

PARENT DEVELOPMENTAL TRAINING AND ITS EFFECTS ON  
PARENTAL COMPLIANCE

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ABSTRACT

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The present study assessed whether teaching caregivers to recognize small progressions in their developmentally delayed children would motivate them to comply more consistently and effectively in the implementation of home treatment programs for their children. The study sample consisted of three groups of 13 caregiver-child (aged 4-35 months) pairs matched for age and severity of delay of each child. A home treatment program of 5 exercises was provided for all children in the sample. The caregivers in the experimental group received readings in child development and visits were made once a week for three weeks by educators who taught the caregivers how to observe and to recognize developmental progressions and how to teach their delayed children. The caregivers of the attention control group received the same amount of time, attention and social reinforcement through readings and education in child management as the caregivers in the experimental group. In the third group, the caregivers received no training or education. The children in the experimental group were significantly superior in the number of specific home program skills learned and their caregivers were more compliant in two measures (amount of blow bubbles used during implementation of the home program and journal recording of the number of home program sessions implemented) than were the subjects in the

other two groups. There was no difference among the groups in the other two compliance measures (a questionnaire and the number of paper sheets used during home program implementation). The improvements in child development and caregiver compliance appear to have occurred as a result of caregivers being taught to recognize minimal gains in their children which apparently provided reinforcement to caregivers. This reinforcement motivated them to continue to carry out the home program.

## Dedication

This work is dedicated to the many families with developmentally delayed children who need so much more than they are generally receiving at the present time. Over the last few years the author has become increasingly interested and involved in the development of methods which would motivate parents to become more compliant and more effective in the implementation of home treatment programs for their developmentally delayed children. One channel of enquiry into the motivation specificities of parents was to compare caregivers who received an intervention designed specifically to motivate them to caregivers who received no such intervention.

Having worked for a number of years with delayed children and their parents, I became increasingly aware that many caregivers do not seem to feel adequately rewarded for implementing home treatment programs. It appeared to me that these caregivers were not recognizing small progressions in their children, and because a delayed child tends to progress slowly, these parents were giving up the home program before it had time to be effective. Thus it seemed that if caregivers were taught to observe and recognize small developmental progressions they would feel more adequately reinforced and possibly would maintain home treatment for a longer period of time than previously. These considerations led to the following research project at the Lethbridge Rehabilitation Centre and Montreal Children's Hospital in Montreal.

I would like to express my appreciation for the cooperation and support I received from the team members of the paediatric department at the Lethbridge Rehabilitation Centre and the occupational therapists

at the Montreal Children's Hospital. I wish also to thank the many caregivers and their children who ~~agreed~~ to participate in the study. I wish to express my appreciation to Dr. L. Serbin, my thesis advisor, for her competent guidance and helpful suggestions and to Dr. N. Taylor Dr. D. White, and Dr. A. Putterman for their valuable assistance as members of my thesis committee. I would like to give special thanks to Dr. D. Andres for his guidance as statistical advisor.

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TABLE OF CONTENTS

LIST OF TABLES . . . . .	1
<u>Chapters</u>	
I INTRODUCTION . . . . .	1
II METHOD . . . . .	10
Subjects . . . . .	10
Child Program and Materials . . . . .	11
Caregiver Training Programs and Materials . . . . .	13
Experimental group . . . . .	13
Attention control group . . . . .	14
Quizzes . . . . .	15
Pre and Posttest Measures . . . . .	15
Child measures of developmental level and progress - Bayley Test of Infant Development and pro- gram skills . . . . .	15
Caregiver measures of compliance, developmental knowledge, and sensitivity to developmental level and performance . . . . .	16
Environmental measure . . . . .	17
Procedures . . . . .	18
Day one of the intervention . . . . .	19
The second, third, and fourth week of the intervention . . . . .	20
Last day of the intervention . . . . .	21
III RESULTS . . . . .	23
Populations Prior to the Intervention . . . . .	23
Method of analysis . . . . .	23
Effectiveness of the Training Program on Compliance . . . . .	24
Method of analysis . . . . .	24
Variables Influencing Compliance . . . . .	28
Correlations among compliance measures and control measures . . . . .	28
Multiple regression analysis . . . . .	30
Effects of the Training Program on Parental Learning . . . . .	33
Method of analysis for developmental knowledge, prediction of performance, and accuracy of observation . . . . .	33
Developmental knowledge . . . . .	37
Performance prediction . . . . .	37

Accuracy of observation . . . . .	37
Recording of children's gains by caregivers . . . . .	40
Effect of Educator on Compliance . . . . .	40
Comparison of Developmental Gains . . . . .	42
Relationship Between Compliance Measures and Developmental Gains . . . . .	48
Summary of Results . . . . .	48
IV DISCUSSION . . . . .	51
Effectiveness of the Training Program on Compliance . . . . .	51
Effectiveness of the Training Program on Caregivers' Learning . . . . .	54
Variables Other than Group Training which Influenced Compliance . . . . .	56
Comparisons of Child Developmental Gains . . . . .	57
Conclusions and Research Suggestions . . . . .	60
REFERENCE NOTES . . . . .	63
REFERENCES . . . . .	64
<u>APPENDICES</u>	
A Reason For Delay of Child in Each Group . . . . .	71
B An Example of the Home Program . . . . .	72
C Instructions for the Use of the Journal . . . . .	73
D Quiz For Readings on Developmental Training . . . . .	76
E Quiz For Readings on Child Management . . . . .	78
F Compliance Questionnaire For Caregivers . . . . .	80
G Developmental Knowledge Test . . . . .	84
H Performance Prediction Task . . . . .	88
I Accuracy of Observation Record Form . . . . .	91
J Consent Form . . . . .	93
K Protocol for Educators in Developmental Training . . . . .	94
L Analysis of Variance Summary Table Comparisons Among Groups on Pretest Measures . . . . .	97
M T-Test Comparison Between the Two Populations, Lethbridge Rehabilitation Centre and Montreal Children's Hospital . . . . .	98

LIST OF TABLES

1	Group Means and Ranges of Age and Bayley Mental and Motor Scores and Group Distribution of Sex and Referral Population . . . . .	12
2	Mean Percentages of Compliance Measures (bubbles used, paper used, treatment sessions recorded in journal, and positive answers on questionnaire) for Each Treatment Group (developmental training, attention control, and no training control) . . . . .	25
3	Multivariate Analysis of Variance Summary Table. Effects of Treatment Condition (developmental training, attention control, and no training control) on Compliance Measures (percentage bubbles used, percentage paper used, percentage treatment sessions recorded in journal, and percentage positive answers on questionnaire) . . . . .	27
4	Stepdown Discriminant Analysis Summary Table. Ability of Compliance Measures (percentage bubbles used, percentage paper used, percentage treatment sessions recorded in journal) to Discriminate Among the Three Treatment Groups (developmental training, attention control and control) . . . . .	29
5	Correlation Matrix. Control Variables (caregiver education, age of child, sex of child, delay of child - (1) severe (2) moderate, language of child and caregiver - (1) English (2) French, Caldwell pretest) with Compliance Variables (percentage bubbles used, percentage paper used and percentage treatment sessions recorded in journal) . . . . .	31
6	Kruskal-Wallis H Test Summary Table. The Effects of Occupational Therapist and Educator on Compliance (use of paper, use of bubbles, journal recording) . . . . .	32
7	Multiple Regression Analysis Predicting Compliance in Journal Recording from Treatment Group (developmental training, attention control and control) and Control Variables (age of child, sex of child, delay of child, language of child and caregiver, Caldwell scores, caregiver education, educator and occupational therapist) . . . . .	34



8. Multiple Regression Analysis Predicting Compliance in Bubble Use from Treatment Group (developmental training, attention control and control) and Control Variables (age of child, sex of child, delay of child, language of child and caregiver, Caldwell scores, caregiver education, educator and occupational therapist . . . . .	35
9. Multiple Regression Analysis Predicting Compliance in Paper Use from Treatment Group (developmental training, attention control and control) and Control Variables (age of child, sex of child, delay of child, language of child and caregiver, Caldwell scores, caregiver education, educator and occupational therapist . . . . .	36
10. Mean Pretest and Posttest Scores of Developmental Knowledge, Performance Prediction and Accuracy of Observation Variables for Each Group (developmental training, attention control and no training control) . . . . .	38
11. Multivariate Analysis of Covariance Summary Table. Effects of Treatment Condition (developmental training, attention control, and no training control) on Developmental Knowledge, Performance Prediction, and Accuracy of Observation Posttest Scores with Pretest Measures as Covariates . . . . .	39
12. Analysis of Variance Summary Table. Effects of Treatment (developmental training attention control and control) on Caregiver Recording of Progression . . . . .	41
13. Analysis of Variance Summary Table. Effects of Treatment (developmental training, attention control and no training control) and Educator (four different educators) on Compliance (use of paper, use of bubbles and journal recording) . . . . .	43

14	Multivariate Analysis of Variance Summary Table. Effects of Treatment (developmental training, attention control and control) on Developmental Gains (percentage Bayley mental gains, percentage Bayley motor gains and per- centage skills gained) . . . . .	45
15	Mean Values of Developmental Gain Measures (percentage Bayley mental gains, percentage Bayley motor gains and percentage skills gained) by Treatment Group (developmental training, attention control and control) . . . . .	46
16	Pearson's Product Moment Correlations between the Compliance measures (per- centage bubbles used, percentage paper used and percentage of treatment sessions recorded in journal) and Developmental Gains (percentage Bayley mental gains, percentage Bayley motor gains, and percentage skills gained) . . . . .	49

## CHAPTER I

### INTRODUCTION

Children with developmental delays represent a large proportion of patients referred for assessment and management in physical, occupational, and speech therapy departments (e.g. Mayo, 1979). These children are usually referred because they are below the norm in their motor or language milestones (Bousefield, Note 1; Walfish, Note 2). Delayed children are frequently provided with a home treatment program which their parents are expected to implement (Starr, Note 3). However, one study has reported parental compliance in home treatment programs at 50% (Mayo, 1979). Further, in health regimens requiring long term intervention, as in the training of a child with a developmental delay, compliance is consistently low (Donabedian & Rosenfeld, 1964; Finnerty, Shaw & Himmelsback, 1973). In view of these various observations on compliance, it becomes important to discover what can be done to motivate parents so that they will carry out a home treatment program in a consistent fashion. The specific purpose of this study was to assess one method for increasing motivation and thus for improving parental compliance in the implementation of home treatment for a child with a developmental delay. A developmentally delayed child was defined for the purposes of this study as one achieving 80 or less on at least one of the subscales of the Bayley Test of Infant Development (Bayley, 1969).

Since it has been shown that educational and therapeutic methods, without parental support and assistance, are often of little benefit to a child having difficulties (developmental or behavioural), the

involvement of parents in the treatment of their own children has increased over the past decade (Leigh, 1975; Reisinger, Ora & Frangia, 1976; Rosenberg, 1977). Evidence has accumulated which documents the value of having parents implement programs in behavioural management (Anchor & Thomason, 1977; Berkowitz & Graziano, 1972; O'Dell, 1974; Tavorina, 1974) and cognitive training (Bronfenbrenner, 1975; Hanson, 1977; Karnes, Teska, Hodgins & Badger, 1970; Stedman, 1977). Intervention involving parents has been shown to enhance the child's subsequent cognitive development and to produce longer effects (Bronfenbrenner, 1975) and better child performance (Radin, 1972) than interventions which do not involve parents. It would appear that parental inclusion is essential in the treatment of children with developmental delays because these children usually have been given a long period of intervention (Aronson & Follstrom, 1977; Fowler, 1972; Karnes et al., 1970; Shearer & Shearer, 1972). It would thus appear that both the qualitative and quantitative aspects of the treatment are important determinants of the developmental results (Williams & Scarr, 1971).

Many therapists consider that one of the potential benefits of parents working with their children is the possibility that parents will continue to use what they have learned, after the initial training has been completed (Reisinger, 1976; Rosenberg, 1977). The circumstances under which parents continue to work with their children on their own or fail to do so should, therefore, be of considerable interest to these therapists. To date, however, there have been only a few studies providing experimental information, from disciplines other than medicine, on the specific factors related to parental compliance. Discussion of

research techniques in the psychological literature has devoted little space to follow-up studies, and often does not even mention the measurement of compliance (Bijou, Peterson, Harris, Allen & Johnston, 1969).

The question as to whether parents comply with the treatment program in the absence of professionals and generalize learned principles across environments and across classes of behaviours (i.e. to alter the home treatment program as the child develops), remains largely unanswered. The lack of research in the area of compliance in psychology may be due to the many difficulties involved in this type of research. It is more difficult in psychology than in medicine to find good objective measures of compliance; in medicine, one can easily measure serum drug levels, for example. It is difficult, as well, to ascertain whether learned skills have generalized when one uses an observer to gather data, because the presence of observers may act as a stimulant for parents to comply (Reisinger, 1976). Journals and diaries have been used as measures of compliance (Lindsley, 1966; Mayo, 1979). Diaries, however, may also act as a stimulant for parents to comply and in some instances parents have failed to keep diaries, despite the fact that programs appeared to have been followed (Mayo, 1979). There are other difficulties associated with any follow-up study in psychology such as the problem of controlling variables after therapy, for example, the occurrence of new problem behaviours or changed living circumstances (Goldstein, Heller & Sechrest, 1966; Paul, 1968; Strupp & Bergen, 1969).

There are many examples of parental noncompliance in treatment programs for children. Most noncompliance, however, has been reported

Incidentally, often being mentioned at the end of a study which was presenting the effectiveness of a given therapeutic approach. Several authors have reported high parental noncompliance in behavioural management training (Lindsley, 1966; Mira, 1970), in contingency contracting (Bletchman, 1979; Stuart & Lott, 1971; Weathers & Liverman, 1975), in implementing physical therapy treatment programs (Mayo, 1979), in carrying out psychiatric recommendations (Davidson & Schrag, 1969), and post-discharge recommendations for retarded children (Wikler & Stoycheff, 1974), and in implementing infant developmental programs (Karnes et al., 1970; Rosenberg, 1977).

There is evidence that the more complicated and the more time-consuming the total regimen becomes, the more likely it is that non-compliance will occur (Davis, 1968; Mayo, 1978). It is reasonable to assume that with parents of developmentally delayed children non-compliance would be related to the same factors, because the treatment programs are often complex and their demands on parents' time are often great (e.g. Hanson, 1977).

The personality traits of parents may also influence their willingness to implement home training activities. It is possible that parents who have experienced very little success in child-rearing will develop a low expectation of attaining the specified goal (i.e. developmental gains) of their child's therapeutic program. Such a sense of failure may well arise from the difficulties of caring for a developmentally delayed child. Retarded children who have extensive histories of failure, respond to failure by putting forth less effort on subsequent trials than do children of normal intelligence (Cronwell, 1967). Just as the retarded children had fewer successes and so came to expect

failure, it is possible that parents having normative expectations for their child's delayed development will interpret the latter's continued growth delay as an indication of their own personal failure. It could be expected, therefore, that as a result of repeated and past failure to achieve expectations many parents of developmentally delayed children may react as though they have "learned helplessness" and may fail to implement home treatment programs.

According to Seligman's theory (1975), "learned helplessness" is a form of depression which occurs under such conditions of failure. It is known that depressed mothers often fail to implement behavioural management techniques for their children (McLean, 1976). Klinger (1975) has argued that depression results when an individual has a low expectation for success in attaining a highly desired goal. Bell (1979) found that parents of developmentally delayed children had more unrealistic expectations and inaccurate perceptions of their children's performance than did parents of normally developing children. In a survey of paediatric occupational therapists, the major reason for parental non-compliance cited was failure of parents to see improvements in their children (Starr, Note 3). Parents may discontinue a home program because they have unrealistically high expectations and fail to perceive the small improvements their children have achieved.

The main purpose of this study was to investigate one method to improve motivation of parents so that they would comply more consistently in a home treatment program. The assumption that increased motivation would improve parent effectiveness in child intervention was based on Rosenberg's (1977) findings. Rosenberg (1977) believed that commitment to a treatment program might be related to parental performance in child

intervention. Rosenberg's term, commitment, was a concept closely related to motivation. He found that committed parents were more effective trainers of their children and that children of committed parents showed significantly more developmental gains than those of non-committed parents. He also suggested that the maintenance of a parent's commitment to a program may be related to the reinforcements that a parent experiences in working with his child. Committed parents, therefore, had found some source of reinforcement which they needed in order to learn new child treatment techniques. If this is so, then unmotivated or noncommitted parents may need reinforcement in order to become committed. Klinger's (1975) and Rotter's (1972) theories suggest that lack of commitment to child care activity is either the result of a low valuation of the goal associated with the activity or the expectancy that the goal is unattainable. Thus goal related incentives and the expectancy of attaining a goal are crucial to an understanding of commitment. Together these incentives and expectancies determine commitment and consequently, levels of parental motivation and compliance.

It has been demonstrated empirically that compliance can be enhanced through the use of external reinforcement. Present day techniques for motivating uncooperative families, however, use somewhat primitive methods of reinforcement. In behavioural modification therapy, compliance monitoring using feedback to and/or encouragement of the parent for implementing behaviour modification has been highly successful (Lindsley, 1966). Requiring parents to deposit cash and returning it, contingent on their rate of performance of an assignment (Eyberg & Johnson, 1974) has been effective in increasing parental compliance. In some cases parents have been induced to carry out program procedures



through the use of reinforcers such as payments (Fleishman, 1979; Patterson & Reid, 1973). Bletchman (1979) found some disadvantages to parenting salaries in her study. She found that contingency praise alone was more effective in improving and maintaining family compliance than contingency praise and money payment. Payment appeared to hinder generalization of learned treatment techniques over time.

The literature on intrinsic and extrinsic rewards indicates that an individual who is motivated by rewards which are inherent in an activity will persevere longer and more vigorously in that work than will a person whose behaviour is maintained by external controls (Deci, 1972). Strategies using extrinsic motivators (external reinforcers) have tended to be successful only as long as the extrinsic controls were applied (Patterson, 1971). Notz (1975) has described several conditions required for intrinsic motivation. The most important condition for the present study is the degree to which an individual performing a task finds that the pursuit of the task provides personal satisfaction. In order to achieve intrinsic motivation, therefore, it is important to make the pursuit of the task satisfying.

Very little consideration of this intrinsic reinforcement issue has appeared in the parent training literature, although an interesting attempt to motivate parents by increasing intrinsic rewards has been reported by Reid and Hendricks (1973). In their study, professional help was initiated when a set of parents were found unwilling to implement a program designed to reduce their son's stealing. Instead of resorting to external controls to bring about compliance, these parents were encouraged to work on simple nonthreatening procedures that increased the frequency of enjoyable interactions within the

family. Once this was done, it was possible to deal with the stealing. Thus, it would appear to be both possible and desirable to utilize intrinsic rewards to motivate parents.

A basic assumption of most treatment programs which train parents to work with their own children is that once professionals are no longer available to reward appropriate parent performance, improvements in a child's development at home will act as reinforcers to maintain parent behaviour (Rosenberg, 1977). This assumption has not yet been tested, however. With a delayed child, who is of course developing slowly, parents may not have adequate knowledge of child development to recognize noteworthy developmental changes and thus may not find program implementation satisfying.

The present project was designed to test whether parents' recognition of small qualitative and/or quantitative developmental progressions in their children would increase parental commitment and compliance. The expectation of increased compliance in parents, trained to observe and recognize developmental progress and trained to teach delayed children, is based on the assumption that early recognition of their children's developmental progress would provide reinforcement and therefore increase parental motivation to implement the home program.

The general objective of the present study was to evaluate the effectiveness of a program of training in observing and recognizing developmental progress and in teaching delayed children (developmental training), on compliance of caregivers with the implementation of a home treatment program prescribed for their developmentally delayed children. This developmental training group was compared to an attention control group of caregivers receiving education in child

management and a control group receiving no caregiver intervention. The general hypothesis was that there would be a difference in terms of compliance among the three groups.

The primary prediction was that caregivers receiving the developmental training would demonstrate the highest rate of compliance when compared to the other two groups. Specific related predictions which would verify the effectiveness of the developmental training program were that caregivers receiving this training:

1. would demonstrate the most knowledge of specific stages of development and would recognize the most developmental gains made by their children;
2. would be able to predict more accurately whether their children could perform certain developmental activities and;
3. would be able to observe more accurately whether their children did perform correctly the same developmental activities which caregivers had predicted.
4. It was predicted that children whose caregivers had received training in observing and recognizing developmental progress and teaching of a delayed child would demonstrate greater gains in appropriate sequential development and in specific skills trained by the home program when compared to the attention control and no training control group. It is suggested that the developmental gains would be the result of their caregivers' increased compliance and increased effectiveness as teachers.

## CHAPTER II

### METHOD

#### Subjects

The total sample consisted of 39 caregiver-child pairs. The criteria for admission into the study were: that the child had been referred to the Occupational Therapy Department at the Montreal Children's Hospital or to the Paediatric Department at the Lethbridge Rehabilitation Centre, had demonstrated delayed development defined as a developmental index of  $\leq 80$  on either the Bayley Mental Scale of the Developmental Index (MDI) or the Bayley Motor Scale Developmental Index (PDI), was to be provided with a home program and was not on active inservice treatment; and that the primary caregiver, who was the person most likely to be the most involved in carrying out the home program, agreed to be involved in pre and posttesting with the child at home, agreed to implement the child program which included keeping a journal, and in the case of the developmental training and attention control group agreed to attend (with any other important caregivers of the child, if possible) three 1-hour sessions in the home, and was able to speak and read either French or English.

The child-caregiver pairs were matched according to the age of the child (within 4 months) and the severity of the child's delay (severe delay: MDI or PDI  $< 50$ ; or moderate delay: MDI and PDI  $\geq 50$  to MDI or PDI  $\leq 80$ ). The caregiver-child pairs were then randomly assigned to one of the three treatment conditions; experimental (caregivers' training in observing and recognizing developmental progress in their children

and in teaching their delayed children), attention control which controlled for the effects of attention and social reinforcement received by the experimental group (caregiver education in child management) or no caregiver training control.

There were six severely delayed and seven moderately delayed children in each group. For 19 of the 39 children the reason for delay was unknown. Seven of the 19, however, were premature. Recognized causes of delay included anoxia at birth, seizures, deafness and microcephaly (Appendix A). Descriptions of the subjects are provided in Table 1.

Most caregivers were parents. There were two foster mothers and one grandmother, however, in the study. Three of the primary caregivers were fathers. The average education levels of the primary caregivers were similar in each treatment condition with an average of 11.92 years in the developmental training group, 11.31 in the attention control group, and 10.77 in the control group.

#### Child Program and Materials

The five child exercises to be carried out in the home by the caregiver(s) were provided by the Occupational Therapy Department of the referring institution. The home program used the method of presentation described by Hanson (1977) and is similar to that normally used in occupational therapy departments to promote optimal development of developmentally delayed children. This type of remedial program is based on active skill building exercises. Instructions were typewritten and deemed suitable for the developmental level of the child. (For an example of a home program see Appendix B).

The treatment supplies provided for the home program consisted of

Table 1

Group Means and Ranges of Age and Bayley Mental and Motor Scores  
and Group Distribution of Sex and Referral Population

Variables	Group		
	Developmental Training	Attention Control	Control
Age in months	21.69 ( 6-34 )	21.54 ( 7-35 )	21.85 ( 4-35 )
Bayley Mental Scale raw scores	103.30 (60-151)	100.61 (47-140)	108.07 (48-161)
Bayley Motor Scale raw scores	42.53 (20-73 )	45.84 (22-68 )	45.54 (20-75 )
Sex male	7	6	6
female	6	8	7
Referral population			
Lethbridge Centre	4	5	6
Montreal Children's Hospital	9	8	7

Note. The numbers in brackets are ranges.

a 220-ml bottle of commercially sold "Wonder Bubbles" (Chemtoy, Cicero, Ill.) and either examining room table paper in 1-m lengths (Multimedica Incorporated, Montreal, Que.) or manilla paper measuring 210 X 275 mm. The journal consisted of two manilla sheets measuring 210 X 275 mm. for each of the 5 exercises, with typewritten instructions for its use. In the journal the caregiver could circle how many times the exercises were given each day (up to 5 times) and how many times the child succeeded in correctly performing the exercise. Space was provided for caregivers to record any comments such as the children's reactions to the exercises and to record any developmental progressions the caregivers had noted (Appendix C).

The treatment supplies were incorporated into the home program in a variety of manners by the occupational therapist. For example, the blow bubbles were used to teach such skills as fine motor control and spatial awareness, and were used for language stimulation and gross motor play. The crackly paper was used to provide a different surface for younger infants to lie upon so they could experience sound as a result of movement and was used to teach object permanence, to strengthen hand muscles and improve balance. The small paper was used for prewriting skill building and fine motor skills such as tearing or folding.

#### Caregiver Training Programs and Materials

Experimental group. The readings provided to parents of the experimental group consisted of excerpts taken from Teaching Your Down's Syndrome Infant (Hanson, 1977) (for page numbers see reference) and Help Your Baby Learn (Lehane, 1976) (for page numbers see reference). The educators used these readings for two purposes. First, using the readings the caregivers were taught how to observe and manage their

developmentally delayed children. The readings explained the meaning of certain terminology such as objective or goal, consequence, and behaviour or response. The readings provided teaching strategies to be used during the implementation of the home program which included teaching caregivers how to use reinforcements effectively and how to prompt or cue their children's responses. The readings also included sections on how caregivers could observe their children's behaviour more accurately and how to handle problem behaviours which might arise.

Second, using the readings as a guide caregivers were taught what gains to expect in their children by observing what milestones the children had already achieved and then were taught to look for the next most logical developmental progressions which their children would make. The readings provided minute developmental milestones presented in the order in which they normally develop. The developmental milestones included gross motor activities (for example, the many milestones involved in developing head control, sitting, rolling, crawling, standing, walking, running, kicking, jumping, and throwing skills), fine motor activities (for example, the milestones involved in visual development, reaching, grasping, object manipulation, and problem solving skills), communication (for example, the milestones involved in early auditory responses, and in expressive, and receptive language), and social and self-help skills (for example, the milestones involved in the development of socialization with others, feeding, and dressing). Also included were some explanations about why certain milestones are important.

Attention control group. The readings provided to parents of the attention control group were readings in child management taken from



Child Management (Smith & Smith, 1976) (for page numbers see reference).

These readings were similar in length to the readings provided for the experimental group. These readings provided information as to how parents can be consistent with their children, why consistency is important and what are the results of consistency training. The readings explained how rules can be chosen, introduced, and enforced and about how to deal with difficult behaviours in the children. These readings were not specific to developmentally delayed children nor were examples provided for such young children. However, they could be related to the home program by the suggestion that the exercises could be thought of as the introduction of new rules for the children.

Quizzes. Quizzes on the readings provided for the experimental group (for an example see Appendix D) and for the attention control group (for an example see Appendix E) were given to the caregivers of the appropriate groups. These caregivers were given the quiz on the assigned readings at the end of each caregiver training session. These quizzes were used both to help motivate the caregivers to do the readings, since the caregivers knew that they were going to receive these quizzes, and also to establish whether learning had occurred.

#### Pre and Posttest Measures

Child measures of developmental level and progress—Bayley Test of Infant Development and program skills. Development was measured using the Bayley Scales of Infant Development (Bayley, 1969). The current edition of the Bayley Scales of Infant Development (BSID) has 163 items on the Mental scale, and 81 items on the Motor scale. It has been standardized on a sample of 1262 children ranging in age from two through thirty months. This assessment was chosen because it has been

used frequently in past research and because recent evidence suggests that certain items are predictive at specific ages (i.e. perceptual items in early development, conceptual items at 8 months and language items at 12 months) (Siegel, 1979).

Another measure of infant development was the percentage of the five skills given in the home program that was acquired by each child during the study.

Caregiver measures of compliance, developmental knowledge, and sensitivity to developmental level and performance. Compliance was measured as the percentage of the treatment supplies used (paper and bubbles) during the home program training and the percentage of treatment sessions recorded in the journal (out of a possible five sessions per day) over a one month period (from 28 to 36 days, except for one subject who, due to leaving the city, recorded for 40 days), and by recording the percentage of questions answered positively on the Compliance questionnaire (Sackett, Becker, MacPherson, Luterback, & Haynes, 1976). The Compliance questionnaire (Appendix F) was developed by Mayo (1979) from a standardized questionnaire put out by a group of researchers at McMaster University (Sackett et al., 1976) and adapted by the researcher for the purposes of this study. It consisted of 10 questions which were used to measure compliance. These questions were answered on a 5-point scale.

Developmental knowledge measures were used to establish whether or not learning of caregivers occurred as a result of the training provided to the caregivers in the experimental group. To measure the knowledge of the readings, all caregivers were given a preintervention and post-intervention developmental knowledge test designed by the researcher

and based on the readings provided to caregivers of the experimental group. Two forms of the test were presented in a counterbalanced order. (For an example of one test see Appendix G).

In order to assess caregiver's ability to predict the child's performance, the primary caregiver was given a performance prediction task both before and after the intervention. The task consisted of 13 items chosen from the Bayley MDI. On this task the caregiver recorded whether or not he or she thought the child would achieve these items. (For an example of one performance prediction task see Appendix H).

The accuracy of observation record form was given as a preintervention and postintervention test to see if caregivers receiving the developmental training (experimental group) became more accurate in observing their children after the intervention. The record form consisted of the same 13 items in the performance prediction task. On this form the caregivers recorded their observations as to whether the children attempted or achieved the items. (For an example of one accuracy of observation record form see Appendix I).

Another measure of developmental knowledge was each caregiver's ability to recognize and record his or her child's developmental progress. This measure consisted of the number of child developmental achievements recorded by caregivers in the journals and verified by the posttesters.

Environmental measure. The Caldwell Home Inventory was used as a control measure because of the potential effects of environment on caregiver compliance and on child development. This inventory was designed to be a more sensitive measure of environmental influences

than socioeconomic indices (Caldwell, 1979).

The Caldwell Home Inventory consists of VI factors. Factor I is emotional and verbal responsiveness of the mother; factor II is avoidance of restriction and punishment; factor III is organization of environment; factor IV consists of the provision of appropriate play material; factor V consists of maternal involvement with the child; and factor VI consists of opportunities for variety in the daily routine. The present version of the Caldwell Home Inventory is designed for use with families of infants and toddlers and contains 45 items. The data for the Caldwell Home Inventory were collected from 175 families residing in Little Rock, Arkansas.

#### Procedure

Prior to participation in the study, the occupational therapist assessing a developmentally delayed child appropriate for the study, would ask the primary caregiver if he or she were willing to participate. The caregiver was then asked to give signed consent (Appendix J) to participate in a study on the effectiveness of the home program which the occupational therapist would provide. The occupational therapist devised the five home program exercises to be provided for the child, incorporating the treatment supplies (blow bubbles and paper) into two of these exercises. The primary caregiver was taught by the occupational therapist how to help the child exercise and how to use the treatment supplies. Finally, the occupational therapist would contact the researcher and give her the name, age, language, and telephone number of the subject, the primary caregiver education level as well as the home treatment program provided. Follow-up by the occupational therapist was arranged for more than one month later.

Day one of the intervention. On day one of the intervention the pretest session was administered. The pretest took place in the child's home at a time when the child was normally awake. The first half hour was informal in order to help the caregiver-child pair relax in the presence of the assessor. Observations for the Caldwell Home Inventory were made both during this time and throughout the duration of the pretest session. The performance prediction task and the accuracy of observation record form were explained. While the caregiver was busy with the performance prediction task the assessor was getting to know the child.

Each child was assessed using the Bayley Scales of Infant Development (1969). During the developmental assessment the caregiver was reminded to fill out the accuracy of observation form when appropriate. The participating caregiver was then asked to answer the questions on the pretest developmental knowledge test and the assessor gave the home program to the infant in order to determine how many of the home program skills the child could already perform.

Once the assessment was completed the caregiver received the treatment supplies of blow bubbles and paper to be used during the home program. The importance of the equipment was emphasized and the primary caregiver was reminded to do each of the exercises once a day, getting the child to try each exercise five times (for a total time of 25-30 minutes daily). The caregiver was asked to use fresh paper supplies each day and not to use the equipment for any purpose other than the exercises.

At the end of the pretest session the journal was provided together with typewritten instructions for its use. Enough supplies were given

to last 40 days. Finally, an appointment was made for a return visit in approximately one month.

The pretest assessment was administered by an assessor who was ignorant of the groups into which the caregiver-child pair would enter and unfamiliar with the caregiver-child pair. There was one exception to this, when one grandmother refused to have the original assessor back but agreed to have the researcher do the posttest. Data from this subject were included in the total sample.

After the pretest, subjects were matched and randomly assigned to one of the three conditions, at a subsequent session by a different examiner, and the caregivers of the experimental and attention control group received the appropriate readings. Once the subjects were assigned to a condition, those in the experimental and attention control group were assigned to an educator. Each educator visited the caregivers of the experimental and attention control group to teach them about the respective readings, to provide appropriate suggestions about the home program and to provide social reinforcement to caregivers for carrying out the home program. The educators were qualified personnel in child development (two physiotherapists, one nursery school teacher and one combined occupational and physiotherapist) who had experience in working with delayed children and their parents. Each educator saw families from both the experimental and attention control groups and each educator saw either the same number of families in the experimental and attention control groups or saw one extra family in one group.

The second, third, and fourth week of the intervention. Caregivers in the experimental group received excerpts on child development and on observation and training of a developmentally delayed child, as soon as

possible after their assignment to a group. The intervention program for the experimental group consisted of three visits by an educator to discuss the assigned readings (4 to 7 pages each week) in child development which aimed at training parents to recognize developmental gains in their children and to become more effective teachers of their children. The educators provided suggestions which would make implementation of the home program easier and praised caregivers for doing the home program with their children (for further information of the educator protocol refer to Appendix K). The caregivers had previously been advised that they would be given a little quiz at the end of each session to see what they had learned. Caregivers were asked to have their journals available for these sessions and to pose questions they might have about the home program and about their children's reaction to it, as well as questions with regard to the readings.

Caregivers of the attention control group received readings on child management. The intervention program for the attention control group was exactly the same as for the experimental group except that the readings discussed were different.

The intervention program for caregivers of the no training control group consisted of three telephone calls during the month to remind caregivers to fill out the journal and to give caregivers suggestions which might make implementation of the home program easier.

The last day of the intervention. The posttest session was administered approximately one month after the pretest, in the child's home, and was planned at the same time of day by the same assessor as the pretest. Two days before the follow-up session each primary caregiver was telephoned and reminded of the posttest visit and was

asked to have the journal and left over supplies ready to be returned to the experimenter. The first 15 minutes were taken to help the child and caregiver relax. The caregiver was asked to fill out the Compliance questionnaire while the assessor became reacquainted with the child. The caregiver was asked to do the performance prediction task and accuracy of observation record form was explained.

The child was reassessed using the Bayley Infant Scale (1969). During the developmental assessment the caregiver was reminded to fill out the accuracy of observation form when appropriate. The caregiver was asked to fill out the posttest developmental knowledge test and the assessor gave the home program to the child to determine how many skills the child had acquired during the month.



## CHAPTER III

### RESULTS

The experimental results are presented in seven sections. These include: first, description and comparisons among the three treatment groups and between the Lethbridge Rehabilitation Centre and Montreal Children's Hospital populations prior to the intervention; second, the effects on the compliance measures of training in observing and recognizing developmental gains and teaching a delayed child; third, the effects of specific variables which might influence compliance; fourth, the differential effects of the three caregiver treatments on caregiver learning of developmental knowledge, on caregivers' ability to predict and observe accurately child capabilities, and on caregivers' ability to recognize and record developmental gains in their children; fifth, the effectiveness of the specific educators; sixth, the effect on the child development measures of the caregivers' increased compliance and increased effectiveness as teachers and, seventh, the relation between compliance measures and developmental gains.

#### Populations Prior to the Intervention

Method of analysis. Initially, in order to determine whether the matching control variables, age and severity of delay, actually ensured similarities among the three groups, univariate analyses of variance (ANOVA) were performed. These analyses used group as the independent variable (developmental training, attention control, and no training control). Age (in months) and severity of delay as reflected in pretest Bayley mental and motor scores were the dependent variables. Other

important control variables which may influence compliance such as sex of the child, primary caregiver education (in years of schooling) and home environment (in Caldwell Home Inventory pretest scores) were also examined using the ANOVA.

The univariate analyses revealed that there was no initial difference among the groups for age, Bayley mental and motor pretest scores, sex, primary caregiver education and home environment (see Appendix L).

According to t tests there was no difference between the two populations (Lethbridge Rehabilitation Centre — L.R.C. and Montreal Children's Hospital — M.C.H.) for age, delay, Bayley mental and motor pretest scores, primary caregiver education and home environment. There appeared to be more girls referred from the L.R.C. than from the M.C.H.  $t(37) = 2.38, p < .05$  (see Appendix M). This result was not significant when Greenhouse-Geisser alpha corrections were made (Keppel, 1973).

#### Effectiveness of the Training Program on Compliance

Method of analysis. In order to determine the effect on compliance of the caregiver training program in observing and recognizing child gains and in teaching a delayed child, a multivariate analysis of variance (MANOVA) was performed. The MANOVA was used as opposed to an ANOVA because of the theoretical prediction that the variables would be related and because correlations between variables were in the predicted direction (Turner, 1978). In the MANOVA, subsequent univariate results were interpreted only when a significant overall multivariate F was obtained.

Upon examination of the means (Table 2), the developmental training group appears to have the highest means in all compliance variables when compared to each of the other two groups. The MANOVA was found to be

Table 2

Mean Percentage of Compliance Measures (bubbles used, paper used, treatment sessions recorded in journal, and positive answers on questionnaire) for Each Treatment Group (developmental training, attention control, and no training control).

Group	Developmental Training	Attention Control	No Training Control
Variables			
Compliance: Journal (after three weeks of intervention)	57.45	42.49	29.61
Compliance: Journal (at end of intervention)	61.28	36.90	25.22
Compliance: Bubbles	70.06	44.27	32.49
Compliance: Paper	66.29	39.65	53.02
Compliance: Questionnaire	86.15	79.89	79.00

significant,  $F(16,60) = 2.15, p < .05$ . In this analysis group (developmental training, attention control, and no training control) was the independent variable and the compliance measures (paper use, bubble use, journal recording, questionnaire) as well as the developmental measures (skills gained, Bayley motor gains, Bayley mental gains) were the dependent variables. As can be seen in Table 3, the univariate analysis of variance demonstrates a significant difference among the groups for the compliance measures (journal recording of the number of treatment sessions implemented by the end of the intervention,  $F(2,36) = 5.6, p < .01$ ) and use of blow bubbles,  $F(2,36) = 4.6, p < .05$ . The compliance measures of questionnaire and use of paper did not demonstrate significant differences among the groups.

When Least Significant Differences tests were performed the developmental training group was higher for both the use of blow bubbles and journal recording than the attention control group,  $p < .05$ , and the no training control group,  $p < .05$ . There was no difference between the attention control group and the control group. Although differences were found between the developmental training and attention control groups at the end of the intervention, there was no significant difference between these two groups in journal recording after three weeks of intervention,  $F(1,24) = 1.4$ .

It was important, as well to determine which combination of the four compliance measures (paper use, bubble use, journal recording, and Compliance questionnaire) were most successful in discriminating among the training groups. A stepdown discriminant analysis was used to answer this question.

The stepdown discriminant analysis entered each variable in order

Table 3

Multivariate Analysis of Variance Summary Table

Effects of Treatment Condition (developmental training, attention control, and no training control), on Compliance Measures (percentage bubbles used, percentage paper used, percentage treatment sessions recorded in journal, and percentage positive answers on questionnaire)

	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>
MANOVA F - Pillais	16,60		2.15	<.02*
ANOVA F's				
Compliance: Journal (at end of intervention)	2	4401.16	5.64	<.01**
Error	36	780.53		
Compliance: Bubbles	2	4827.76	4.61	<.02*
Error	36	1047.41		
Compliance: Paper	2	2306.11	2.36	ns
Error	36	975.22		
Compliance: Questionnaire	2	197.55	1.80	ns
Error	36	107.43		

\* <.05.

\*\* <.01.

of their discriminating values. The most discriminating variable, compliance in journal recording of the number of treatment sessions implemented was entered first, Wilks lambda = .76,  $p < .01$ , compliance in the use of blow bubbles was entered next, Wilks lambda = .67,  $p < .01$ , and compliance in the use of paper was entered last, Wilks lambda = .62,  $p < .01$  (Table 4). The F level for the Compliance questionnaire was insufficient to enter into the equation. The Compliance questionnaire did not, therefore, add significantly to the discriminating value of the other three measures. As a result, further analyses using the compliance measures do not include the Compliance questionnaire. One useful function was found which included the three compliance measures, journal recording, use of blow bubbles and paper (see the Canonical discriminant functions in Table 4) and 53.85% of the cases as opposed to a chance level of 33.33% were correctly classified into the appropriate treatment groups. This is significant according to the proportions test,  $z = 2.4$ ,  $p < .01$ .

In summary there was a significant difference among the groups for the compliance measures of journal recording of the number of treatment sessions implemented and for the percentage of bubbles used during treatment. The caregivers in the developmental training group recorded more sessions implemented and used more blow bubbles than did caregivers in either the attention control or no training control group. There was no difference between the attention control and no training control groups on these measures.

#### Variables Influencing Compliance

Correlations among compliance measures and control measures. Prior

Table 4

Stepdown Discriminant Analysis Summary Table  
Ability of Compliance Measures (percentage bubbles used,  
percentage paper used, percentage treatment sessions  
recorded in journal) to Discriminate Among the Three  
Treatment Groups (developmental training, attention  
control and control)

	Wilks Lambda	p	Canonical Discriminant Function
Variables Entered			
Compliance: <del>Journal</del>	.76	<.01*	-.67
Compliance: Bubbles	.67	<.01*	-.56
Compliance: Paper	.62	<.01*	-.17

\*<.01.

to the calculation of a multiple regression analysis, the correlations between the compliance measures (use of paper, use of bubbles, journal recording) and those control measures appropriate for correlations (sex, age, delay, language of the child, caregiver education and home environment) were computed. The resulting correlations have been shown in Table 5. Although many correlations appeared quite high, using Bonferroni corrections (Larzelere & Mulaik, 1977) only one relationship was significant. Maternal responsiveness on the Caldwell Home Environment Inventory was negatively associated with the use of bubbles,  $r = -.45$ ,  $p < .05$ . This indicates that the less responsive a caregiver was with his or her child prior to treatment the more the caregiver used bubbles during the time of the study.

The Kruskal-Wallis H test was used to evaluate whether educators and occupational therapists differed with respect to caregiver compliance. Concern with violations of assumptions led to using a non-parametric test. There were no significant effects for any variable (Table 6).

Multiple regression analysis. The relationships among the three compliance measures (use of paper, use of bubbles, and journal recording) that discriminated among the groups and a number of potentially significant control variables were examined by the means of a multiple regression analysis. Each of the three compliance measures was separately analysed by the multiple regression using sex, age, delay and language of the child, caregiver education and home environment, as well as occupational therapist and educator as control variables because the sample was heterogeneous with respect to some of these variables and it was suspected from previous literature (Davidson & Schrag, 1969;



Table 5

Correlation Matrix

Control Variables (caregiver education, age of child, sex of child, delay of child - (1) severe (2) moderate, language of child and caregiver - (1) English (2) French, Caldwell pretest) with Compliance Variables (percentage bubbles used, percentage paper used and percentage treatment sessions recorded in journal)

	Bubbles	Paper	Journal
Caregiver Education	-.14	-.03	-.01
Age	-.08	-.04	-.26
Sex	.10	-.24	.14
Delay	.13	.10	-.31
Language	.11	.03	-.13
Caldwell pretest	-.35	-.24	-.01
Subtest of Caldwell			
Maternal Responsiveness	-.45*	-.18	-.21
Avoidance of Restriction	-.14	-.07	.24
Organization of Environment	-.07	-.05	.23
Appropriate Play Material	.01	-.22	.26
Maternal Involvement	-.33	-.26	-.14
Variety of Day	-.18	-.17	-.27

Note. The degrees of freedom are 37 for each correlation.

\*  $p < .05$  using the Bonferroni alpha correction.

Table 6

Kruskal-Wallis H Test Summary Table

The Effects of Occupational Therapist and Educator on Compliance  
(use of paper, use of bubbles, journal recording)

Variables	Educator		Occupational Therapist	
	<u>H</u>	<u>p</u>	<u>H</u>	<u>p</u>
Compliance: Journal	3.80	ns	8.20	ns
Compliance: Bubbles	7.25	ns	5.00	ns
Compliance: Paper	1.00	ns	9.10	ns

Evault, Cohen & Harmatz, 1972; Mayo, 1979) that some variables might demonstrate correlations with compliance. The control variables were treated as covariates in the analysis permitting the examination of the relationship between compliance and groups independent of the influence of the covariates. In order to do this, all variables were entered into the regression analysis prior to the entry of the group variable. In this way, the amount of criterion variance accounted for by the group variable, independent of and in addition to the control variables, can be determined.

Inspection of the F ratios (see Tables 7, 8, 9) testing the significance of the  $R^2$  increase indicate that the cluster of control variables regressed in the multiple regression do not account for a significant proportion of the variables in any of the three compliance measures. In the equations involving use of bubbles and journal recording, the addition of the group variable to the equation resulted in a significant change in  $R^2$  value indicating that this measure accounted for significant additional proportions of the dependent variable variance. Although certain variables may influence compliance the most important variable to affect compliance (use of bubbles and journal recording) is the group (developmental training, attention control, and no training control) to which the subjects belong.

#### Effects of the Training Program on Parental Learning

Method of analysis for developmental knowledge, prediction of performance and accuracy of observation. Change in developmental knowledge, performance prediction, and accuracy of observation as a result of treatment was examined by means of a multivariate analysis.

Table 7

Multiple Regression Analysis Predicting Compliance in Journal Recording from Treatment Group (developmental training, attention control and control) and Control Variables (age of child, sex of child, delay of child, language of child and caregiver, Caldwell scores, caregiver education, educator, and occupational therapist)

Predictors (Step entered)	Standardized Beta	R <sup>2</sup> Increase	Overall F	p
Step 1			1.53	ns
Sex	1.32	.007		
Occupational Therapist	1.87	.006		
Caregiver Education	-.52	.013		
Educator	-6.96	.018		
Age	-1.01	.049		
Delay	-18.70	.114		
Language	-7.01	.074		
Caldwell Scores	.39	.008		
Step 2			3.14	<.01*
Group	-27.45	.479		

\* <.01.

Table 8

Multiple Regression Analysis Predicting Compliance in Bubble Use from Treatment Group (developmental training, attention control and control) and Control Variables (age of child, sex of child, delay of child, language of child and caregiver, Caldwell scores, caregiver education, educator, and occupational therapist)

Predictors (Step entered)	Standardized Beta	R <sup>2</sup> Increase	Overall F	p
Step 1			2.08	ns
Age	.36	.001		
Language	8.81	.009		
Delay	8.04	.005		
Sex	17.90	.011		
Caregiver Education	2.43	.022		
Educator	-4.8	.039		
Occupational Therapist	-4.90	.049		
Caldwell Scores	-2.45	.218		
Step 2			3.11	<.01*
Group	-25.22	.134		

\* <.01.

Table 9

Multiple Regression Analysis Predicting Compliance in Paper Use from Treatment Group (developmental training, attention control and control) and Control Variables (age of child, sex of child, delay of child, language of child and caregiver, Caldwell scores, caregiver education, educator, and occupational therapist)

Predictors (Step entered)	Standardized Beta	R <sup>2</sup> Increase	Overall F	p
Step 1			.59	ns
Caregiver Education	.37	.001		
Language	3.63	.001		
Age	.37	.001		
Delay	6.26	.005		
Educator	-6.19	.002		
Occupational Therapist	-.52	.001		
Sex	-12.08	.067		
Caldwell Scores	-1.08	.056		
Step 2			.73	ns
Group	-13.65	.046		

of covariance in which pretest scores served as covariates. This strategy was chosen in preference to the repeated measures design since recent comparisons of the two approaches have suggested that the former model more adequately reflects the data in this study (Huck & McLean, 1975). Mean values for pre and posttests can be seen in Table 10. The overall multivariate analysis of covariance statistic,  $F(6,64) = 2.46$ ,  $p < .05$ , was significant.

Developmental knowledge. As can be seen in Table 11, the univariate analysis of covariance demonstrated a significant difference among groups  $F(2,33) = 7.72$ ,  $p < .01$ , for developmental knowledge scores. The pretest scores used as covariates did not demonstrate a significant difference among the groups prior to the intervention,  $F(2,36) = .71$ . Contrasts demonstrated a significant difference between the developmental training and attention control group,  $t(22) = 3.8$ ,  $p < .01$ , and between the developmental training and no training control group,  $t(22) = 2.5$ ,  $p < .05$ , but not between the attention control and no training control groups. This indicates that the caregivers in the developmental training group demonstrated significantly more learning according to scores on the developmental knowledge questionnaire than did caregivers in either of the two control groups.

Performance prediction. Although the overall multivariate analysis of covariance statistic was significant (Table 11), the univariate analysis of covariance for performance prediction did not demonstrate a significant difference among groups.

Accuracy of observation. Although the overall multivariate analysis of covariance statistic was significant (Table 11) the univariate analysis of covariance for accuracy of observation did not

Table 10

Mean Pretest and Posttest Scores of Developmental Knowledge,  
Performance Prediction and Accuracy of Observation Variables  
for Each Group (developmental training, attention control  
and no training control)

		Developmental Knowledge (15.00)	Performance Prediction (13.00)	Accuracy of Observation (13.00)
Group				
Developmental Training	Pretest	5.61	10.15	12.07
	Posttest	9.00	11.30	12.90
Attention Control	Pretest	4.58	11.50	12.66
	Posttest	5.75	11.08	12.75
No Training Control	Pretest	5.46	10.46	12.41
	Posttest	5.69	10.61	12.76

Note. The numbers in brackets are the maximum possible scores.



Table 11

Multivariate Analysis of Covariance Summary Table  
Effects of Treatment Condition (developmental training, attention control, and no training control) on Developmental Knowledge, Performance Prediction, and Accuracy of Observation Posttest with Pretest Measures as Covariates

	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>
MANCOVA F - Pillais	6,64		2.46	<.03*
ANCOVA F's				
Developmental Knowledge	2	34.37	7.72	<.01**
Error	33	4.45		
Performance Prediction	2	3.19	1.33	ns
Error	33	2.38		
Accuracy of Observation	2	.19	.97	ns
Error	33	.20		

\* <.05.

\*\* <.01.

demonstrate a significant difference among groups.

Recording of children's gains by caregivers. Differences in the number of gains recorded by caregivers in the journal were analyzed by the means of an analysis of variance using group as the independent variable and developmental gains recorded by caregivers in the journal as the dependent variable. Inspection of the means of this variable indicated that caregivers of the developmental training group recorded gains made by their delayed children more frequently than did caregivers in either the attention control group or the no training control group.

As can be seen in Table 12, according to the analysis of variance significant differences were found for gains recorded by caregivers,  $F(2,36) = 20.17, p < .01$ , among the groups. Post hoc L.S.D. tests showed that there was a significant difference between the developmental training group and both the attention control and no training control groups,  $p < .05$ , but not between the attention control and no training control groups. Thus, the caregivers in the developmental training group recorded more gains made by their children than did caregivers in either of the two control groups.

#### Effect of Educator on Compliance

In order to explore the effects of the different educators on caregiver compliance (use of paper, use of bubbles, and journal recording) in the two groups (developmental training and attention control), two-way analyses of variance were performed. It was particularly important to establish whether or not all educators managed to obtain better compliance with the caregivers of the developmental training group than with caregivers of the attention control group. There was no

Table 12

Analysis of Variance Summary Table

Effects of Treatment (developmental training, attention control  
and control) on Caregiver Recording of Progression

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Variable	MS	F	p
Progressions Recorded in Journal	203.15	20.17	<.01*
Error	10.07		

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Note. Degrees of freedom are 2, 36.

\* Adjusted Alpha level when the Cochran's test of homogeneity is  
significant at <.01.

significant effect of educator for any compliance measure and there was no interaction between the groups and educators. This indicates that no single educator managed to achieve significantly more compliance from caregivers than any other educator and all educators obtained more compliance from caregivers in the developmental training group than in the attention control group. Using the Greenhouse-Geiser alpha adjustment (Keppel, 1973) there was also no significant effect for group (Table 13).

#### Comparison of Developmental Gains

Differences among the groups in percentage change of Bayley mental and motor scores and skills taught in the home program were analyzed by a multivariate analysis of variance. This analytical strategy was chosen for these measures in preference to a repeated measures analysis or multivariate analysis of covariance because it was believed that percentage change would be more representative of real gains made by children of varying degrees of delay. That is, two skills gained by a more delayed child would indicate greater gains, relative to baseline performance than two skills gained by a less delayed child. Percentage change, therefore, takes into account relative changes from the developmental level the child had achieved prior to the intervention.

Since the multivariate analysis which included the four compliance measures and the three developmental measures had shown a significant effect the univariate results for the developmental measures (Bayley mental gains, Bayley motor gains, and skills gained) were interpreted. There was a difference among the three groups (independent variable) for percentage gain of the specific skills (dependent variable) the children were taught in the home program  $F(2,36) = 10.25, p < .01$

Table 13

Analysis of Variance Summary Table

Effects of Treatment (developmental training, attention control and no training control) and Educator (four different educators) on Compliance (use of paper, use of bubbles and journal recording)

Variables	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>
<b>Compliance: Journal</b>				
Educator	3	1616.83	2.08	ns
Group	1	3452.16	4.46	ns
Interaction (Groups by Educator)	3	643.10	.83	ns
Error	18	774.86		
<b>Compliance: Bubbles</b>				
Educator	3	1271.61	1.33	ns
Group	1	3689.17	3.86	ns
Interaction (Group by Educator)	3	1223.90	1.28	ns
Error	18	955.74		
<b>Compliance: Paper</b>				
Educator	3	17.33	.02	ns
Group	1	4598.88	4.17	ns
Interaction (Group by Educator)	3	1190.38	1.08	ns
Error	18	1101.90		

(Table 14).

The mean percentage gains made by the children in skills can be seen in Table 15. When L.S.D. tests were performed there was a significant difference,  $p < .05$ , between the developmental training group and both the attention control group and no training control group but no difference was found between the attention control group and the no training control group.

There was no difference among the three training conditions in percentage gains made over the month for either the Bayley mental scores or for the Bayley motor scores (Table 14).

In order to evaluate whether all children in the study progressed as much as or more than a normally developing child would, a comparison was made between the Bayley mental and motor scores received after one month of home program treatment to the increase in scores expected for a normally developing child over a one month period of time. All but seven children in the study gained in one month as much as or more than would be expected of a normally developing child of the same age. The difference between real gains for these delayed children and expected gains if they were developing at a normal rate was significant for both the Bayley mental scores and for the Bayley motor scores, L.S.D. test,  $p < .05$ . These results indicate that these delayed children made even more gains in a one month period than would be expected of normally developing children.

These findings suggest that differences between real scores achieved and expected scores may be a more meaningful measure of change for this sample than difference between pre and posttest scores. Percentage difference between scores expected from a normally developing

Table 14

Multivariate Analysis of Variance Summary Table

Effects of Treatment (developmental training, attention control and control) on Developmental Gains (percentage Bayley mental gains, percentage Bayley motor gains and percentage skills gained)

Treatment Condition	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>
MANOVA F - Pillais	16,60		2.15	<.02*
ANOVA F's				
Skills Gained	2	5564.10	10.25	<.01**
Error	36	523.07		
Motor Gains	2	114.80	2.05	ns
Error	36	55.89		
Mental Gains	2	36.24	.35	ns
Error	36	103.85		

\* <.05.

\*\* <.01.

Table 15

Mean Values of Developmental Gain Measures (percentage Bayley mental gains, percentage Bayley motor gains and percentage skills gained) by Treatment Group (developmental training, attention control and control)

Group	Developmental Training	Attention Control	No Training Control
Percentage skills Gained	83.07	56.92	43.07
Percentage Bayley Motor Gains	12.39	6.02	7.78
Percentage Bayley Mental Gains	8.20	8.44	7.47



child after one month and actual scores obtained by the delayed child after one month of home program treatment takes into account the age of the child as well as the developmental level of the child prior to the intervention. This is because the expected number of gains in scores on the Bayley mental and motor scale over a one month period of time varies with the age of the child.

When the raw data were examined using a matched subjects design it appeared that subjects in the developmental training group consistently made more gains on the motor subscale of the Bayley than did subjects in the other two groups. According to inspection of the raw data the scores were skewed and the homogeneity of variance test was significant, Cochran's  $C = .77$ ,  $p < .001$ . Since two assumptions for the use of a parametric test were violated the nonparametric statistical test, Friedman's Test of Matched Groups was used for this analysis. According to the Friedman Test there was a difference among the three treatment conditions,  $\chi_r^2 = 7.55$ ,  $p < .05$ . When pairs of groups were examined using the Wilcoxon Signed Ranks Test there was a significant difference between the subjects in the developmental training group and no training control group,  $t = 15$ ,  $p < .05$ , but no difference between subjects in the developmental training group and attention control group,  $t = 18$ ,  $p < .07$ , nor between the attention control group and no training control group,  $t = 27$ .

Almost all children in the study made more mental and motor gains on the Bayley Test of Infant Development than would be expected of a normally developing child and children in the developmental training group made more motor gains than children in the no training control group. No differences were found among the groups on the mental scale

of the Bayley Test of Infant Development.

Relationship Between Compliance Measures and Developmental Gains

An examination of the relationship between the compliance measures and developmental gains made by the children was performed using the Pearson Product Moment Correlation Coefficient. As can be seen in Table 16, there was a significant positive relationship between two objective compliance measures (bubble used and journal recording) and specific skills gained by the child. There were no significant correlations between the three compliance measures and Bayley mental and motor gains. These results indicate that higher compliance is related to greater gains in specific skills.

Summary of Results

No differences were found among the groups or between the two populations for any control variable prior to the intervention. Caregivers of the developmental training group were the most compliant, according to the two measures of the percentage of blow bubbles used during treatment and for journal recording of the number of treatment sessions implemented by the end of the intervention. These same caregivers demonstrated the greatest knowledge of development and the highest recording of developmental progressions in their children. The children of caregivers who received the developmental training demonstrated the greatest gains in the specific skills they were taught by the home program and demonstrated more motor gains on the Bayley Test of Infant Development when compared to the number of gains expected in a normally developing child than the children in the no training control group.

The compliance measures which were best able to discriminate among

Table 16

Pearson Product Moment Correlations between the Compliance Measures (percentage bubbles used, percentage papers used and percentage of treatment sessions recorded in journal) and Developmental Gains (percentage Bayley mental gains, percentage Bayley motor gains, and percentage skills gained)

Compliance Measures	Bubbles	Paper	Journal
Developmental Gains			
Skills Gained	.37*	.30	.39*
Bayley Motor Gains	.01	.28	.27
Bayley Mental Gains	-.10	.01	.14

\* $p < .01$  using the Bonferroni alpha adjustment.

the three groups were the measures of journal recording and percentage of blow bubbles and papers used. Caregivers who were in the developmental training group were the highest compliers for all educators who trained them. As well, when all caregivers were considered, caregivers who showed the least responsivity to their children prior to treatment used the most blow bubbles during treatment.

Finally, there was a relationship between caregiver compliance and children's gains of specific skills. This relationship suggests that higher compliance by caregivers is related to greater gains in specific skills by the children.

## CHAPTER IV

### DISCUSSION

This study demonstrated that caregivers who were taught to observe and to recognize developmental gains became more compliant in implementing home treatment programs for their developmentally delayed children. A more important finding was that the children of caregivers who received this developmental training learned significantly more of the skills prescribed in the home program, when compared to the children of caregivers in the other two groups. The caregivers in the developmental training group acquired significantly more developmental knowledge and recorded more progressions in their children than did the other caregivers. It is not clear, however, whether caregivers in the developmental training group learned to recognize more progressions and/or simply recorded accurately the developmental progress which their children had made. The specific training program evaluated in this study, however, was successful in improving parental compliance which in turn resulted in an increased rate of child development.

#### Effectiveness of the Training Program on Compliance

The training program used in the current study effectively increased compliance in two out of three objective compliance measures (use of bubbles and journal recording). In the third objective measure (use of paper) a tendency to improve compliance was demonstrated. For each measure (bubbles and journal) the average level of compliance was highest in the developmental training group with no difference in compliance levels observed between the two control groups (attention control and

no training control):

Paper use may have been an unreliable measure of compliance because consumption of paper depended on whether the type of exercise prescribed called for the destruction of a sheet of paper so that it could not be reused and/or on whether the child succeeded in performing the exercise. Some caregivers, thus, may have reused sheets of paper adding a large degree of 'error' variance to this dependent measure.

One other measure, the subjective compliance questionnaire, did not differentiate among the groups. In general, all caregivers knew what they should be doing in the home program and felt that they had complied to a great degree. The inability of the compliance questionnaire to discriminate between compliers and noncompliers corresponds to previous findings (Mayo, 1979). As found in this study, questionnaires and verbal reports completed by subjects tend to overestimate the subjects' rate of compliance in comparison with more objective methods (Gordis, Markowitz & Lillienfield, 1969).

In summary, it appears that education in child development and training in observation and recognition of developmental progress were effective in motivating caregivers to become more compliant, as indicated by the two most reliable objective measures of compliance. This finding is in accord with the medical compliance literature, which indicates that a combination of education and behavioural methods (generally social reinforcement) can increase compliance (Sackett & Haynes, 1976).

The caregivers in the developmental training group appear to have become more motivated than the other caregivers in implementing the home treatment program. Motivational theory assumes that commitment to a home program depends on the belief that the goal (the child's gains)

associated with the program is attainable (Klinger, 1975; Rotter, 1972). Repeated failure of efforts to attain the desired end will lead to abandonment of that goal. A possible solution to this problem involves teaching the caregiver of a delayed child to discriminate and accept more subtle displays of improvement in development. Caregivers in the present study were taught to recognize each child's minute developmental change as an achievement. It seems likely that as a child exhibited the first developmental change, his caregiver would realize that the next developmental change was attainable and would thus continue to strive for the final goal which was a specific developmental milestone. In other words, each caregiver appears to have been reinforced continually in his/her pursuit of a goal by recognizing small improvements in his/her child. Thus caregivers continued to carry out the home program.

This type of training program may be essential for caregivers with delayed children because these children take a long time to achieve specific developmental milestones. However, it must be appreciated that the children are continually drawing closer to these goals during a treatment process.

As long as a caregiver continues to recognize changes in his/her child, this reinforcement is intrinsic because it is inherent in the pursuit of the goal. It appears, in this study, that the reinforcing value of recognizing the children's gains was indeed internalized to some extent. This intrinsic reinforcement apparently helped to maintain compliance in the developmental training group over the one week period following cessation of visits by the educators. The attention and social reinforcement (extrinsic reinforcement) provided to the attention control group failed to maintain caregiver compliance after the cessation

of educators' visits after three weeks of home program implementation. This conclusion is based on the fact that no differences were observed between the developmental training group and the attention control group in journal recording after three weeks of home program implementation. There was a significant difference, however, in journal recording after one month of program implementation, indicating that journal recording was greatly reduced for the attention control group but not for the developmental training group after the end of the training intervention. Home program maintenance presumably decreased in parallel with journal recording. These results support Deci's (1972) findings that intrinsic reinforcers are more effective than extrinsic reinforcers in maintaining behaviour. If these findings are reproduced in further studies, long term follow-up would help ascertain whether compliance in child treatment is maintained over time.

#### Effectiveness of the Training Program on Caregivers' Learning

Before it can be concluded that the increased compliance was due to the training program, it is important to demonstrate that the caregivers who received developmental training actually did learn the material presented to them. As predicted, caregivers who received developmental training gave correct answers to significantly more questions concerning knowledge of developmental processes and also recorded significantly more developmental gains made by their children, than did caregivers in either of the other two groups. It is not known from these results whether caregivers in the developmental training group demonstrated a greater ability to recognize developmental gains in their children by recording more gains and/or simply recorded accurately, the increased number of progressions made by their children. This is an important



point that needs to be clarified in a further study which would adjust for actual gains made by the children. This adjustment would be difficult because many of the gains recorded by caregivers in the developmental training group were qualitative in nature (i.e. holding head more steadily, improved sitting posture, crawling with better coordination). These qualitative progressions in children, though important, are often not identified in standardized developmental test results. It can only be concluded, therefore, that the developmental training was successful in teaching caregivers about developmental processes.

Caregivers who received the developmental training did not learn to predict performance more accurately or to observe their children's behaviour more accurately than caregivers of the other groups. This could have been due to an inadequacy in the performance prediction task and in the accuracy of the observation record form. Most caregivers received very high scores initially for both performance prediction and accuracy of observation so there was little room for improvement. Future tasks and record forms might include many more items and also include more difficult items.

Both groups receiving a teaching intervention learned their respective readings equally well. It cannot be suggested, therefore, that the caregivers receiving child management education demonstrated less compliance either because they did not receive instruction, or because they did not learn anything. It must be concluded that what they learned was not appropriate for increasing compliance. This interpretation may not be true, however, for all caregivers in this group. The education may have been appropriate for the three caregivers in the

child management education group whose children had behaviour problems. Training of such children so they are easier to manage may have made them more rewarding than previously and thus made home program implementation more satisfying for their caregivers. The three caregivers whose children were management problems were in fact high compliers.

Variables Other than Group Training which Influenced Compliance

Caregivers in the developmental training group included both low (less than 40%) and high compliers. Although it was important to try to determine which variables identified caregivers who were highly influenced by the developmental training program and those who were not, no variables were found to be significantly related to high and low compliance.

Since only two caregivers invited refused to enter the study, it is safe to assume that in this study there was a good cross-section of the various motivational levels of caregivers. When all subjects are considered, a single variable, initial maternal responsivity, was found to be negatively related to compliance (use of bubbles). This finding was marginally supported in the developmental training group alone and suggests that the less responsive caregivers demonstrated greater use of the bubbles.

Further studies are needed, however, to verify this finding and then to clarify it. Research is necessary to try to gain greater understanding of home environment conditions and of caregiver-child relationships which are optimal for gaining caregiver compliance and for encouraging child development. It may be that those caregivers who usually relate poorly with their children felt more comfortable and even welcomed the opportunity to become more involved with their children

when given a concrete structure such as a home program to follow.

It was found for all educators that caregivers in the developmental training group complied more than those in the child management education group. No single educator managed to obtain greater compliance from caregivers than any other educator.

Variables which might affect compliance such as maternal education (Evault, Cohen & Harmatz, 1972), age of the child (Davidson & Schrag, 1969), and extent of delay (Mayo, 1979) were not related to the compliance measures in this study.

#### Comparisons of Child Developmental Gains

The main reason for training parents to observe and recognize developmental progress and to teach their delayed children was to help these children gain in appropriate sequential development and in specific skills. The children of the caregivers who received the developmental training did develop significantly more specific skills than did the children in the other two groups. These increased gains appear to be the result of the caregivers' increased compliance and/or their increased effectiveness as teachers.

Initial examination of average motor gains on the Bayley Test of Infant Development suggested that children of caregivers in the developmental training group had made more gains than those in the other groups. It would be expected that differences would show first on the motor scale of the Bayley Test rather than on the mental scale because most of the training concerned motor skills. This apparent difference between the groups was not statistically significant. When actual motor gains achieved by the child versus expected gains of a normally developing child were compared among the groups, however, the children in the

developmental training group made significantly more motor gains than did children in the no training control group, and there was a marginal difference when these children were compared to the children of the attention control group. It may be, therefore, that differences between actual scores achieved and expected scores is a more meaningful measure of change for this sample than pre and posttest difference scores. The expected number of gains in scores on the Bayley motor scale over a one month period of time varies with the age of the child. Therefore, the percentage difference between the scores expected from a normally developing child and scores obtained by the delayed child takes into account the age of the child as well as the developmental level of the child prior to the intervention.

It was also found that there was a positive relationship between high compliance and the number of specific skills gained by the children. These results indicate that the greater the compliance by caregivers the higher the number of specific skills achieved by the children. It may be that increased implementation of a home program results in improved developmental gains.

There was no difference in the percentage of mental gains obtained on the mental scale of the Bayley Test of Infant Development. Similar results were found in a previous study. Radin (1972) introduced a parent intervention program for disadvantaged kindergarten children. At the end of the study there was no difference in IQ levels between children whose parents had been trained to help them and controls who received no extra parent help. One year later, however, there was a significant increase in IQ in children receiving trained parent help when compared to controls. The reason for the lack of mental

differences in the present study may be that one month is too brief a period for differences to be clearly established among the groups. A future study providing training over a longer period of time and/or including a follow-up measurement procedure would help establish whether or not mental effects are detectable at a later date.

Each group in this study received a home program, and therefore the effectiveness of home treatment per se could not be established definitively. It was of interest to the researcher, however, to establish whether these delayed children made as many or more developmental gains on the Bayley Test of Infant Development than would be expected in a one month period for a normally developing child. Actual gains were significantly higher than expected gains when all children were considered, for both the motor index and mental index of the Bayley test. These results could not be due to test-retest unreliability. There should be as many changes in the reverse direction as in the progressive direction if differences seen in the present study were due to test-retest unreliability. There may have been, however, some improvement as a result of the pretest exposure and as a result of the tester having better knowledge of the children. It would not be expected that the amount of learning in delayed children would be measureable simply as a result of exposure, since the literature suggests that these children need extra stimulation in order to achieve their potential development (Aronson & Follstrom, 1977; Scherzer, Mike & Ilson, 1976; Williams & Scarr, 1973). These test-retest improvements were therefore accepted as being the result of the increased stimulation of the home treatment program. The indication that treatment programs can influence development of delayed children is supported by

previous findings (Bidder, Bryant & Gray, 1974; Connolly & Russel, 1976; Findlay, 1979; Scarr-Salapatek & Williams, 1973; Sherzer et al., 1976) although there is also evidence to the contrary (Piper, 1978; Wright & Nicholson, 1973).

#### Conclusions and Research Suggestions

The results of this study may have important implications in monitoring and in improving the efficacy of treatment programs for developmentally delayed children. It appears that a home program with a one month follow-up as now provided by many occupational therapists is less than optimally effective. Caregivers in the control group who were treated in this manner were compliant on the average less than 40% of the time. Telephone reminders did not appear to be effective since caregivers would say that they were having no problems with the program but their children gained only 43% of the skills in which they were being trained. Home visits to provide social reinforcement and advice on implementation of the home program (attention control group) did not significantly increase compliance. Compliance in this group was 40%, and only 57% of the skills were achieved by these children. Caregivers, however, who were trained to recognize developmental progress in their children showed significantly greater compliance when compared to caregivers of the other two groups, on the average complying with the instructions 67% of the time. Even more important is that the children of these caregivers gained 83% of the skills in which they were trained in the home program.

Although it is not known how long the increased compliance will last for the caregivers of the developmental training group, it does appear that developmental training can be used in therapy departments

to increase caregiver compliance and child development. It may not, however, be considered efficient to provide individual training for the many caregivers who need it. A future study is needed to assess the effects of the same training in a group setting. The use of groups over a slightly longer period of training with follow-up refresher courses might be more efficient as well as longer lasting.

In conclusion, caregivers of the developmental training group were the most compliant. In addition, the children of these caregivers demonstrated the greatest gains in the specific skills which they were taught by the home program. They also demonstrated more motor gains than children in the no training control group on the Bayley Scales of Infant Development when compared to the number of gains expected in normally developing children. These improvements appear to have occurred as a result of caregivers being taught to recognize minimal gains in their children, which apparently provided reinforcement to caregivers and thus motivated them to continue to carry out the home program. Caregivers in the developmental training group did learn more specific knowledge of developmental processes. Although caregivers receiving developmental training did record more gains made by their children it could not be clearly established that they learned to recognize more gains in their children than did other caregivers because their children actually made more gains.

The results of the effectiveness of developmental training in increasing caregiver compliance and in increasing their children's developmental progress need to be verified in further studies. Provision of long term follow-up would assess whether compliance in child treatment is maintained over time. It would also be important in

future studies to try to establish the number of caregiver sessions needed in order to provide optimal maintenance of compliance. Providing developmental training programs in a group setting might prove to be as effective or more effective than individual training sessions and would certainly be more efficient. The effects of group versus individual training could be determined in further studies which could also try to determine what parent variables would be predictive of caregivers who were more suitable for group training and those who were more suitable for individual training.

When all caregivers are considered, caregivers who showed the lowest responsivity towards their children prior to the intervention were the most compliant in one measure. Caregivers who relate poorly with their children may feel more comfortable interacting with their children through the concrete structure of the home program. Further research is necessary to try to gain a greater understanding of the specific home environment conditions and caregiver-child relationship variables which have the greatest influence on caregiver compliance and on child development.

Finally, all children achieved more appropriate gains on the mental and motor scales of the Bayley Test of Infant Development than would be expected of a normally developing child. These findings suggest that the increased stimulation provided by the home program did result in an improvement in development.



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APPENDIX A

Reason For Delay of Child in Each Group

Group	Experimental	Attention Control	Control
Reason For Delay			
Unknown etiology (without prematurity)	6	2	4
Unknown etiology (with prematurity)	1	4	2
Failure to thrive	1	2	1
Anoxia at birth	2	1	3
Deafness	2	1	0
Seizures	1	2	2
Microcephalous	0	1	1

APPENDIX B

An Example of the Home Program

1. Encourage fine motor coordination (fine finger movements) by having \_\_\_\_\_ rip the paper into strips. Try to get her to rip the paper holding the paper between her thumb and fingers.
2. Try to get \_\_\_\_\_ to place at least six beads into a container.
3. Encourage fine hand movements by having \_\_\_\_\_ break the bubbles after you blow them. Try to get her to poke them out with one pointed finger.
4. Try to get \_\_\_\_\_ to pair sound with objects. Present an object and label the object.

i.e. show a ball,

say ball,

\_\_\_\_\_ says ba,

say "That is right ball."

Present objects for which \_\_\_\_\_ already knows the sound.

i.e. b for bottle, ball, by,

m for mommy,

wa for water.

5. Try to help \_\_\_\_\_ to stand alone for one minute.

Use a corner or a wall. Stand child with back against corner, give the child a toy to hold. Encourage child not to lean against wall but to stand independently.

Do each activity once every day. Try to get \_\_\_\_\_ to perform each activity five times. Please use a new sheet of paper every day and put the paper and bubbles in a safe place so they are used only for the home program.

APPENDIX C

Instructions for the Use of the Journal

This journal is to be used to facilitate the development of infant programs for young children. It is necessary to know how many times each exercise was given before a program can be evaluated. Please record, as carefully as you can, in order to help us in this study. Thank you.

You have one sheet of paper for each of the five exercises.

- (1) Each day that you do an exercise circle the number of times the exercise was performed. Mark it on the appropriate sheet of paper for that exercise.
- (2) Circle, as well, the number of times your child was able to complete the exercise successfully.
- (3) Make any comments you may have at the bottom, such as: too difficult, child cried, enjoyed this one, achieved it easily, etc.
- (4) Record any developmental gains you have noted in any possible area of development, not necessarily specific to the home program.

We have given you and your child a number which is at the top of each sheet. We will know that it is your journal by the number, therefore it is not necessary to add either your name or your child's name.

Journal

Number \_\_\_\_\_

Date of Day 1 \_\_\_\_\_

EXERCISE: \_\_\_\_\_

How many times per day did you try the activity with your child?  
Circle the number.

How many times did your child succeed in doing the activity correctly?  
Circle the number.

Day 1.	0	1	2	3	4	5	0	1	2	3	4	5
Day 2.	0	1	2	3	4	5	0	1	2	3	4	5
Day 3.	0	1	2	3	4	5	0	1	2	3	4	5
Day 4.	0	1	2	3	4	5	0	1	2	3	4	5
Day 5.	0	1	2	3	4	5	0	1	2	3	4	5
Day 6.	0	1	2	3	4	5	0	1	2	3	4	5
Day 7.	0	1	2	3	4	5	0	1	2	3	4	5
Day 8.	0	1	2	3	4	5	0	1	2	3	4	5
Day 9.	0	1	2	3	4	5	0	1	2	3	4	5
Day 10.	0	1	2	3	4	5	0	1	2	3	4	5
Day 11.	0	1	2	3	4	5	0	1	2	3	4	5
Day 12.	0	1	2	3	4	5	0	1	2	3	4	5
Day 13.	0	1	2	3	4	5	0	1	2	3	4	5
Day 14.	0	1	2	3	4	5	0	1	2	3	4	5
Day 15.	0	1	2	3	4	5	0	1	2	3	4	5
Day 16.	0	1	2	3	4	5	0	1	2	3	4	5
Day 17.	0	1	2	3	4	5	0	1	2	3	4	5
Day 18.	0	1	2	3	4	5	0	1	2	3	4	5
Day 19.	0	1	2	3	4	5	0	1	2	3	4	5
Day 20.	0	1	2	3	4	5	0	1	2	3	4	5
Day 21.	0	1	2	3	4	5	0	1	2	3	4	5
Day 22.	0	1	2	3	4	5	0	1	2	3	4	5
Day 23.	0	1	2	3	4	5	0	1	2	3	4	5
Day 24.	0	1	2	3	4	5	0	1	2	3	4	5
Day 25.	0	1	2	3	4	5	0	1	2	3	4	5
Day 26.	0	1	2	3	4	5	0	1	2	3	4	5

Day 27.	0	1	2	3	4	5	0	1	2	3	4	5
Day 28.	0	1	2	3	4	5	0	1	2	3	4	5
Day 29.	0	1	2	3	4	5	0	1	2	3	4	5
Day 30.	0	1	2	3	4	5	0	1	2	3	4	5
Day 31.	0	1	2	3	4	5	0	1	2	3	4	5
Day 32.	0	1	2	3	4	5	0	1	2	3	4	5
Day 33.	0	1	2	3	4	5	0	1	2	3	4	5
Day 34.	0	1	2	3	4	5	0	1	2	3	4	5
Day 35.	0	1	2	3	4	5	0	1	2	3	4	5

Please record any comments you have about the activity and your child's reaction to it.

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Please record all developmental changes you have noted in your child.

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APPENDIX D

Quiz For Readings on Developmental Training

Choose the most correct answer which you have obtained from your readings.

1. A behaviour or response is:
  - a. anything we think or do.
  - b. any action of a person.
  - c. an idea we want to present.
  - d. what is happening around us.
  - e. a gesture.
  
2. Consequences which strengthen behaviours are called:
  - a. punishers.
  - b. ignoring.
  - c. time out.
  - d. a smile.
  - e. reinforcers.
  
3. Prompting or cueing can be:
  - a. weakening to behaviours they follow.
  - b. encouraging.
  - c. physical or verbal.
  - d. consequences.
  - e. fun.
  
4. Once you have decided upon the behaviour you want to teach, and on the strategy you will use to teach, it is necessary to:
  - a. tell your child what to do.
  - b. stop the baby crying.
  - c. observe what your baby already can do.
  - d. control your own behaviour.
  - e. begin the exercise or activities.

5. One of the most important general teaching ideas includes:
- a. providing consequences for behaviours.
  - b. providing your baby with as many learning experiences as possible.
  - c. being consistent.
  - d. working two hours a day with your baby.
  - e. all of the above.

APPENDIX E

Quiz For Readings on Child Management

Choose the most correct answer which you have obtained from your readings.

Day 1

1. A child will repeat a behaviour:
  - a. after the child has been yelled at about it.
  - b. if it makes the child feel good.
  - c. which gets no response.
  - d. all of the time.
  - e. whenever the child feels like it.
  
2. Consistency means:
  - a. a parent can stabilize the child's emotional life.
  - b. the parent responds to the child.
  - c. when Darlene rings the doorbell sometimes mother goes to the door and sometimes she doesn't.
  - d. absolute predictability of a behaviour.
  - e. both a and b.
  
3. Consistency is important because:
  - a. it makes life easier for the parent.
  - b. it relieves discomfort in the child.
  - c. it helps the child feel safe.
  - d. it is relieving an uncomfortable situation.
  - e. it is not important.



4. Consistency can result in:

- a. preventing tantrums in your child.
- b. no more crying.
- c. a decrease in temper tantrums.
- d. emotional upset in your child.
- e. your child eating a whole meal.

5. Children test out old rules:

- a. because they are naughty.
- b. just for the fun of it.
- c. because there has been a change in environment.
- d. when a change has occurred to see which rules are still in effect.
- e. because parents forgot to enforce the rules.

APPENDIX F

Compliance Questionnaire For Caregivers

This questionnaire is to find out how you feel about the infant home program your child was given. Please answer all questions as best you can. There are no right or wrong answers and everything you say will be kept strictly confidential.

1. In general how satisfied have you been with the instruction you received?

1. \_\_\_ very satisfied
2. \_\_\_ moderately satisfied
3. \_\_\_ neither satisfied nor dissatisfied
4. \_\_\_ moderately dissatisfied
5. \_\_\_ very dissatisfied

2. How friendly do you feel that the instructor who helped you with the program is?

1. \_\_\_ very friendly
2. \_\_\_ moderately friendly
3. \_\_\_ neither friendly nor unfriendly
4. \_\_\_ moderately unfriendly
5. \_\_\_ very unfriendly

3. What were the instructions you were given by your therapist for your child (the home program)?

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4. How often were you told to carry out the exercises?

1. \_\_\_ once a day
2. \_\_\_ once a week
3. \_\_\_ three times a day
4. \_\_\_ three times a week
5. \_\_\_ don't know.

5. In general how often were you able to carry out the instructions?

1. \_\_\_ as prescribed, specify \_\_\_\_\_
2. \_\_\_ less often, specify \_\_\_\_\_
3. \_\_\_ more often, specify \_\_\_\_\_
4. \_\_\_ not at all
5. \_\_\_ don't know.

6. In general how closely did you follow your instructor's advice?

1. \_\_\_ very closely
2. \_\_\_ moderately closely
3. \_\_\_ somewhat closely
4. \_\_\_ not very closely
5. \_\_\_ not at all closely.

7. How likely do you think it is that the treatment you have been given will help your child's development?

1. \_\_\_ very likely
2. \_\_\_ moderately likely
3. \_\_\_ somewhat likely
4. \_\_\_ not very likely
5. \_\_\_ not at all likely.

8. Did following the home program inconvenience you or limit your normal daily activities?

1. \_\_\_ a great deal
2. \_\_\_ a moderate amount
3. \_\_\_ somewhat
4. \_\_\_ just a little
5. \_\_\_ not at all

9. How difficult is it for you to find the time to receive training for the infant home program?

1. \_\_\_ very difficult
2. \_\_\_ moderately difficult
3. \_\_\_ somewhat difficult
4. \_\_\_ not very difficult
5. \_\_\_ not at all difficult

10. Which of the following statements would you agree applies to you about your home program?

1. \_\_\_ my child does not like them
2. \_\_\_ I don't really like doing them
3. \_\_\_ I feel I am helping my child
4. \_\_\_ I enjoy the activity with my child
5. \_\_\_ I forget to do them
6. \_\_\_ I feel the procedures are helping my child
7. \_\_\_ other family members enjoy helping me with carrying them out
8. \_\_\_ my child enjoys the procedures
9. \_\_\_ I don't have the time to do them

10.  I don't think they make any difference to my child.

11.  I don't think my child needs to do any of them.

APPENDIX G

Developmental Knowledge Test

Please read carefully and choose the best answer. Circle the letter.

1. Development is a continuous process that begins:
  - a. as soon as the baby is born.
  - b. as soon as the baby is stimulated by the environment.
  - c. at the time of conception.
  - d. when the baby becomes aware of others.
  - e. both b and d.
  
2. The sequence of development:
  - a. varies from child to child.
  - b. and the rate of development are the same for all children.
  - c. is the same for all children.
  - d. is essentially the same for all children except that some children may miss some parts of the sequence.
  - e. is similar in all children but the rate varies from child to child.
  
3. Johnny will walk when he is one year old if:
  - a. someone practices daily with him from the time he is six months old.
  - b. his nervous system is ready for it.
  - c. he has the appropriate opportunities to practice.
  - d. both b and c.
  - e. all of a, b, and c.

4. Practice is necessary in order for a baby to:
  - a. achieve the highest level or quality of any skill.
  - b. learn to do anything.
  - c. be as good as Daddy wants him to be.
  - d. pass from one developmental stage on to the next one.
  - e. show the parents new activities the baby has learned.
5. Teaching strategies which help your baby learn include:
  - a. observing your child well.
  - b. being consistent.
  - c. consequence and prompting or cueing.
  - d. controlling problem behaviours by ignoring them.
  - e. changing the environment around your child.
6. One reason why it is important to gather information on your child's progress in the home program is:
  - a. to be able to tell your relatives about what your baby is doing.
  - b. to help parents better evaluate the progress you have made in teaching your child.
  - c. to be able to reward your child more effectively.
  - d. to grade your child.
  - e. both b and c.
7. The first step in gaining sitting control is:
  - a. seating self in a small chair.
  - b. sitting while supported with the head steady.
  - c. sitting supported by own hands.
  - d. sitting while supported by furniture or hands for at least 60 seconds.
  - e. raising self to sit from the stomach.

8. Walking activities begin with:
  - a. walking with support.
  - b. walking backwards.
  - c. cruising (holding on to furniture).
  - d. beginning stepping movements when held fully supported at chest.
  - e. walking while led by one hand.
9. Fine motor activities include:
  - a. visual following.
  - b. reaching and grasping behaviours.
  - c. object manipulation.
  - d. problem solving skills.
  - e. all of the above.
10. A young infant usually shows the ability to hear by:
  - a. listening to the mother's voice.
  - b. either quieting or becoming more active when a bell is rung.
  - c. starting to make sounds.
  - d. turning the head towards sounds.
  - e. imitating sounds.
11. Once a baby can hold two objects, one in each hand, the next thing the baby can do is:
  - a. throw a cube.
  - b. grasp the feet.
  - c. transfer an object from one hand to the other.
  - d. grasp an object voluntarily.
  - e. put an object in a cup.



12. The first sign of expressive language is:
  - a. vocalizing, babbling, or cooing.
  - b. laughing.
  - c. saying dada, mama.
  - d. expressing wants without crying.
  - e. crying due to a cause.
  
13. After a child has learned to play peek-a-boo the next game the child is likely to learn to play is:
  - a. responding to self-image in a mirror.
  - b. playing ball.
  - c. playing pat-a-cake.
  - d. copying household activities.
  - e. parallel play.
  
14. The first step in problem solving for a child is to:
  - a. look for a fallen object.
  - b. uncover a toy.
  - c. lift an inverted cup.
  - d. unwrap an object.
  - e. lift a lid off a box.
  
15. Problem behaviours, according to your readings:
  - a. are impossible to control.
  - b. must be stamped out.
  - c. can be controlled by ignoring the behaviour.
  - d. are no fun.
  - e. get on your nerves.

APPENDIX H

Performance Prediction Task

0-18 months

Number \_\_\_\_\_

To be filled out by the assessor previous to testing in response to caregivers' answers

Date \_\_\_\_\_

Before I test your child, I would like you to answer a few questions about how you think your child is going to do on this test. The following items, amongst others, are going to be used for the test. I will use cubes, a cup, paper, a ring, a box, a car and pegs and pegboard.

First I want to ask you:

yes or no

1. a. Do you think most other children the same age as your child will reach for a cube? \_\_\_\_\_  
b. Will your child reach for the cube? \_\_\_\_\_
2. a. Will most other children \_\_\_\_\_'s age put a cube in a cup? \_\_\_\_\_  
b. Will your child? \_\_\_\_\_
3. a. Will most children your child's age put 3 cubes in a cup? \_\_\_\_\_  
b. Will your child put 3 cubes in a cup? \_\_\_\_\_
4. a. Will most children your child's age put 9 cubes in a cup? \_\_\_\_\_  
b. Do you think that your child will put 9 cubes in a cup? \_\_\_\_\_
5. a. Do you think that most children \_\_\_\_\_'s age will pick up a cup by the handle? \_\_\_\_\_  
b. Will your child pick up a cup by the handle? \_\_\_\_\_

yes or no

- 6. a. Do you think that most children the same age as your child will play with paper, crumple or rattle it?
- b. Do you think that your child will?
- 7. a. Will most children \_\_\_'s age pick up and pull a string attached to a ring in order to get hold of the ring?
- b. Will your child pull the string to get hold of the ring?
- 8. a. Will most children the same age as \_\_\_ uncover this box?
- b. Do you think that your child will?
- 9. a. Do you think that most children \_\_\_'s age will push a car?
- b. Do you think that your child will?
- 10. a. Will most other children \_\_\_'s age place one peg in the board?
- b. Do you think that your child will?
- 11. a. Do you think that other children \_\_\_'s age will place all pegs in?
- b. Will your child place all pegs in?
- 12. a. Do most children your child's age say two words?
- b. Does your child say two words?
- 13. a. Will most children your child's age name one of ball, watch, pencil, scissors, cup?
- b. Do you think that your child will name one of those objects?

14. If "4" is the score of the average child in terms of his attentiveness and co-operativeness in this testing situation, where do you think your child's behaviour would come on a scale with 1 extremely unco-operative and inattentive and 7 extremely co-operative and attentive?

1      2      3      4      5      6      7

15. Will your child attempt all items? \_\_\_\_\_ yes or no.

APPENDIX I

Accuracy of Observation Record Form

Date: \_\_\_\_\_ To be filled out by caregiver when observing infant assessment

ITEM	ATTEMPTS ITEM ✓ (or) -	COMPLETES ITEM CORRECTLY ✓ (or) -	BEHAVIOUR									
			1	2	3	4	5	6	7			
reaches for cube			unco-operative	inattentive	co-operative	attentive						
puts a cube in cup			1	2	3	4	5	6	7			
how many cubes		Circle if attempts	Circle if completes									
picks cup up by handle	3	9	3	9								
plays with paper			1	2	3	4	5	6	7			
picks up string on ring			1	2	3	4	5	6	7			
uncovers box			1	2	3	4	5	6	7			
pushes car			1	2	3	4	5	6	7			

ITEM	ATTEMPTS ITEM ✓(or) -	COMPLETES ITEM CORRECTLY ✓(or) -	BEHAVIOUR 1 2 3 4 5 6 7 unco-operative co-operative inattentive attentive
places 1 peg in board			1 2 3 4 5 6 7
places all pegs in board			1 2 3 4 5 6 7
says two words			1 2 3 4 5 6 7
names one object of watch, ball, pencil, scissors, cup			1 2 3 4 5 6 7

APPENDIX J

Consent Form

I, \_\_\_\_\_ the parent  
or guardian of the child \_\_\_\_\_, give consent to  
the investigative procedure to be carried out under this research  
project.

I am aware that this is a study on the effects of home programs provided  
by the Occupational Therapy Department of the Montreal Children's  
Hospital. This study will involve, (two), 1<sup>1</sup>/<sub>2</sub> hour sessions in my home  
with myself and my child for assessment. I also agree to carry out the  
home program daily for one month and to keep a record of exercises done.  
I also agree to participate, if requested, in three additional one hour  
sessions with myself and spouse (if possible), in my home. I under-  
stand that the findings may be of benefit to my child and/or other  
children. I understand that if the results of this project are  
published no parent or child will be identified by name.

Parent \_\_\_\_\_

Witness \_\_\_\_\_

Date \_\_\_\_\_

APPENDIX K

Protocol for Educators in Developmental Training

The instructions given to the educators were as follows:

Week One. Talk about the readings. Ask each set of caregivers if they have tried out the procedures on their delayed child. Obtain examples. Praise them for completing the reading and for applying the principles learned in the readings. Give each set of parents the quiz.

Ask caregivers to read the second set of readings and explain that these will be a little bit different. Explain further that the first set of readings was designed to help them be able to work better with their child on the home program and that the second set of readings will help them to understand their child better in terms of their child's development and to understand the meaning of many new steps in development. Ask if they could decide together from the next set of readings at what developmental level their child is now functioning. Ask further if they could be ready together to tell you what is likely to be the next developmental step their child will perform, and to be ready to look for that step in order to observe progress in their child.

Look at the journal and find out if it was easy or difficult to carry out the home program. Praise the caregivers for keeping a record and for carrying out the home program. You can give them hints on how to make it easier to carry out the program, giving examples as described in the child management visit protocol. About 45 minutes should be spent on the readings and 15 minutes on the home program.

Week Two. Answer any questions on the readings. For each developmental area in the readings try to work out with the caregivers



what they think is their child's developmental level. Point out if the caregivers have not already determined it, what is likely to be achieved next by the child. Ask caregivers to look for these steps. Explain qualitative differences in development (i.e. smoother movements, better head control-wobbles less, greater enjoyment of practising that developmental step on the part of the child, etc.). Provide ideas of qualitative differences with regard to the developmental levels the caregiver feels that their child is at right now. Explain that these qualitative differences can be as important as going on to a new stage and should be recognized as developmental progress. Try to help caregivers realize that there can be much meaning in each little change in their child and that each small change in either quality or quantity of movement, in problem solving or in language or self-help skills, can be helpful and be as important as the large milestones such as sitting, walking, running and talking. Give the caregivers the quiz.

Ask caregivers to read the third set of readings. Explain that this set of readings will be similar to the last set but will include different areas of development. Give the caregivers the same instructions as given in week one with regard to the developmental readings.

Look at the journal and ask them about the home program just as on Day 1.

Week Three. Follow the protocol of week two.

Protocol For Educators in Child Management

Week One. The instructions to the educators were as follows: Talk about the readings. Ask caregivers if they have tried out any of the techniques on their delayed child or on other children in the family. Obtain examples. Praise them for completing the readings and for applying the principles learned from the readings. Answer any questions they may have about the readings. Give the caregivers the quiz.

Look at the journal, ask them if it was easy or difficult to carry out the home program. Praise the parents for keeping a record and for carrying out the home program.

You can provide them with hints on how to make it easier to carry out the home program; for example, by finding a time when the other children are reading, at school or watching a good T.V. program; by finding a set time in the day so they can do the program every day; or by working the program into the daily schedule by practising rolling over just after diaper change or language stimulation after feeding or in the bath.

About 45 minutes should be spent on the readings and 15 minutes on the home program.

Be generally sociable so that the caregivers enjoy the visit.

Ask the caregiver to read the second set of readings for the next week and prepare similar questions. (Carry out the same procedure every week.)

APPENDIX L

Analysis of Variance Summary Table  
Comparisons Among Groups on Pretest Measures

Pretest Variables	<u>MS</u>	<u>F</u>	<u>p</u>
Age in months	.30	.00	.99
Error	.30		
Delay			
Bayley mental raw scores	185.62	.18	.83
Error	1031.22		
Bayley motor raw scores	43.41	.18	.83
Error	241.17		
Sex	.10	.39	.68
Error	.25		
Caregiver education	4.33	.43	.65
Error	10.07		
Caldwell Home Inventory	4.38	.12	.88
Error	36.50		

Note. The degrees of freedom for all variables are 2,36.

APPENDIX M

T Test Comparison Between the Two Populations, Lethbridge  
Rehabilitation Centre and Montreal Children's Hospital

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Pretest Variables

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	M	SD	t
Sex	7.07 (12.04)	4.37 (7.29)	2.38
Age	24.6 (19.9)	7.02 (9.44)	.08
Delay	7.07 (11.58)	4.36 (6.94)	2.03
Caregiver Education	11.59 (11.17)	5.79 (2.97)	1.61
Bayley MDI (raw scores)	105.87 (102.83)	30.18 (32.30)	.29
Bayley PDI (raw scores)	46.13 (43.71)	16.62 (14.50)	.51
Caldwell Home Inventory	35.6 (33.6)	6.37 (5.58)	.98

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Note: Montreal Children's means and standard deviations are in brackets.