which they are working, or, if the child is not moved to action by the mother's suggestion and the mother then makes a new suggestion. If the mother offers more than one level of help within a single event, then only the highest level of intervention is scored.

Each event begins with the possibility of having a code such as I0 to I5 (Intervention 0 to Intervention 5), where for example I5 referred to the mother's intervention at level 5 or the mother actually assembling the pieces. Similarly, interventions coded D1 to D5 indicate the mother's pointing out the discrepancy between the goal and the assembling made. The code I0 indicates a construction event initiated by the child: in the case where the mother held the last piece, the intervention is coded as I1 since there is no selection involved. Presumably, if the mother makes a mistake by unintentionally providing the wrong piece or demonstrating the wrong combination, and she corrects herself, the score does not go down a level.

When the child understands and acts upon the mother's suggestion, the code R+ is used. When the child cannot follow the mother's instruction, the code R- is used. Self-corrected mistakes made without appeals however, are not coded as R- but rather as R-rej (meaning the child has rejected the mother's error). When the child does not respond to maternal intervention, Ig is used to simply show that the child is ignoring the instruction (see Table 4).

Construction event. Constructions made by the mother or child are noted. Individual pieces are numbered in the order that they are assembled. Events where the mother or the child dismantles a construction unit and then puts it back together are also observed.

Independent child activity. As stated above, construction events initiated by the child are coded as I0; in instances however where the child is succeeding under his/her own efforts, the mother's actions are still considered contingent if she offers such appropriate I1 comments as "good girl/boy, try some more..."

Layer. There are six layers to the pyramid with 1 indicating the largest, or bottom layer and 6 indicating the sixth or top layer.

The same coding scheme is used when the child is asked to assemble the pyramid independently.

Data Analysis

Given that the data were not the result of a standardized, norm-referenced test, inter-coder reliability was not measured in the classical sense. However, to increase confidence in the investigator's ability to understand the dynamics of the mother-child interaction under investigation, a co-rater was used to obtain some measure of reliability. That is, corresponding 10-minute intervals from a videotape of a mother-child dyad during both the instructional and performance sessions were coded independently. The use of the co-rater was helpful in the interpretation of both instructional and motivational cues given by the mother, as such interactions can at times seem to be ambiguous. The data obtained during the pre- and post-testing interviews assisted in the interpretation of the mother-child interaction observed during testing. In particular, the final session, when the mother and the investigator viewed the videotape together, augmented the data by having the mother subsequently respond to portions of the videotape. This exchange permitted an additional opportunity to observe the mother's attitudes toward her child and to substantiate the research questions of the mother-child interactions observed in the videotapes.

In addition to the primarily qualitative information, a Chi-square test of statistical significance was applied to help determine the likelihood of the observations being merely random occurrences or systematic occurrences among clusters of variables (Borg & Gall, 1989). The coded responses that the mother made were referred to as the observed data.

Table 4

Definitions of Mother-Child Interactions Coding Categories

Construction Activities by the Child

Categories	Definitions
IO	Construction event initiated by the child.
R+	Successful construction by the child in response to the mother's intervention.
R-	Child's error in response to the mother's intervention.
R-rej	Child's immediate and spontaneous rejection of his or her own error.
Ig	Child's overt ignoring of the mother's intervention.

Interventions by the Mother

I1	General verbal or gestural instruction to the child to enter into the activity.
I2	Communications that gives specific verbal or gestural information about the next relevant step: "I think you need a very big piece."
I3	Selection of the block by pointing or handing it to the child.
I4	Lining up two or more blocks so that the child need only push them together.
I5	Full demonstration by the mother.

CHAPTER FOUR

Results

Findings Related to the Research Questions

Wood and Middleton (1975) state that where the child succeeds at any one step of the problem solving task, successful scaffolders offer no help, because it is not needed. Such interventions, in this case by mothers, arise from sensitivity to the child's performance and this kind of behavior is said to be contingent on the child's actions. Thus, mothers who scaffold well are those whose teaching strategies arise directly as responses to their children's initiatives.

Mother-child interactions about a learning task were videotaped in as naturalistic settings as possible, their home environments. Brooks and Baumester (1977) have challenged experimental researchers in the field of exceptional children to "leave the security of their laboratories, tolerate greater ambiguity, and go where people actually live in order to analyze adaptive behavior." This research used a mainly field-observation methodology in which systematic observations of mother-child interactions were videotaped; the data are completely limited to what the mother and the child actually did with the task at hand, and not what the child might or might not have been able to do. There may well have been skills that the children could actually perform, but if they did not, that fact was scored as "does not perform." That is, the "data" gathered consists of the skills and interactions exhibited at the moment of the actual investigation.

There is some concern that data which are recorded through systematic observation are a function not only of the behavior of the people being studied but also of the environmental context in which the investigation takes place; a most important part of that environment is the presence of the researcher (Seltzer & Seltzer, 1983). The analysis of observations that are conducted in the setting in which behavior naturally occurs, in this case the home environment, must take this concern into consideration. Nevertheless, some researchers feel that the benefits of naturalistically situated field research with the researcher present outweigh the disadvantages (Brooks and Baumester, 1977). This is particularly the case if the observer can remain as objective as possible. Seltzer & Seltzer (1983) states that there is a need to conduct nonexperimental field research to build a better knowledge base in the field of children with 'special needs' or who have various handicaps. "Conducting observations in a natural setting as opposed to constructing an artificial testing situation is more appealing... Systematic observation is more likely to yield reliable data than participant observation" (p. 566).

The main idea behind this research was that the mothers who considered their children less than able problem-solvers or who considered their children as poorly developed problem-solvers or who considered them as inadequately equipped to be potential learners, would tend to use a rigid, non-contingent teaching approach. Such a teaching approach does not take into consideration the degree of success of their children's efforts during the instruction period. It may be recalled that there were four main research questions which guided the study, as follows:

1. Do mothers of children with Down Syndrome engage in processes similar to scaffolding when teaching their children to solve problems?

2. Are these processes similar to those utilized by mothers whose children do not have Down Syndrome when teaching their children problem solving?

3. Are mothers of children with Down Syndrome who hold relatively negative expectations toward their children likely to intervene frequently, regardless of their child's response to a task? Are they more likely to use directive strategies?

4. Are mothers of children with Down Syndrome who have relatively positive expectations toward their children likely to intervene less frequently than those with negative expectations? Are they then less likely to use directive strategies?

It has been suggested that mothers with positive expectations tend to offer just the appropriate level of help needed (Wood and Middleton, 1975).

Analysis:

We will deal with the questions in order. It may be recalled that the questions all dealt with whether or not the mother is following the contingency rule. It may be recalled that contingent interventions must fit one of the following criteria: the mother increases her level of help following her child's failure; similarly she decreases her level of help following the child's success after instruction; or she either does not intervene or offers only general encouragement following the child's success on a child-initiated construction attempt. On the other hand, a mother's level of intervention is considered non-contingent if she fails to adjust her level of assistance in the appropriate direction. Finally, a mother is also considered to have used non-contingent interventions if she increases her help by more than three levels following her child's failure or if she decreases her assistance by more than three levels following her child's success. (For a fuller description of levels of intervention, see Chapter Three).

The findings answered all four research questions in the affirmative. Before looking at the data with respect to these questions in detail, it might be useful to present a couple of vignettes from the videotapes to give some idea of the range of responses that were observed.

The following transcribed excerpts from the videotapes contrast the sequential teaching approach used by two different mothers. Each excerpt represents approximately the first 1 1/2 minute of each instructional session.

The first conversation took place between a mother (M) who was judged to have positive expectations toward her child (C). The mother and the child throughout the teaching session established mutual contact, and both mother and child were smiling at each other frequently, both during the instructional and post-instructional phase. Throughout her interactions with the child this particular mother gave verbal praise to her child for doing well, and when her child encountered difficulties, she would pose questions and describe the different features of the blocks without reverting to putting the pieces together for her.

M: Maggie, we're going to make something out of these blocks. Can you guess what they make? (Looks at her daughter in a teasing way.)

C: (Looks at the blocks.) Is it a house? I want to do it? I want to do it? (Brings all the blocks closer to her.)

M: No, it's not a house. But, let's see, what it does make? (The mother pushes the blocks closer to her.) First we should put all the big blocks together. Can you do that for me? (Smiling, the mother pushes the blocks back towards her daughter)

C: (Looks down at the blocks and smiles) I know! I know! This is big, and this is big (pushes the smaller blocks towards her mother).

M: (As her child is pushing the smaller blocks towards her) Why don't you try putting the <u>Big</u> blocks together? Look at that! There's a hole and a little peg. How are you going to make the blocks fit together?

C: (Tries to put two same-sized blocks together, hole to hole)

M: Hum! Is that correct? (Always smiling)

C: (Giggles.) No... NO... NO... no good. (Turns the blocks around a few times and then assembles the two pieces correctly)

M: (Claps her hands.) Good that was right, now the other two big ones have to go together.

C: (Continues assembling all four blocks.) This goes with this, mommy look? One, two , three, four... (Pulls the unassembled blocks closer to her).

M: (Always smiling.) That was very good Maggie. Let's try to do another one.

The following exchange occurred between a mother who was evaluated as having a somewhat negative outlook on her child's abilities and her child. The mother gives her child very directive instructions and at the same time calling the child's visual attention to the blocks, and when the child rejected her directions she would get upset at him. Of course, such an approach is not only ineffective with a child with Down Syndrome, but would be equally inappropriate with any child.

M: (Brings all the blocks close to her, begins sorting them and as, she completes sorting the four bigger blocks for the first level finally looks up at her child.) Look Pat! (Goes ahead and puts the four blocks together and makes the first layer of the pyramid.) See? These blocks make something, do you want to make the next level?

C: (Child pushes the blocks closer to him, along with the assembled pieces closer to him and takes the four blocks apart. He starts piling them on top of each other and turns them around pointing to the hole and peg in each block. He then makes a pile with the blocks.) Look?

M: (Angrily takes the blocks away from him, puts the blocks back together into the first level of the pyramid and tells him to stop being bad. She then chooses the next four blocks for him and tells him to put them together.) Now, make another one of these things. (pointing to the first level)

C: (Looking angrily back at the mother) No!

M: (Takes his hands, puts two blocks together for him this way, and lets go because he begins to scream.)

C: NO! I do it! Not you! (Takes the blocks away from his mother and puts the four of them together, quickly)

In contrast to the other mother, this particular mother was very directive. Throughout the session her child had to struggle to be allowed to do the pyramid on his own. Well into the instructional session, the child was trying to put the different levels on top of one another so that they would form the pyramid. As he was doing this at one point, the top level fell apart and the pieces scattered on the table. Without giving the child a chance to get the blocks and put them together again, the mother picked up the blocks, put them together again, and then put this layer on top of the others.

These two excerpts illustrate the range of expectations whether negative or positive, pessimistic or optimistic.

For purposes of the analysis which follows the mothers had already been divided into two groups of three each: one group representing those with relatively positive expectations, and the other group representing those mothers with relatively negative expectations. The assignment was not based on counts of the use of negative words or any such precise quantitative approach. Rather, the assignment of mothers to categories was as obvious to the researcher as the above vignettes suggest. Such interaction behavior was typical of mothers who had already been classified except of course, that the data were much more extensive. What was recorded on many hours of videotape confirmed the initial classifications, as well as providing examples of more or less effective scaffolding.

These excerpts may help to illustrate the data on which the findings of the study were based.

Question 1: Do mothers of children with Down Syndrome engage in processes similar to scaffolding when teaching their children to solve problems?

The analysis showed that the mothers of children with Down Syndrome engage in processes similar to scaffolding when teaching their children to solve problems. Table 5 illustrates the overall picture. First, it is clear that in the majority of cases, mothers did follow the pattern and only relatively infrequently did they actually do the opposite (i.e. increase their level of help when the child succeeded). Table 5 indicates that after a child-initiated attempt which led to success, most mothers offered less help, whereas after a child-initiated attempt which led to failure most mothers offered more help. More often than not, when not following the contingency rule, mothers tended to provide their next instruction at the same level.

Table 5

Mother's Response to their Children's Activities Grouped on the Basis of the Pattern:"If the child is correct give less help when next intervening; if incorrect give more help."

Results of Child's Attempts

	Success	Failure
	N of interventions	N of interventions
Mother's Process	(%)	(%)
More Help	30 (28)	62 (55)
Less Help	41 (38)	10 (8)
No Help or Same Help	37 (34)	43 (37)
Total	108	115

Question 2. Are these processes similar to those utilized by mothers whose children do not have Down Syndrome when teaching their children problem-solving?

The analysis showed that the processes used by mothers whose children have Down Syndrome when teaching their children problem-solving are for the most part similar to those utilized by other mothers. This statement is based on comparing the observations in this study with previous findings as reported in the literature. For example, the degree of contingency observed in this study is similar to that observed in a study of `normal' children conducted by Wood and Middleton (1975). Table 6 indicates that the actions of the mothers of these children with Down Syndrome were contingent forty-nine (49%) of the time. The degree of contingency observed in this study is similar to that observed by Wood and Middleton (1975). In addition, the pattern is also very much like the one observed by Jamieson (1989) who noted general use of contingent behavior on the part of mothers of both hearing and deaf children. However, in Table 5 it is interesting to note that about a third of mothers actions were in an inappropriate direction, that is, offering more help after success (28%), and less help (8%) after failure. It may well be that this large proportion of non-contingent actions is not equally distributed among mothers with different levels of expectations for their children;

Table 6

Comparison of Degree of Contingency in this Study to One by Wood and Middleton (1975) & Jamieson (1989) where Children do not have Down Syndrome

	Mothers' Actions:		
	This study	Wood & Middleton (1976)	Jamieson (1989)
	N=6	N=12	N=4 **
Contingent	108 (49%)	200 (55%)	* (58%)
Non-contingent (same)	43 (19%)	107 (29%)	*
Non-contingent (opposite)	72 (32%)	58 (16%)	*(42%)
Total	223	365	*

* Total number of interventions not available.

** Hearing mothers of deaf children.

questions three and four both deal with this possibility and we will look at both of these together.

Question 3: Are mothers who hold relatively negative expectations toward their children likely to intervene frequently, regardless of their child's response to a task? Are they more likely to use directive strategies?

Question 4: Are mothers of children with Down Syndrome who have relatively positive expectations toward their children likely to intervene less frequently than those with negative expectations? Are they then less likely to use directive strategies?

Table 7 shows three different levels of contingent and non-contingent behavior; that is, more help, less help and no help. Those aspects of contingent interventions which are presented in the top half of the table include the number of contingent interventions following the child's failure after instruction, the number of contingent interventions following the child's success after instruction, and the number of times the mother did not intervene following a successful child-initiated construction. The data in table 7 shows that mothers with positive expectations are more likely to use contingent behavior than mothers with negative expectations. Similarly, mothers with negative expectations are much more frequent in their use of non-contingent actions than those mothers who expect their children to do well. In other words, the teaching behavior of mothers with positive

Table 7

Total Numbers of Contingent and Non-Contingent Interventions During Instruction by Mothers of Children with Down Syndrome Who Have Positive Expectations Versus Negative Expectations

Intervention	**Positive Expectations**	**Negative Expectations**
	N of interventions (%)	N of interventions (%)
Contingent	75 (66)	33 (30)
More Help	20 (17)	21 (18.5)
Less Help	21 (18.5)	9 (8)
No Help	34 (30)	3 (2.5)
Non-Contingent	38 (34)	77 (70)
More Help	20 (17)	42 (38)
Less Help	2 (1.8)	8 (8)
Same Help	16 (14.2)	27 (24)
Total	113	110

Chi-Square = 29.49; *df=1; *p*<.001

*(Degrees of Freedom)

expectations is related closely to what their children actually achieve, whereas those with negative expectations do not seem to be "keeping an eye" on the actions of the child. The figures are indicative of the mothers' sensitivity to their children's behavior when instructing them in a problem-solving situation. Sixty-six percent (66%) of the teaching interventions of the mothers whose expectations for their children's successful performance were positive were contingent on the problem-solving actions of their children but this can be said of only thirty percent (30%) of the interventions of the pessimistic mothers. The bottom half of the table shows how many times more help following success and less help following failure was offered, as well as instances of not offering help when it would have been appropriate.

It is clear that pessimistic mothers were not as likely as optimistic mothers to be good scaffolders. They seem to have underestimated the potential of their children to learn to solve problems. It is apparently very important for mothers, and undoubtedly other teachers as well, not to underestimate the abilities of their children. Unfortunately, there seems to be a cultural tendency in our society to underestimate the abilities of those who differ in noticeable ways from the norm. On this point, see, for example, Jamieson's (1989) analysis of the expectations of hearing mothers of their hearing impaired children. As in the Jamieson study, although mothers in both groups tended to use a higher number of contingent than non-contingent teaching strategies, mothers who held negative expectations for their children produced a relatively lower number of contingent responses and a relatively higher number of non-contingent responses. This difference for our data was statistically significant, (Chi-square = 29.49; df=1; $p<.001$). Could the behaviors of the mothers, particularly the pessimistic ones, be producing some of the "disabilities" frequently associated with children who have Down Syndrome?

It is also interesting to look at the differences in the pattern of the mothers actions. For example, Table 8 suggests that mothers with negative expectations are more than three times as likely to perform the step for the child, and three times as likely to put the correct blocks between the child's hands than mothers with high expectations. Conversely, the mothers with positive expectations are more likely to leave the initiative for the next move to the child than mothers with negative expectations. The pattern of differences presented in Table 8 is statistically significant at the (Chi-square = 16.76; df= 4; $p<.01$).

Table 8

Total Number of Interventions at Different Levels During Instruction by Mothers of Children with Down Syndrome who Have Positive Expectations Versus Negative Expectations

	Group	
*Interventions Level	Positive Expectations	Negative Expectations
	N of interventions (%)	N of interventions (%)
1 (general instruction)	4 (3.5)	11 (10)
2 (specific instruction)	64 (56.5)	37 (34)
3 (pointing to the blocks	35 (31)	32 (29)
4 (lining up 2 or more blocks)	5 (4.5)	15 (13.5)
5 (mother actually assembles the pyramid)	5 (4.5)	15 (13.5)
Total	113	110

Chi-Square = 16.76 df=4 _P_<.01

* For a full explanation of the levels of intervention see Chapter 3.

Further Analysis:

Because the research was based on field studies, it was concerned with qualitative as well as quantitative aspects of mother-child interactions. From the qualitative point of view, it became obvious that the mothers with negative expectations also differed from the mothers with positive expectations not only in proportion, but also in the manner of their contingent and non-contingent instructional behaviors in that they were much more directive, and even domineering. This observation became very obvious in analyzing the children's attempts to assemble the pyramid independently after having been taught once by their mothers.

As is common in field studies, our interests went beyond the analysis of the data in the light of the four specific research questions. For example, after they had completed their efforts to teach the children to construct the pyramid, the mothers were asked to allow their children to rebuild the pyramid without help. All the mothers, continued to intervene periodically. However, mothers with negative expectations interfered significantly more often than the mothers with positive expectations (Chi-square = 5.72; df=1; $p < .05$), see Table 9. Here, it's conceivable that any differences in the children's performance might be due to these additional interventions that were given in spite of the investigator's instructions to the mothers to let the children build the pyramid alone. Despite the extra help from their mothers,

Table 9

Total Numbers of Contingent and Non-Contingent Interventions During Post-Instruction by Mothers of Children with Down Syndrome Who Have Positive Expectations Versus Negative Expectations

Intervention	**Positive Expectations**	**Negative Expectations**
	N of interventions (%)	N of interventions (%)
Contingent	65 (58)	48 (42)
More Help	29 (26)	23 (20)
Less Help	16 (14)	12 (10.5)
No Help	20 (18)	13 (11.5)
Non-Contingent	47 (42)	66 (58)
More Help	20 (18)	32 (28)
Less Help	8 (7)	6 (5)
Same Help	19 (17)	28 (25)
Total	112	114

Chi-Square = 5.72; *df=1; $\underline{P}<.05$
*(Degrees of Freedom)

the children of mothers with negative expectations were significantly less successful in their "independent" constructions. Maybe children who are helped too often do not benefit. It may well be, as Wood and Middleton (1975) suggest, that "mothers intervened in the post-instruction session to keep a failing child going: it was the least competent children who attracted the extra interventions" (p. 187). Lack of success on the part of the children may also arise from an inadequate teaching style on the part of the mother. The children of mothers with negative expectations appeared to be less competent than the other children in the research; perhaps their lower competence has arisen over time from the inadequate teaching styles of their mothers. There were also significant differences in the levels of interventions that mothers used. For example, Table 10 suggests that mothers with negative expectations are more than four times as likely to line up two or more blocks for the child so that all the child has to do is push them together, than the mothers with positive expectations. Conversely, the mothers with positive expectations are more likely to leave the initiative for the next move to the child than the mothers with negative expectations. The pattern of differences presented in Table 10 is statistically significant (Chi-square = 19.67; df=4; $\underline{p} \leq .01$). Although mothers had been asked not to intervene,

Table 10

Total Number of Interventions at Different Levels During Post-Instruction by Mothers of Children with Down Syndrome who Have Positive Expectations Versus Negative Expectations

*Interventions Level	Group Positive Expectations	Negative Expectations
	N of interventions (%)	N of interventions (%)
1 (general instruction)	8 (7)	19 (16.5)
2 (specific instruction)	60 (53.5)	35 (30.5)
3 (pointing to the blocks	36 (32)	38 (33.5)
4 (lining up 2 or more blocks)	5 (4.5)	20 (17.5)
5 (mother actually assembles the pyramid)	3 (3)	2 (2)
Total	112	114

Chi-Square = 19.67 df=4 $\underline{P}<.01$

* For a full explanation of the levels of intervention see Chapter 3.

some of them taught their children how to assemble the pyramid all over again.

Clearly, these poorer results of pessimistic mothers is not only because of inferior instruction for this particular problem and this specific case only. What is more likely is that what we observed in this study was characteristic of interactions patterns of behavior that had already been well established by the time the researcher arrived with the pyramid and the video recorder.

One of the advantages of observing in natural settings is that events not specifically predicted present the researcher with unanticipated insights. One of the mothers for example sat her child, who was rather short, on her lap at his request so that he could get a clearer view of the blocks on the table. As he started to manipulate the blocks and organize them for assembly by first making little piles of blocks according to the different sizes, she put her hand on his arms and guided them towards the pile of big blocks, thereby interrupting his efforts to arrange the blocks. The child put the four blocks closer to himself and before he began to assemble the first layer of the pyramid he tried to shake his mothers hand away from his arms, and told her to take her hand away. As the child completed the first layer of the pyramid and leaned forward to bring closer to him the next pile of blocks, the mother once again put her hand on his arm to help him to arrange the blocks. The child became very upset at his mother, and told her once again to take her hands away. As she didn't do this as quickly as he would have liked, he shook her hands away from his arm and then took both her hands in his and firmly placed them far away from him on the table as he could reach, and told her to keep them there. Throughout this session, the mother tried to direct him in the same manner and every time her hands moved he told her "no, no, no..." and she then put them back on the table were he had told her to keep them. In this event, the videotape shows that there was a constant struggle for independence on the child's part, even though the mother offered to do everything for him. Occasionally such events enable the researcher to "triangulate" the findings (Everton & Green, 1986), with respect to the specific research questions. Triangulation can involve the use of qualitative data to corroborate findings based on quantitative analysis.

In addition, re-examination of the videotapes also revealed similarities and differences in the children's independent construction performance during the post-instruction session. The two children (Paul and Maggie) who produced the highest number of corrected unassisted constructions were observed using (in Vygotskian terms) egocentric speech during their initial independent construction attempts. The first child, Paul, would always shake his head to himself everytime he'd make an incorrect construction, which he corrected spontaneously. The second child, Maggie, engaged in loud discourse with herself, and would tell herself "No, No, No, all wrong", and she would correct herself as soon as she noticed her error, clap her hands, and then go on. Following these initial construction attempts, and self-corrections, the egocentric speech disappeared and each child went on to assemble the pyramid smoothly.

The present study suggests that if mothers with negative expectations are not good scaffolders during the instructional and post-instruction phase perhaps, this may very well be consistent with their behavior in the past. If this is so, then it is not hard to understand why the children of mothers with negative expectations take fewer initiatives in problem-solving and other learning situations; perhaps instead of the mother being sensitive to her child's actions, the child becomes sensitive to the mother's instruction and develops the habit of being more and more dependent. Our data suggests that children who are not given the opportunity to take initiatives, to try to experiment and to make sense of their world, and to broaden the scope of their activities, are not likely to become independent learners. This is consistent with Bruner's observations (1983).

In light of the above observation, the apparent inabilities or deficiencies of children who have Down Syndrome deserves further research. Do they result only in shortcomings from the children, or are they at least in part related to systematically inappropriate parental behavior?

Could it be that many parents have been given advice and instruction based on pessimistic attitudes toward children with Down Syndrome which have long been prevalent in our society? Are mothers of children with Down Syndrome given "expert" advice that tends to direct their concerns towards the procedures they use to help remedy their children's 'deficiencies' thereby diverting their attention from the actual behaviors of their charges? Does advice that concentrates a mother's attention on the lesson plan or teaching strategies make it less likely that she will keep her eye on the child? If so, is it no wonder her behavior is less contingent than that of mothers with positive expectations. Concerning exceptional children, it has been observed that "the self-fulfilling prophecy of their supposed deficiencies keeps them excluded from many helpful programs and activities" (Dybwad, 1985). Perhaps it would be appropriate to include instruction on scaffolding in the assistance given to mothers of children with Down Syndrome.

Although the sample excerpts presented on page 82 represent only a few minutes of the investigation, these, and many more such events on the videotape taken together with the statistical results, suggest the instructional behavior of the mothers with positive expectations is consistently much more effective than that of the negative mothers. This undoubtedly suggests important guidelines concerning effective interaction strategies with children who have Down Syndrome. As the above examples showed, the actions of mothers who are good scaffolders are not only more contingent on their childrens actions but also less directive, and more verbal in their explanations to the children. Instruction on scaffolding, with its emphasis on appropriate interaction, may prove to be especially useful in early intervention programs for children with Down Syndrome and their parents. Educationally it offers some hope that if parents of children with Down Syndrome whose condition is often associated with learning difficulties can be taught to understand the numerous possibilities and potential of their children, their subsequent change in behavior might lead to more successful interaction strategies, in short, to better scaffolding, to the advantage of their children.

CHAPTER FIVE

Discussion

Summary of Findings Related to the Research Questions

Past research with children who have various types of handicapping conditions has usually tended to focus on what these children can't do instead of what they can do, and how they are limited. This seems to be consistent with longstanding prevailing attitudes towards other "minority" groups such as girls and women, or to other disadvantaged groups such as immigrants or displaced persons (Gould, 1981). According to Gallagher (1989), this view can be identified as the "psychometric philosophy of education". From this perspective, children or learners are seen as having measurable abilities. This view assumes that any ability that exists must exist in some amount and must, therefore, be quantifiable. A psychometric perspective regards individual differences in performance as reflecting differences in the amount of a given ability. Research on children with Down Syndrome has been no exception. The development of cognitive capacities in children with Down Syndrome has not been the focus of much educational research. When research has been conducted on the cognitive development of children with Down Syndrome, the results have generally indicated that the intelligence of children with this syndrome generally falls within the range of moderate to educable retardation, forgetting to mention that most of these studies observed children who were not reared in a 'normal' environment, but in institutions. Recent research has only began to study children with Down Syndrome who are reared in the home and who receive treatment similar to that of other children and who experience appropriate developmental and educational programs (Cunningham, 1989).

The present research was conducted keeping in mind a growing number of studies which underline the importance of considering the social context in which cognitive skills develop in children. More and more research has come to view early interaction between mothers and their children as being critical to the developmental process, especially in terms of language and cognitive development (Vygotsky, 1962; Bruner 1975).

The present study investigated interactions between mothers and their children during problem-solving situations. The main focus was on the observed interactions of mother and child while the mother was attempting to teach the child how to assemble a construction toy out of wooden blocks (see Chapter 3 for a detailed explanation).

A number of studies have been conducted examining the pattern of interaction between a mother and her child in a problem-solving situation (Wood & Middleton, 1974; 1975; Wood, Bruner & Ross, 1976: Wood, 1980; Jamieson, 1989). One aim of these studies was to try and relate the instructional behavior of the mothers to their children's performance in the subsequent testing phase. Those mothers who were good scaffolders offered tutorial interventions which were significantly related to the child's level of task competence. When their children later attempted to rebuild the pyramid on their own, they were significantly more successful than children of mothers who were not good scaffolders.

In the present study, as predicted, the teaching behaviors of mothers of children with Down Syndrome were similar to those of mothers described in other studies (Wood & Middleton, 1976; Jamieson, 1989). These mothers engaged in scaffolding actions when instructing their children during a problem-solving task, that is, increasing their level of help after failure to achieve any one of the steps, and decreasing their level of help after success. However, not all mothers were equally adept at scaffolding. It was found that the teaching behaviors of these mothers were significantly related to the abilities of their children as they perceived them. Mothers with positive expectations toward their children's abilities and potential for learning were more effective scaffolders than mothers who had negative expectations of their childrens abilities and potential for learning. Perhaps what is happening to the mothers with pessimistic expectations for their children's learning is that they are not only using more directive approaches in teaching their children, but that this approach typifies the way they negotiate all learning with their children, including communication skills. Naturally this has outcomes for cognitive development. In Vygotskian terms, pessimistic mothers appear to utilize more directive interpsychological processes when negotiating intersubjectivity with their children than do optimistic mothers. Whatever the mechanism by which it came about, this research found that children of optimistic mothers had more effective problem-solving skills, were more self-directive, and seemed abler at taking initiatives and learning than those whose mothers had negative expectations for their development.

Discussion

There might be a variety of possible and plausible explanations to account for the differences in the above examples on maternal behavior. Some of the mothers may still be experiencing aroused emotional states to the diagnosis of their child having Down Syndrome; the initial period of diagnosis is formative, and likely to have long-term implications (Cunningham & Glenn, 1985). This emotional response makes parents feel "vulnerable" and "stigmatized", and may give rise to parental interaction styles, in this case, maternal styles, which are incompatible with healthy reciprocal mother-child communication, socialization, and learning. Inasmuch as this is the case, mothers of children with Down Syndrome may experience a lack of confidence in the ability of their children to learn, and this may interfere with their ability to interact, communicate and teach their children optimally. This lack of confidence may lead to an increase in maternal control during mother-child interactions as a means of "training" the child, and of minimizing possible misunderstandings.

Various models of parental reactions and the process of adjustment have been put forward to guide professional counselling with respect to parental diagnosis of any "handicapping" condition (Blacher, 1984). The first need of parents when they are told that they have a child with Down Syndrome is to come to terms with the diagnosis. This of course is no simple feat. In some instances this is also complicated by the immediate need for a decision on whether or not to take the baby home, whereas for others it may be whether to pursue active medical treatment for any life-threatening conditions. However, all parents have to begin with the process of constructing an understanding of what the diagnosis means for the child, themselves and the family (Cunningham & Glenn, 1985). A four-phase model of adjustment was described by Cunningham (1979a). It begins with an initial shock phase, manifested in emotional disorganization and paralysis of action, which can last a few minutes, several days, or even longer. This is followed by a reaction phase, often expressed in sorrow, anger, grief disappointment, anxiety and denial. Such reactions according to Cunningham (1979a) can be seen as coping strategies which allow the parents to control the amount of uncertainty they can deal with at any given time. Here, they also test out and learn their own feelings through interactions and observations of others. Unfortunately, observations of others might here reinforce parental fears and anxiety. Professionals can provide accurate information and emphasize that such feelings are neither unusual or pathological. The third phase according to Cunningham (1979a), is achieved as the parents move towards an adaptation phase. Here. parents have developed sufficient "reformulated frameworks of understanding" which allows them to anticipate the future to some extent. Finally, an orientation phase is reached, when the parents begin to organize, seek help, and plan the future. They have achieved a "functional acceptance", which allows them to get on with day to day interactions. Reformulation of the reaction to the diagnosis of Down Syndrome is continual, and acceptance, whatever this takes, is an everchanging construct. If the mother is denying the child's condition, or is anxious, she will find it difficult to make the necessary adjustments when teaching and interacting with her child. For various reasons some mothers may not have reached the "functional acceptance" stage (Cunningham & Glenn, 1985).

Some support for Cunningham's model was provided by repeated observations of the videotapes. These observations led to unanticipated findings which were particularly useful in terms of triangulating, that is, in qualitatively substantiating the research questions which had already been supported by the use of quantitative methods. One example is the mother who sat her child on her lap so that he could get a better view of the blocks on the table. Every time he started to manipulate the blocks and tried to organize them for assembly his mother would take his hands and try to guide him, thereby interrupting his efforts to arrange the blocks (for a complete description of this example see Chapter Four).

As previously noted, the mothers with positive or optimistic expectations toward their children were more successful at scaffolding than were mothers who had negative or pessimistic expectations. It is appropriate to emphasize that scaffolding behaviors need not be outside the competencies of those pessimistic mothers. Rather, it is more likely that mothers have been diverted from basing their instruction on their children's actual behaviors, by what they have learned from whatever source about their children who have Down Syndrome. In the end, they get what they expect, because their teaching and other interactive behaviors are based on expectations rather than observations.

Another possible explanation for the difference in mothers' behaviors also concerns parental acceptance of the child's abilities relative to the diagnosis of Down Syndrome, which is central to the kind of parental expectations and in the end to cognitive development of the child. Although parents may have accepted the diagnosis in this case, what they have accepted might be a bleak-looking future. In such cases, mothers might control their interactions in order to reduce the risk of misunderstanding their child, or they may be highly directive and manipulating in order to minimize the possibility of failure by the child. The videotapes clearly showed that pessimistic mothers provided instruction by means of pointing to, manipulating, or actually arranging the blocks. This maternal teaching style restricted the opportunities of the children for making choices. This style, accompanied by the use of very repetitive language, hardly provided additional information to the child in terms of the various features of the task. Consistent redundancy may primarily serve the purpose of minimizing confusion between mothers and children. However, the extreme dependence of these children on the directions of their pessimistic mothers appears to indicate that such an approach is not effective in maximizing the development of the children (Snow, 1977).

More optimistic mothers who allow their children more opportunities to respond independently also help their children to develop their ability to take initiatives. Children develop these abilities only if they are given the opportunity to do so, and if they are then reinforced for having done so. Bower's (1977) notion concerning risk-taking is applicable here: children are born with the ability to take initiatives, but if they are not given opportunities to exercise this ability, initiative-taking may disappear. In our study mothers who had positive expectations tended to base their instructional strategies on their children's behavior, intervening only when the child was not succeeding independently, thereby allowing increased opportunity for initiative-taking. In addition, initiatives on the part of these children were positively reinforced, both by the mothers' encouraging comments and perhaps even more importantly, by their success in constructing the pyramid, resulting from their initiative-taking. In contrast, mothers who had relatively negative expectations of their children's abilities appeared to focus on a preconceived teaching plan rather than on their children's behavior; in accordance with this plan, they created a situation where their children seemed to miss opportunities for initiative-taking that would otherwise have arisen naturally. Consequently these children were deprived of opportunities to practice their inherent capacity to take initiatives; in our observations compared to other children, they initiated fewer than one third the number of construction attempts. Not only did mother's interaction style lead them away from opportunities to imitate actions, but it resulted in fewer instances of success on which their mothers could base positive reinforcement. Even more serious perhaps, is that there was little child behavior upon which these mothers could make their own initiatives and responses contingent. Mothers cannot respond to behavior that does not occur. Such a teaching scenario becomes a no win, double jeopardy situation: not only does it appear to extinguish initiative-taking abilities in children, but once having done so, it also makes effective scaffolding by the mothers more difficult and much less frequently possible.

A recent study conducted by Jamieson (1989) focussed on the teaching behaviors of hearing and deaf mothers when teaching their hearing and deaf children, respectively, in problem-solving situations. These results suggested that both groups of mothers use strategies similar to scaffolding. Hearing mothers of deaf children were not as effective scaffolders as others. These mothers tended to be more dominant and intrusive toward their deaf children, exhibited a higher frequency of maternal interventions which were not contingent on the child's previous behavior, and a higher proportion of interventions aimed at ensuring that the child remained on task. Jamieson concluded that since hearing mothers were more likely to consider their deaf children defective than deaf mothers for example, they were also likely to have lower expectations for their ability to learn to solve problems. These findings are very compatible with ours.

Findings Not Related to the Research Questions

Field research is less focussed than the more controlled methods of laboratory work. As a result, more information is inevitably collected than is specifically related to the precise wording of the research questions and this is not to say that such information is not relevant- far from it. And field research which is based in any part on the sights and sounds of videotaped recording has the added advantage that viewing and re-viewing turns up new data that might have been missed initially. Some of these data may have a direct bearing on theories or facts already available in the literature, and when such are uncovered and recorded, they help to substantiate such facts and theories. For example, in our tapes, Maggie and Paul, who achieved the greatest number of unassisted correct constructions during the post-instruction session, appeared to be using egocentric speech as a self- regulatory mechanism during independent attempts to construct the pyramid. This is clearly in accord with Vygotsky's theory (1962).

As already mentioned in the literature review (Chapter 2) there are two prevalent ideas as to the cognitive development of children with Down Syndrome; one suggests that their development follows patterns substantially different from those of ordinary children (Cichetti & Felicisima, 1981), whereas the other holds that the pattern is the same for all, only slower for children with Down Syndrome (Miller & Yoder, 1974). Some of the data which emerged in the present research lends some support to this later view by showing that our subjects were able to do the problem-solving task, even though it took them a bit longer than might be expected. Although this had not been formally predicted, it was not an unexpected finding.

A serependitous finding of the study involves the unanticipated interventions by the mothers in the post-instruction session. Although the mothers had been asked to allow the children to assemble the blocks independently after they had been taught to do so, they continued to intervene periodically. However, the mothers with negative expectations intervened significantly more frequently than the other mothers during these sessions, yet despite these interventions, despite all this "help", their children produced less than half the unassisted correct constructions of the children in the high expectations group. Here, once again, might be an indication that not only do these mothers have an apparent lack of confidence in their children's abilities, but that this is translated into interactional mother-child behaviors that minimize the opportunities for optimal development of children with Down Syndrome, as they undoubtedly would for *any* child.

Limitations of this study

The qualitative and quantitative findings of this research lend support to the dialectical perspective of cognitive development in children with Down Syndrome. However, the results discussed here must be considered within the limitations of this study. The number of subjects is small, which limits the possibility of making global generalizations. In fairness however, it should be noted that our data are based on more cases than some of Piaget's early studies, or more recent studies such as that of Ninio and Bruner (1978). Another factor related to limited generalization from this study is that no attempts were made to match the children or parents rigorously on such variables as measures of intelligence, socioeconomic status, and so forth. A stronger research design would have included more subjects and an equal number of males and females. However, given the low occurrence of children with Down Syndrome, and the reluctance of many parents to give them anything approaching a typical family environment, and in view of the intensive nature of the observations for a field study of this sort, random sampling of comparable subjects would be neither desirable nor feasible.

Despite the limitations imposed by research using a small number of subjects, none of whom are comparable in the experimental sense, no apologies are made for the methodology chosen. Children with Down Syndrome have been studied in institutions, in laboratories, and in mostly segregated schools under highly contrived situations, and these studies to a large extent have told us what these children cannot do. Studying these children in as a naturalistic setting as possible, their home environment, while in a problem solving situation with their mothers, allowed qualitative as well as quantitative analyses to generate new knowledge about these children and their cognitive development. To give one example, most of the experts consulted in the design phase of this research cautioned that our subjects would be too young to be able to complete the construction of the pyramid, even with parental assistance; however, the videotapes show not only that these children can construct the pyramid, but that they enjoy doing so, and that those whose optimistic mothers are good scaffolders can do so to a higher level of completion, more independently, and more quickly than those whose mothers, like the experts that were consulted, were pessimistic about the ability of their children to learn the skills required. Nevertheless, such findings based on such small numbers certainly need confirmation by other similar findings.

Implications for Practice

Using children who have Down Syndrome as subjects, this research replicated what has already been widely reported in the literature for other children, namely that the nature and quality of early mother-child interaction appears to be strongly linked to the child's later cognitive development. There were also indications that the quality of maternal interaction was associated with the mother's evaluation of the child's ability to learn. This being the case, it is clear that the quality and content of early parent counselling is crucial to the child's later educational achievement.

During the initial period after the diagnosis of Down

Syndrome is made, parents are vulnerable and often in an aroused emotional state which makes them particularly sensitive to the actions and statements of others (Cunningham & Glenn, 1985). The emotional state manifested by most parents while trying to deal with the implications of having a child with Down Syndrome must be acknowledged and dealt with constructively through counselling based on appropriate information if subsequent attempts at intervention are to meet with success. If left unresolved, this initial period of trauma can become a long struggle with feelings of anger. These feelings of anger and initial disbelief may in the end foster parental attitudes which are unrealistic, and parental behaviors which are uncooperative or overprotective towards their children.

Most educational programs currently providing services to parents of infants with Down Syndrome suggest early intervention programmes with an emphasis on parental involvement. These early interventions tend to focus on procedures, practical activities which can be reasonably expected to help the baby's development. This seems helpful to parents, who want to know what to do. Most parents at the beginning of these intervention programmes are so absorbed with the need for information and practical advice for helping their children, that their attention may be diverted away from the actual actions of their particular child, in favour of rigid adherence to procedures. If this happens, it seems that the mothers social interventions with her child are not as likely to be contingent as they might otherwise be.

The present research suggests that early counselling of parents and families is required if parents are to deal constructively with the emotional impact of the diagnosis and understand fully the implications. Cunningham and Glenn (1985), stress that in the first few days, parents should be given a positive idea of activities which can be easily implemented. It is essential, they state, that parents achieve success and that they are able to observe short-term, positive benefits. If they don't achieve this in their early attempts, "they are likely to develop negative expectations about their own abilities, the baby and the future" (p.351).

Without appropriate counselling, attempts at intervention may actually be counterproductive, especially if it leads parents to focus rigidly on teaching strategies rather than on the child's initiatives and responses. In such a case, the parents may actually be taught to interact with their children who have Down Syndrome in a pattern which deviates markedly from that which they would probably use intuitively when interacting with other children. It may well be that if early intervention does not include advice on contingency and scaffolding, it may actually be better not to intervene at all. Effective counselling then, must include advice on the necessity to make teaching behaviors contingent on the child's actions; it must draw the parents' attention away from the Down Syndrome stereotype and procedures based on it to the actual behaviors of their particular children as unique individual human beings, different from all others.

One informal "counselling" technique which has been successful has been parental group organizations. These parents groups have enabled parents of children with Down Syndrome to meet other parents who have children with the same syndrome, and have proved to be particularly beneficial by providing the opportunity to meet and interact with both parents and children who have successfully overcome some of the initial difficulties. Some of these parents groups were set up because initially parents were dissatisfied with the kind of information they received from professionals. Many parents have spoken of uneasy relations with their doctors, particularly with their pediatricians (Brinkworth, 1985). These complaints, less now than they used to be, always centered on the issue that too pessimistic of a picture of a child with Down Syndrome had been painted at the bedside: "Take home your broken doll" and "He'll never be more than a vegetable" are just two of the quotations from physicians that individual parents have recalled with bitterness and anger (Brinkworth, 1985). The other complaint about professionals who deal with parents whose children have Down Syndrome is that the professionals who usually break the news appear at times very ill-equipped and untrained in counselling for such a delicate and critical task. Parents have complained that too often they are advised to give up their children, to reject them, and there are a number of parents who initially rejected but later took their child back after hearing other views presented differently. It is here that parental groups have been very helpful, not in whether a particular couple reject or accept their child, but that this decision be made in the light of accurate, up-to-date knowledge. Many professionals have of course shown empathy and concern, and have offered support and guidance to families with children who have Down Syndrome. However, this seems to have been the exception rather than the rule. Professionals offer help and make suggestions based on what they have learned and on how they have been trained. Many are unaware of how much can be accomplished through education, and some may have been taught that the best place for such children is a residential facility (Murphy, 1986).

Although this research focused on parents of children with Down Syndrome interacting in their home settings, our findings undoubtedly have implications for interaction in other commonly occurring social settings as well, including schools and classrooms. The beginning school years will open up an entirely new world for most children with Down Syndrome if instead of being institutionalized or otherwise segregated, these children are welcomed to ordinary classrooms with other children, and if they are given similar opportunities for learning (Houminer, 1986).

What will the child with Down Syndrome get from a "regular" and "ordinary" classroom experience? In favourable circumstances, the school experience can provide the kind of stimulating and rich experiences in which the world appears as an interesting place to explore (Murphy, 1986). Learning situations at school should help a child with Down Syndrome obtain a feeling of personal identity, self-respect, and enjoyment, which is what all children should experience ideally. Schools should give children with Down Syndrome the opportunity to engage in sharing relationships with others and prepare the child so that later on the child can be a contributing member in society. Of course, schools should also encourage the development of basic academic skills, physical abilities, self-help skills, and social as well as language competence. Schooling will only provide this if we humanize the teaching process, if we view each student as a person with an individual integrity all their own. This requires seeing the student and not the stereotype, in other words, making teaching and other interactive behavior contingent on the child's actual behavior.

We must expose children with Down Syndrome to forces that will contribute to self-fulfillment in a broader sense, and we must try to prepare them for all areas of life. Easier said than done? Perhaps, but this is the kind of environment that has been identified as an ideal educational setting for all children, so that all can learn optimally. Improving classroom learning interaction for all children not as members of categories but as unique individuals is good for all children, not just those who are said to be "learning disabled".

It is time to alter ranking ourselves and others as ranked in terms of educational prospects and attainments. We have had a tradition of considering those who are more gifted as being inherently more valuable and deserving than those who are less well endowed (Parsons, 1959; Gould, 1981). We should now accept that individual capabilities vary for each person. If the school is to prepare children for life and provide them with knowledge and tools to help them function optimally in an unsegregated society, then children with Down Syndrome will have to learn along other children (Pueschel, 1986), not only for their own benefit, but for that of the other children too!

Teaching programs should consider the importance of providing future teachers with instruction in the theory and practice of scaffolding. Snow (1979) underlines the importance of contingent responding in conversational exchanges between mothers and their children, and there is every reason to believe that her advice is just as applicable for teachers and parents when interacting with children who have Down Syndrome. "If one were asked right now to advice an anxious mother how to teach her child to talk, the best answer would be 'Watch what he's doing, listen to what he's saying, and then respond'" (p. 35). As a result of doing so, it is hoped that these children become more effective learners, take more initiatives, and that they overcome the feelings of helplessness that seem to emerge as much from inappropriate treatment as from any inherent disabilities they may have.

Suggestions for Further Research

The fact that the findings answered all four research questions in the affirmative and the fact that these findings are in harmony with a growing body of well-established research indicates that further research in the area of assisted problem-solving would be well advised. It is well established by now that scaffolding is an important interactional pattern when instructing any child, but it may even be more crucial when teaching children with some disability.

In research where random samples are, for whatever reason, neither feasible nor desirable, replication becomes even more important. If attempts at replicating the present study were to lead to similar findings, greater confidence in the importance of scaffolding in children with Down Syndrome and their cognitive development would result. Longitudinal research would be of great theoretical and applied interest if children with Down Syndrome whose mothers were taught scaffolding techniques showed continuing benefits over time. Would good scaffolding lead to cumulative benefits? If so, further research might provide insights into questions such as the following: Can mothers of children with Down Syndrome be taught to improve their scaffolding behavior? Is their improved instruction style beneficial to the cognitive development of their children, as Wood and Middleton (1974; 1975) have shown with other children? Also, are the effects and benefits of scaffolded instruction long lasting? Do children with Down Syndrome who have been effectively socialized live longer than others?

Retrospective research with adults who have Down Syndrome and who are coping well should also be conducted in order to gain insights on what made it work for them. This kind of research might prove very beneficial in pointing the way to situations which fosters long-term "survival".

A stronger research design would have included a greater number of subjects, an equal number of male and females, and subjects of different cultural and ethnic groups, to help determine whether the effects of good scaffolding are generalizable across cultures and with both sexes.

In the present study, when the mothers observed themselves on videotape, most of them criticized their own behaviors quite spontaneously, saying that they had intervened too much. All noticed something about their instructional behavior which they would have changed the second time around, and the changes they proposed imply more awareness at scaffolding then they had actually shown while instructing their children. Hindsight is always a useful perspective. Here, it reinforces the fact that these mothers can be made aware of the importance of contingency in their interactions with their children. Previous research with deaf children has shown that teachers can be taught the technique of contingent interaction in conversational exchanges with these children (Wood & Wood, 1983, 1984). If with deaf children, why not children with Down Syndrome?

The very fact that the mothers in this study were self-critical on viewing their own behavior on videotape suggests that they are open to feedback and a willingness to become more adept scaffolders. After all, although mothers with positive expectations provided significantly more contingent interventions than mothers with negative expectations, both could undoubtedly profit from being taught to increase the effectiveness of their scaffolding, to the benefit of their children with Down Syndrome.

The above suggestions might lead to insights into questions such as: Can mothers of children with Down Syndrome be taught to improve their scaffolding behavior? If so, would their instruction be beneficial to the cognitive development of their children, as Wood (1980) and Wood and Middleton (1974; 1975) have shown it to ordinary children? Also, are the effects of scaffolded instruction durable over time?

CHAPTER SIX

Conclusions

The results of the present study suggest that Down Syndrome in and of itself does not necessarily give rise to the extent of deficiency in learning that is often observed. The children whom we observed achieving things that were thought by "experts" to be too difficult for them are instances of the possible. We observed some children with Down Syndrome who were learning to be measurably more able as problem solvers than others. While it may be that there are individuals with Down Syndrome who even with optimal social interaction may not develop as well as some of the subjects of this study, our research has shown that certain patterns of social interaction with their caregivers can enhance cognitive and social-emotional growth and development in at least some children with Down Syndrome. In this, they resemble ordinary children, rather than differing from them.

Whatever capacity to learn is available to any child should be exploited to the maximum. It is important that the quality of reciprocal interaction be high for all children; but it may even be more crucial for caregivers to pay special attention to children with certain "disabilities". Because the initial parent-child bonding might be disrupted in children with Down Syndrome as a result of the initial reactions to the diagnosis, and at times because of slower language development, certain adjustments in communicative approach must be made if effective two-way interaction is to occur. Regardless of the individual "disabilities" which each child might have, the learning of each child can be enhanced as a result of completed communicative acts. All socialization results from successful reciprocal communication, both verbal and nonverbal. For this, all children are inevitably dependent on the effectiveness of their primary caregivers, in this case mothers, as communicators. Recent research by Wood (1980), suggests that tutors who are good scaffolders communicate better than those who are not. Many mothers are excellent at scaffolding, but research has definitely shown that those who are not can be taught to improve this skill.

The present research is revealing, and it provides grounds for optimism: not only does it show that children with Down Syndrome can do tasks similar to those performed by other children, it describes differences in teaching approaches among parents of children with Down Syndrome which might account for some of the differences in performance of these children. By so doing, it suggests strategies which should be of benefit to the cognitive development of these children. The observations of mother-child interactions in a home situation suggests that the more effective teaching occurs when the focus is on the children's activities, particularly on their initiatives and responses. In addition, mothers who hold negative expectations towards their children do not appear to teach as effectively as mothers with positive expectations. The results of the present study suggests that it is the response of others to the diagnosis of Down Syndrome, rather than the syndrome itself, which may give rise to the inadequate learning of many children. In this connection, it is also possible that parents of children with Down Syndrome are not operating in a vacuum: if teachers are subject to the same attitudes toward the learning potential of children with Down Syndrome, educational programs may well be providing institutional support for the idea of teaching such children not only in a preconceived manner, and in a segregated environment, rather than responding to the child's lead. Early family counselling which includes suggestions and instruction on the importance of carefully watching and responding to the child may assist parents of children with Down Syndrome and eventually teachers, too, to facilitate the development of effective, independent problem-solving skills in children with Down Syndrome.

Most of the research and practice on children with Down Syndrome has focussed on the "disabilities" of the child, on what the child can't do, giving rise to a conception of children with Down Syndrome as being completely "mentally retarded". The fact that the children in this study demonstrated considerable ability, at times surpassing what was expected by the "experts", suggests that the fault does not lie completely in the diagnosis of Down Syndrome, but in the tendency of their mothers/parents to teach them as if they were defective or unable. Perhaps this attitude, can be changed. This study strongly suggests that if mothers with negative expectations can become as effective scaffolders as the mothers with positive expectations, their children too, would be characterized by higher levels of successful achievement. A future study of immediate concern would be a longitudinal one, focussing on the changes in the problem-solving abilities of children with Down Syndrome after their mothers have been taught to scaffold more effectively. As far as the literature review shows, this has yet to be done with children who have Down Syndrome; but the results of the present study suggest that immediate gains could be made by parents with a minimum of expense and effort. Parents of children with Down Syndrome should be presented with a more realistic and optimistic outlook of their children's abilities. Parents should be shown that by carefully watching and responding to their children's abilities in a contingent manner, they can facilitate their children's problem-solving skills and cognitive development. Surely it makes much more sense in the short and long run to develop the inherent abilities that children with Down Syndrome have, rather than focussing and concentrating on their shortcomings and "disabilities". The time has come for educators and professionals to stop using a "deficit approach" to the study of Down Syndrome and to concentrate on what these children <u>can do</u>.

Epilogue

The current evolution of a more sympathetic public understanding, including the breaking down of old stereotypes and misinformation concerning Down Syndrome, are largely the result of the work done by parent groups. It is parents who have led the way in educating the public, educators and professionals. Parents have fought hard to lay to rest many of the former misunderstandings, confusions, fears, and assumptions surrounding individuals with Down Syndrome. Many educators have been found to listen to these parents initially, but they have then often reverted to their own former misconceptions about these children.

We now know that early intervention programs involving parents are helpful. However, the developing of the full potential of children with Down Syndrome will depend on the quality of formal education they eventually receive as well. We have told parents and children alike that it is their inherent right to receive an education in the "least restrictive environment"; yet, when these children have been ready for school, they find that the school is not only not ready for them, but that it is often hostile and opposed to their admission. More than ever, the time has come for educators to stop paying lip service to the education of children with Down Syndrome, and to do what is best for them. As educators and professionals, part of the solution remains with us. The parents cannot do all that is needed without our help. What do we do with children who can learn, albeit at a somewhat slower pace?

The most serious problems that children with Down Syndrome have faced as a group have probably arisen as a result of the secondary effects of the labels that have been attached to them. It is not their actual condition that causes the most serious or debilitating of problems, but rather the labels and negative attitudes and inappropriate interactive behavior of even well-meaning others towards them in light of their "Syndrome". Inappropriate attitudes towards others, who are "disabled", especially children or other traditionally low-status individuals inevitably encourages and allows us to treat them in ways which are counterproductive and harmful to their best interest. Keeping this in mind, we hope that society will come to realize that individuals with Down Syndrome are people in their own right, with full rights and privileges as citizens in a democratic society. This principle should apply to any citizen, whether disabled in any way, or not. We should treat children with Down Syndrome as we would want our own children to be treated. We should treat adults with Down Syndrome as we ourselves would want to be treated. Perhaps now is as appropriate as any other time for educators and professionals alike to set aside misconceptions about children with Down Syndrome, to concentrate on what these children can do, and to use this knowledge to create as much as possible for all children, "zones of possibilities" (Moll & Greenberg, 1989).

Notes

[1] . I would like to explain my decision to employ "children with Down Syndrome" throughout this study. For several decades, parents of children having this condition have advocated that the term Down Syndrome be used rather than the previous term of "Down's children", because of their concern that their children were being viewed as simple extensions of the syndrome they possessed. I've adopted the terminology of the parents, and express support for the individuality of the children, despite their shared syndrome.

[2] . The terms "normal" and/or "ordinary" children are used interchangeably, to denote children who do not have Down Syndrome.

[3] . The procedures used in the present research are directly modelled on those used by Wood (1980), Wood, Bruner, and Ross (1976), and Wood and Middleton (1974; 1975), and similarities in methodology are, therefore, inevitable. Direct quotes from the original resources have been used where appropriate. However, this presentation will not attempt to give further credit to these sources in every possible instance.

[4] . Although Vygotsky originally wrote more than 50 years ago, the first of his major writings was introduced to the English-speaking world only in 1962. During the past two decades, he has become an important and growing force in

North American psychology, and his ideas have greatly influenced such cognitive and developmental psychologists as Jerome Bruner, David Wood, and Courtney Cazden, among a growing list of many others.

[5] . The terms Positive or High expectations have been used interchangeably, as have the terms Negative or Low expectations.

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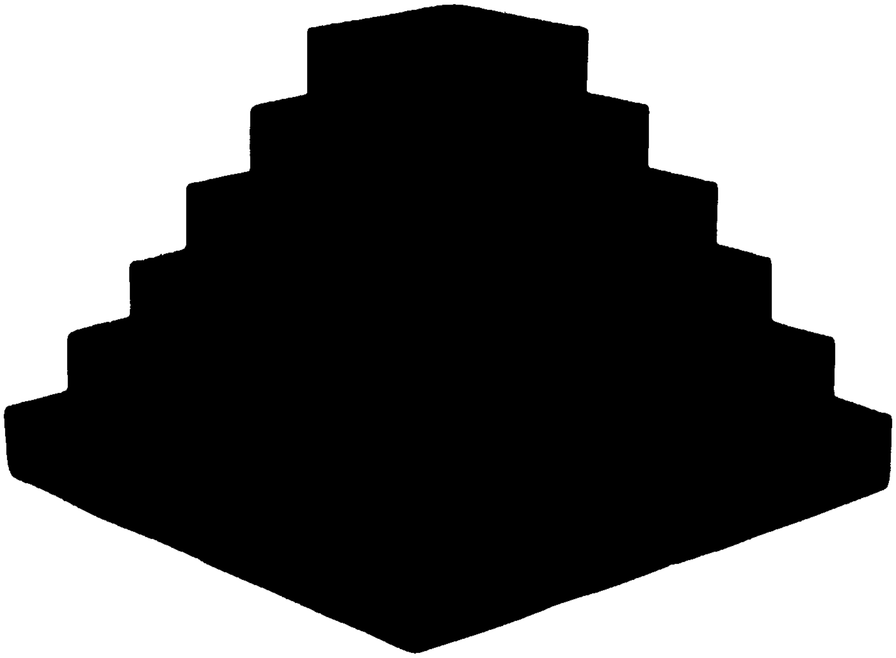

Figure 1. The wooden pyramid (assembled).

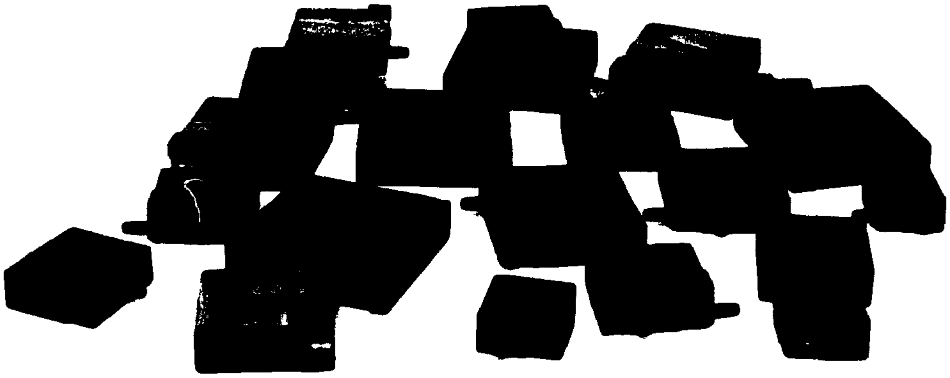

Figure 2. The wooden pyramid (unassembled).

Appendix A

Answers to this questionnaire are going to be audiotaped. Questions are used as a directive which may change according to the eagerness/reluctance of the mother in answering them. Some questions will be modified according to the mother's response, in order to solicit as much information as possible concerning the mother's ideas and attitudes towards her child.

McGill

Department of Educational Psychology
and Counselling
Faculty of Education
McGill University

Postal address
3700 McTavish Street
Montreal, Qc Canada H3A 1Y2

(514) 398-4240 / 41
Telex 05268510
Fax (514) 398 4679

BACKGROUND INFORMATION FOR CHILDREN

NAME______________________________ BIRTHDATE____/_____/__
yr month day

ADDRESS______________________________ PHONE______________
______________________________ POSTAL CODE__________

PARENTS: Father's name__________________ age________
Mother's name__________________ age________

Father's current or most recent occupation______________

Father's last grade completed or degree obtained___________

Mother's current or most recent occupation______________

Mother's last grade completed or degree obtained___________

SIBLINGS: Name____________________ Age_______ Sister/Brother
Name____________________ Age_______ Sister/Brother
Name____________________ Age_______ Sister/Brother
Name____________________ Age_______ Sister/Brother

Do any of your other children have a handicap?
Yes/No If yes, specify__________________________

Are all your children living at home?___________

Child's ordinal position in the family___________

Others in the home______________________________

LANGUAGES SPOKEN IN THE HOME__________________________

CURRENT DAYCARE/SCHOOL__________________________________

SCHOOL HISTORY: How long has your child attended the current daycare/school?_______________________________

Daycare previously attended______________________________

Why was this daycare/school chosen?

If the child does not attend daycare or school why?

Does your child belong to any clubs, sports or organizations? Describe

What's your childs' favorite activity? Hobbies? Toys?

Entertainment:

Favorite T.V. shows:

Favorite Movies:

Favorite Books:

Other forms of entertainment:

DUTIES AND RESPONSIBILITIES AT HOME:

PHYSICAL DEVELOPMENT

Pregnancy and delivery:

What was the mother's health during pregnancy?

What was the length of pregnancy? ______________________________

What was the child's birth weight?______________________________

Did you take any medical tests while you were pregnant which detected that your child had Down Syndrome? Yes_____No_______

If you did take a medical test to determine the condition of your unborn child, and it resulted that the child had Down Syndrome, do you remember what you were told?

____

____

____

Was it ever suggested, that you had the option of giving the child up for adoption once the child was born, or that you might want to consider an abortion?______________________

If you did not take any medical tests during your pregnancy to determine the health of your unborn child, did your child at any time show any signs of abnormalities, difficulties, or problems during the delivery, at birth, or right after the birth? Yes____No____

If yes, describe:

____

____

____

When were you told your child had Down Syndrome, right after the birth of your child or a few days later?______________

Who told you of your child's condition (i.e. doctor, nurse, social worker)?____

Do you remember what you were initially told?_______________

Did you initially understand the diagnosis?_________________

What were you initially told about a child with Down Syndrome by your obstetrician, pediatrician or nurse. ________________

____

Do you remember what you felt when you were told about your child's condition?

Was it ever suggested or implied in any way that you had the option of giving your child up for adoption?

Did you initially consider giving your child up for adoption when you were told he/she had Down Syndrome?

What did you know about children who have Down Syndrome before you had your child?

Was the father of the child present when you were told of your child's condition? Yes:______ No:________

If he wasn't present when was he told?________________________

Was the father of the child present at the birth of the child? Yes_____No_____

If no why not? ____

Is there anything you want to add about your pregnancy or the birth of your child?

Do you as a result of your child's condition belong to any organization whose main goal is to educate both the parents and the public about individuals with Down Syndrome?
Yes______No_____

If yes, explain:

DEVELOPMENTAL INFORMATION

Has your child received any medical treatments for illness or disability? Yes_____No_______

If yes, explain: ______________________________

Has your child received any surgical interventions to correct a health problem associated with Down Syndrome? Yes______
No_______

If yes, explain:______________________________

Did you child receive any cosmetic surgery which corrected any features which are most commonly associated with Down Syndrome? Yes_____No_____

If yes, explain: ______________________________

Does your child have any allergies? Yes__________No__________

Has your child had any major illnesses? Yes________No________

If yes, explain: ________________________________

Has your child ever been hospitalized: Why?________________

At what age?______________For how long?________________

Does your child take any medication: Why? ______________

EDUCATIONAL INFORMATION

How does your child communicate needs and desires?

Does your child show understanding of directions?

Does your child initiate communication "freely"

When did you child begin walking?

When did your child begin talking?

At what age did your child begin to:

crawl_____ sit alone_____ walk alone_____

babble____ stop babbling____ say words______

When was your child toilet trained?

____

Your child can:

walk up and down the stairs alone Yes_____ No_____

catch and throw a ball Yes_____ No_____

dress and undress herself/himself correctly Yes_____ No_____

do up zippers Yes_____ No_____

do up buttons Yes_____ No_____

Does your child have any audio-visual problems? Yes___ No___

If yes, describe:

____

____

____

Does your child wear glasses or use a hearing aid? Yes__ No__

Is there anything you want to add about your child's physical development?

____

____

____

Is there anything you'd like to add about your child and the way he/she learn?

____

____

____

Have your expectations concerning your child been met by your child's performance in everyday tasks and in his/her interactions with other people? ______________________________

____

____

Have you noticed a difference between what you were told to expect from your child to what your child can actually do?

____

____

____

OTHER

Is there anything you wish to mention that we haven't already discussed?

____

____

____

____

____

____

____

____

Appendix B

Mothers' Reactions to the Problem-Solving Session

McGill

Department of Educational Psychology
and Counselling
Faculty of Education
McGill University

Postal address
3700 McTavish Street
Montreal Qc Canada H3A 1Y2

(514) 398-4240 / 41
Telex 05268510
Fax (514) 398-4679

Mothers' Response to the Problem-Solving Session

The following questions are designed to elicit the mothers' reaction to the experimental session. Responses will be recorded audiovisually. The purpose of this questionnaire is to: determine the proximity to which play is mirrored in the day-to-day interactions and at the time of the videotaping; verify the interactions between mother and child both before and after the experimental session; and to compare the interactions effected as a result of the experimental session.

Experimental Session Interactions:

1. How closely do your interactions with your child on a day-to-day basis resemble your interactions on the videotape?
2. How do your interactions differ?
3. How are your interactions similar?

Play Conditions and Interactions:

4. Does the play situations on a day-to-day basis usually take place in certain areas of your home?
5. Is there a scheduled time?
6. Are the interactions consistently the same or different?
7. Which of the following roles do you play? Do you play the role of facilitator, passive observer, active participant or over-bearing participant? Other?
8. What sort of play play activities do you engage in with your child?
9. Who usually initiates the play activity?

Play Interventions:

10. How do you think one should go about teaching new games or concepts to children?
11. What should be the first step?
12. The second step?
13. Have you learned anything from the videotape or from the experimenter's comments on how to handle a play interaction or teach a concept within the auspices of play?
14. Have you learned how to play with your child?
15. Has your child learned how to play with you?

Play Behaviours:

16. Do you think that you or your child behaved differently on the videotape?

17. Is the behaviour typical of yourself and your child?

18. Did you or your child act differently today?

19. How might you and your child usually act when both of you are at play?

20. In general, when your child plays, does he/she often imitate you or his/her playmates?

Mothers' Observations:

21. When you watched the videotape, were you surprised by anything you saw your child do?

22. Have you observed anything that is different that you may not have noted in the past simply because you were provided with the opportunity to observe objectively the interactions taking place between you and your child?

23. Were you surprised by anything you noted about your own behaviour?

24. Have you observed anything different because you were able to be objective about your behaviour in videotape?

25. Did you notice anything special or that you've not noticed before about your child's expressions, or actions?

26. Did you notice anything special or that you've not noticed before about your own expressions or actions?

Development:

27. What are your general ideas about using language with your child?

28. Do you discourage baby-talk?

29. When do you think a child begins to understand words, and can communicate verbally with you? Using adult language?

30. When do you think you can communicate verbally with your child? Using adult language?

31. What are the means you use to communicate with your child? Do you use your voice or mouth words to your child? Do you usually point to your child ?

Perceptions about Play:

32. How do you perceive play?

33. What is your concept of play?

34. Do you differentiate between play and other interactions?

35. How do you do this? What are the criteria or clues for you or your child?

36. Do you believe that play is important in the life of a child?
37. How do you play with your child?
38.Have you thought of using play in order to teach knowledge to your child? Skills?
39.Do you resort to verbal or concrete reinforcement when your child is successful in his play activity?
40.Do you think that reinforcement is a necessary part in play activity as in any other activity?
41.Do you play with your child for the sole purpose of deriving pleasure for yourself and for your child or are there other motives?
42. Are you satisfied in the way you interact with your child?

Appendix C

Coding Sheet for Instruction Session

FORM DEVELOPED FOR STUDY

Recording of Events
Instruction Session

Time that Event Starts
Event Number
Child-Initiated Events
Attempted Elicitations of Maternal Approval
Maternal Interventions I1 I2 I3 I4 I5 I0
Construction Event
Layer (1 largest to 6 smallest) 1 2 3 4 5 6

Appendix D

Coding Sheet for Post-Instruction Session

FORM DEVELOPPED FOR STUDY

Recording of Events
Post-Instruction Session

Time that Event Starts
Intervention Level and Comments
R, R-, or R-rej.
Mother's Behavior