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# The effect of a parent training program on language delayed children

Lynn Krupa  
*Portland State University*

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AN ABSTRACT OF THE THESIS OF Lynn Krupa for the Master of Science in Speech Communication presented February 6, 1990.

Title: The Effect of A Parent Training Program on Language Delayed Children.

APPROVED BY THE MEMBERS OF THE THESIS COMMITTEE:

[REDACTED]

Mary E. Gordon, Chair

[REDACTED]

Joan McMahon

[REDACTED]

Ruth Falco

Numerous studies have reported the efficacy of parent training programs in improving the language skills of LD pre-school children. However, most of these studies have used poor methodology, required extensive training of highly structured treatment techniques, and restricted their subjects to MR children.

The purpose of this research project was to determine whether a child-centered parent training program requiring minimal training would increase the language skills of LD

pre-school children who have normal receptive language. Seven experimental subjects and 6 control subjects were randomly selected from a pool of middle-class families who answered a newspaper advertisement. The parents of the experimental group received 3 individual training sessions over a 3-month period. They were instructed to spend 15 minutes a day, 5 days a week, for 3 months, in a free play situation with their children using the language stimulation techniques they had learned, i.e., parallel talk, description, self-talk, and expansion. To eliminate a possible "halo effect" from the attention given the children in the experimental group, the parents in the control group were instructed to spend 15 minutes a day, 5 days a week, for 3 months, playing individually with their children.

To measure language growth, this researcher elicited pre-treatment and post-treatment language samples from all 13 subjects. A multivariate analysis of variance revealed no significant differences between the experimental and control groups on any of the variables examined, i.e., total number of utterances, mean length of utterance, number of different word roots, number of one-word utterances, number of two-word utterances, and number of utterances of three or more words.

Despite a lack of significant differences between the experimental and control groups in this study, more research should be done before eliminating indirect language stimulation as an effective parent training program. Further

research should examine larger, more homogeneous samples of LD children and implement more intensive treatment over a longer time period.

THE EFFECT OF A PARENT TRAINING PROGRAM  
ON LANGUAGE DELAYED CHILDREN

by

LYNN KRUPA

A thesis submitted in partial fulfillment of the  
requirements for the degree of

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1990

TO THE OFFICE OF GRADUATE STUDIES:

The members of the Committee approve the thesis of  
Lynn Krupa presented February 6, 1990.



Mary E. Gordon, Chair

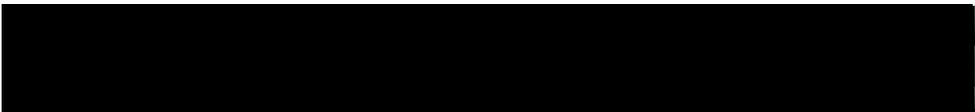


Joan McMahon

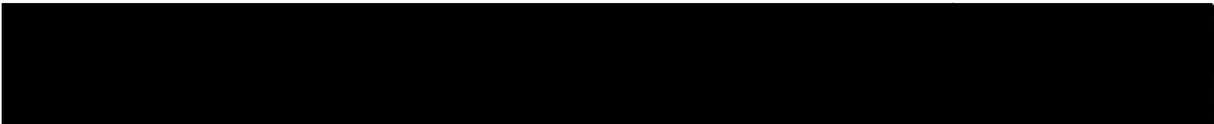


Ruth Falco

APPROVED:



Theodore G. Grove, Chair, Department of Speech Communication



C. William Savery, Interim Vice Provost for Graduate Studies  
and Research

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## CHAPTER I

### INTRODUCTION AND STATEMENT OF PURPOSE

#### INTRODUCTION

This research investigated the ability of a child-centered parent training program to improve the language skills of pre-school children. While most speech-language pathologists (SLPs) believe that parents can be taught to help improve their children's language skills, the research documenting the effectiveness of parent training programs is inadequate (Fey, 1986). Additional research that is more carefully controlled and stronger methodologically needs to be done. Also, most parent training programs which have been developed tend to be complex and require considerable SLP time to administer. Time constraints often prohibit clinicians from using these extensive programs (Girolametto, Greenberg, and Manolson, 1986; Williams, 1986). Instead, parents are trained in a haphazard fashion, if at all. To encourage clinicians to use parent training successfully, simple and effective methods need to be developed.

There are many potential advantages to teaching parents how to work with their language delayed (LD) children. Most parents are personally interested in their children and motivated to help. Parent training may help them accept their

child's handicap and deal with it in a more positive manner (Girolametto et al., 1986; Superior and Lelchook, 1986). Also, parents spend more time with their child than the clinician, have access to powerful reinforcers in the natural environment, and can provide meaningful models consistently and frequently (Girolametto et al., 1986). Some researchers believe that parent input is critical in achieving carryover in the home environment (Superior and Lelchook, 1986). If parents are taught how to improve their child's language skills, they can ensure that the new skills are practiced at home. Besides helping with carryover, parent training can increase the amount of language intervention the child receives. Most pre-school children do not receive language intervention because it is too costly or caseloads are too large. Those who do receive intervention are usually seen by a SLP for 30 minutes one or two times a week. If parents are trained to help with intervention, the amount of treatment the child receives will increase.

Indirect language stimulation (ILS) was the child-centered parent training approach chosen for this study. It is short, simple, and easy for busy SLPs to teach to parents. It is widely used among clinicians who work with pre-school children (Girolametto et al., 1986; Weybright and Tanzer, 1986). More and more researchers are reaching the conclusion that a child-centered approach in which the parent models correct language structures, rather than asking questions and demanding answers, is most effective with pre-school

LD children, especially those who talk very little. According to Girolametto et al. (1986), ". . . new perspectives on language learning indicate that emerging and initial language acquisition can be facilitated by a child-oriented approach" (p. 367). Another advantage of ILS is that it is a natural extension of how parents normally talk to their child and can be carried out at home during normal daily activities.

Although ILS is popular among clinicians and commonly taught to parents, there is little empirical evidence that it is effective in teaching parents how to improve their child's language skills (Fey, 1986). Numerous researchers have studied the efficacy of parent training programs and reported positive results (Carpenter and Augustine, 1973; Cooper, Moodley, and Reynell, 1979; Kemper, 1980; MacDonald, Blott, Gordon, Spiegel, and Hartman, 1974; Seitz and Hoekenga, 1974; Seitz and Marcus, 1976). Few of these studies, however, have used child-centered parent training programs. Of the reported studies investigating child-centered parent training programs, none used a control group and most were either single subject studies or involved only a small number of subjects. Furthermore, most research projects on parent training have been conducted with mentally retarded (MR) children. Little research has been done on the effect of parent training on LD children who exhibit normal receptive language.

## STATEMENT OF PURPOSE

The purpose of this study was to determine whether the language skills of LD children ages 2-4 years will improve if their parents use ILS. The research hypothesis is that there will be a significant difference in language growth between LD children whose parents use ILS and LD children whose parents do not use ILS or any other type of parent training program.

## DEFINITION OF TERMS

The following terms are operational definitions used for this study.

Indirect language stimulation (ILS): a child-centered approach to language intervention (Weybright and Tanzer, 1986). Carried out in the child's natural environment during free play, there is no pressure on the child to talk. The adult uses short, simple sentences to label objects and actions which the child sees. Avoiding questions and commands, the adult lets the child take the lead in the play activity by deciding which toys to play with and/or what to do with them.

Language delay (LD): a deficit in the verbal expression of correct syntactic and semantic forms.

Language growth: an increase in total number of utterances, number of words per utterance, number of different word roots, and mean length of utterance (MLU) in morphemes.

Mean length of utterance (MLU): average length of a child's utterance in morphemes (Shames and Wiig, 1986).

Semantics: vocabulary and meanings associated with words and word combinations (Shames and Wiig, 1986).

Syntax: the combination and ordering of words into phrases and sentences to specify relationship between words. This includes morphology, a study of the smallest meaningful units of language (Shames and Wiig, 1986).

Type-token ration (TTR): obtained by dividing the number of different word roots by the total number of words in a language sample.

## CHAPTER II

### REVIEW OF THE LITERATURE

Three types of parent training programs have been developed, i.e., trainer-oriented, child-oriented, and hybrid (Fey, 1986). Most parent programs are trainer-oriented, using behavioral principles and highly structured treatment techniques. Parents are taught to present a stimulus to the child and elicit a specific response, which is usually rewarded. Because of the highly structured approach, clinicians must spend a great deal of time with the parents, teaching the techniques that will be used with their children. In a child-centered approach, the children take the lead and treatment is indirect. Parents learn less structured methods of increasing their children's language skills. The hybrid approach is a combination of trainer-oriented and child-oriented techniques. While most hybrid procedures occur in naturalistic settings and appear to be child-centered, specific goals are chosen prior to intervention. "Activities are play-oriented and often do not differ significantly from activities commonly performed by parents with their children throughout the day" (Fey, 1986, p. 302). While researchers have been able to show some successes with all three approaches to parent training, the methodology has been generally poor (Howlin, 1984).

## TRAINER-ORIENTED APPROACH

Implementing the direct trainer-oriented approach, Ohio State University researchers studied 6 Down syndrome children who were using only one-word utterances (MacDonald et al., 1974). Three of the children were used as controls; their mothers were not given any training and they did not formally help their children with language development. The mothers in the experimental subject group received 10 language training sessions over a 2-month period. Under clinician supervision, they employed specific techniques with their children. The mothers repeated these procedures at home on a daily basis and tape-recorded the home sessions at least 3 times a week so the SLP could monitor progress. After the 2-month training period, the mothers spent the next 3 months working with their children at home without direct professional supervision. Once a month the professional and the mother met to assess the child's language, review procedures, and develop new rules and procedures for the next month. To measure growth, the researchers administered pre-tests, tests after the 2-month training period, and tests after 5 months to both the control group and the experimental subject group. They found a significant increase in both MLU and grammatical complexity for all experimental subjects and negligible changes for the controls after the 5-month period. Grammatical complexity was defined as "the frequency and range of semantic-grammatical rules" (MacDonald et al., 1974).

The greatest increases occurred with two rules that were trained directly, i.e., action + object and entity + location.

Kemper (1980) conducted a study in a public school similar to the MacDonald et al. (1974) study. While the earlier study used clinicians and parents as trainers, Kemper used only parents and no controls. The subjects were 5 children between 3- and 4-years-of-age who spoke only single-word utterances. The parents attended one training-discussion session per week for 12 weeks. During the same time period, the parents worked at home with their children. They conducted 15-minute speech intervention sessions twice a day, 3 days a week. After the 12-week period, all 5 children were using two-word utterances.

Carpenter and Augustine (1973) used a direct stimulation behavior modification approach with 4 mothers of LD children, but did not include a control group. The mothers were given a 1-1/2-day training workshop where they watched clinicians work with their children and then took over the session. Parents were taught to record the parent stimulus, child response, and reinforcement. After 2-1/2 months of home treatment, a SLP observed the progress of each parent-child group. An increase in correct responses occurred with 3 of the 4 children studied.

Fey (1986) cites numerous other trainer-oriented parent programs that have been successful in accomplishing specific language goals: Bidder, Bryant, and Gray (1975); Forehand and Atkeson (1977); Harris, Wolchik, and Weitz (1981); Hemsley

et al. (1978); Howlin (1981a, 1981b); Kysela, Hillyard, McDonald, and Ahlsten-Taylor (1981).

#### CHILD-ORIENTED APPROACH

Although many researchers have expounded on the value of using an indirect child-centered approach to parent training, only a few have actually conducted experimental studies (Fey, 1986). Seitz and Hoekenga (1974) examined 4 parent-child pairs. No control group was used. The children were severely LD and ranged in age from 26 months to 4 years. For 6 weeks (3 days a week, for 1 hour each day), the parents observed a modeling technique in which the clinician commented and expanded on the child's language during free play. Then the parents worked with their children for 2 weeks (3 days a week). The parent-child pairs were videotaped before and after treatment, during which the parents were instructed to play with their children just as they would at home. The videotapes were transcribed by two observers, and only those verbal and nonverbal behaviors where there was 100% agreement were included in the data summary. The researchers reported that 3 of the 4 children increased the number of utterances and all 4 increased the MLU.

Using identical procedures for the same time period, Seitz and Riedell (1974) conducted a single subject study with a 20-month-old severely retarded child whose parents were trained to use indirect techniques in eliciting language. The parents decreased the number of questions they

asked and increased child-centered play; however, after 8 weeks, the child showed no gains in MLU.

Seitz and Marcus (1976) repeated the single-subject study of Seitz and Riedell (1974) with a different 20-month-old multiply-handicapped, hearing impaired LD child. The focus was on decreasing the mother's verbalizations. The mother and child attended a group parent training program 1 hour per day, 4 days per week for 20 weeks. After spending 2 weeks observing the clinician using modeling techniques with her child, the mother replaced the clinician in the playroom for short periods daily. After each period, the mother received feedback about her interactions with her child. At the end of the 20-week period, a language sample was taken revealing an increase in the child's MLU.

Hetenyi (Hubbell, 1977) trained the mother of a young LD child to use comments and statements that did not require a response and to decrease the number of questions and commands. MLU was not reported, but the child's number of utterances increased from 10% to 56% of total mother/child utterances.

#### HYBRID APPROACH

Some researchers have used a hybrid approach to parent training and reported positive changes in children's language growth (Fey, 1986). Cooper et al. (1979) published probably the most thorough hybrid study to date. It is also one of only a few studies to look at LD children with normal

receptive language. These researchers examined the language growth over 5 years of 69 children ages 2 to 5 years whose parents participated in a training program. Twenty children who received no speech treatment and 11 children who received weekly speech treatment, but did not participate in the parent program, served as controls. Parent training consisted of the SLP modeling the appropriate amount of language with which each individual child could cope and be encouraged to produce. SLP modeling, while the parent watched, occurred every 6 weeks over the 5-year period. Scores on the Developmental Language Programme (Cooper et al., 1979) were used to measure language growth. After 5 years, 70% of the children whose parents received training made accelerated progress. Cooper et al. (1979) defined accelerated progress as more growth than would be expected given the child's chronological age and expressive language age.

Fey (1986) reported several other hybrid programs that have been successful in increasing language growth in children: Cheseldine and McConkey (1979); Culatta and Horn (1981); McConkey, Jeffree, and Hewson (1979).

#### METHODOLOGY

Howlin (1984) reviewed 50 studies involving parents as clinicians. She dismissed 19 studies because of poor methodology, i.e., no baseline information, no reliability data, and/or no objective data recording. She found that the remaining 31 studies employed some type of experimental

manipulation, although the sophistication of the techniques varied. She cautioned that many of these studies, including the 1973 Carpenter and Augustine study (mentioned previously), failed to report specific treatment procedures, making it difficult to determine which components of treatment are important to success. Only 18 parent training programs were control group studies. Of the 18 studies using a control group, Cooper et al. (1979) and Clements, Evans, Jones, Osborne, and Upton (1982) conducted the only studies to include LD children with normal receptive language. The subjects in the other studies were diagnosed as MR, deaf, Down syndrome, disadvantaged, or articulation disordered. While Howlin gave the Clements et al. study high marks for good methodology, she criticized the Cooper et al. study for inadequate statistical analysis and for failing to report IQ, baseline, reliability, and terminal data.

Howlin (1984) concluded that the better the methodology, the more disappointing the results. Stevenson, Bax, and Stevenson (1982) found that both the experimental and control groups in their study showed improvements. Kaufmann and Kozloff (Howlin, 1984), Clements et al. (1982), and Hemsley et al. (1978) found no significant changes in the language of their experimental groups. According to Howlin (1984), "the small sample size of many of the studies cited may account for some of the failures to find significant differences" (p. 218).

## CHAPTER III

### METHODS AND PROCEDURES

#### SUBJECTS

Thirteen children, ages 2.0 to 4.0, from the Portland Oregon, metropolitan area served as subjects for the present investigation. The subjects were selected from a pool of middle-class families who answered a newspaper advertisement.

In addition to meeting the age requirement, the children met the following criteria:

1. Expressive language skills between 6 months and 2 years below chronological age as determined by the Sequenced Inventory of Communication Development-Revised (SICD-R) (Hedrick, Prather, and Tobin, 1984) which was administered by this researcher under the supervision of a SLP, CCC;
2. normal receptive language age as determined by the SICD-R which was administered by this researcher under the supervision of a SLP, CCC;
3. normal bilateral hearing sensitivity at 500 Hz, 1000 Hz, 2000 Hz, 4000 Hz, 6000 Hz at 25 dB as determined by sound field or pure tone audiometry;
4. normal physical development as observed by this researcher and by parent report; and

5. not receiving ILS from their parents or language treatment from a SLP.

Permission form letters were signed by the parents (Appendix A, B). Seven subjects with a mean chronological age of 29.6 months were randomly assigned to the experimental group and 6 subjects with a mean chronological age of 31.1 months were randomly assigned to the control group.

#### EXPERIMENTAL PROCEDURES

##### Pre- and Post-Test Procedures

Each child met with this researcher twice for 30 minutes at a time to obtain individual language samples before and after the treatment period. The subjects were audio-taped in a clinic room while interacting verbally with this researcher during a play session. The tape recorder was placed 2 feet away from the child, who sat on the floor with the researcher. Materials used to elicit spontaneous speech included a doll house with a doll family and plastic furniture, a barn with farm animals, and a variety of trucks and cars. The same setting and toys were used for each child. This researcher used "open-ended" questions, encouraging the child to use more than one-word utterances and a variety of grammatical forms. .

##### Scoring

This researcher was the collector of all language samples at both the Portland State University treatment site

and a private clinic. Total number of utterances, number of words per utterance, percentage of different word roots (TTR), and MLU were determined by hand.

### Examiner Reliability

Interjudge reliability of 89% between this researcher and a student speech-language pathologist was computed on 10% of each transcript. Intrajudge reliability was 92% on 10% of each transcript.

### Parent Training Procedure

Utilizing information from Weybright and Tanzer (1986), this researcher devised the following method of teaching ILS. The parents in the experimental group observed the videotape "Oh, Say What They See" produced by Weybright and Tanzer (1982). This researcher then spent 1 hour individually with each parent practicing the ILS techniques modeled on the videotape:

1. Parallel talk, in which the parent describes out loud what the child is doing;
2. description, where the parent talks about what the child sees;
3. self-talk, or talk about what the parent is doing;
4. expansion, or repeating the child's words with adult grammatical forms; and
5. expansion plus, when the parent expands the child's utterance and then adds information (Weybright and Tanzer, 1986).

This researcher role-played the mother while the mothers individually role-played the children. Then the roles were switched. The parents were given a list and description of the techniques to be used during free play at home with their children (Appendix C). The parents in the treatment group were instructed to spend 15 minutes, 5 days a week, for 3 months, in a free play situation with their children using ILS techniques. They were told to keep the free play limited to parent-child interactions or activities with no one else present in order to eliminate variation caused by a third party. To eliminate a possible "halo effect" from the attention given the children in the experimental group, the parents in the control group were instructed to spend 15 minutes a day, 5 days a week, for 3 months, playing individually with their children. Parents from both groups kept logs and strictly adhered to the interaction requirement. Occasionally parents from both groups would miss a day or conduct 2 play sessions in one day, but this was the exception rather than the rule.

This researcher met individually with the parents of the treatment group twice during the treatment period to encourage adherence to the program. At these times, the parents were observed using ILS techniques with their children. Then the researcher provided feedback about how to improve the use of ILS techniques. The parents of the control group were contacted by phone twice to confirm that they were still spending 15 minutes a day playing with their

children. The period from pre-test to post-test for both the control group and the treatment group ranged from 13 to 15 weeks.

#### DATA ANALYSIS

The total number of utterances and number of words per utterance were computed for each subject's two language samples. Percentage of different word roots (TTR) and MLU were computed for the subjects whose language samples were comprised of at least 50 utterances. Language growth in each measurement from pre-treatment to post-treatment was then calculated. Then the average growth in the experimental group was compared to the average growth in the control group using a multivariate analysis of variance (MANOVA) to determine if there was a significant difference between the two groups.

## CHAPTER IV

### RESULTS AND DISCUSSION

#### RESULTS

The research question asked was whether a child-centered parent training program would increase the language growth of LD pre-school children. Seven experimental subjects whose parents received training and 6 controls were randomly selected from a pool of Portland metropolitan families who answered a newspaper advertisement. A multivariate analysis of variance (MANOVA) was performed on 6 variables to determine if there was a significant difference ( $< .05$ ) between the language growth of the experimental and control groups from pre-test to post-test. Raw data for all subjects are displayed in Appendix D. Means ( $\bar{x}$ ) and standard deviations (SD) for each of the language measures for the two groups are displayed in Table I. The MANOVA revealed no significant differences between the experimental and control groups on all of the variables, i.e., total number of utterances, MLU, TTR, number of one-word utterances, number of two-word utterances, and number of utterances of three or more words.

TABLE I

MEANS, STANDARD DEVIATIONS, AND MANOVA FOR LANGUAGE  
VARIABLES OF EXPERIMENTAL AND CONTROL GROUPS

	Parent Training		No Parent Training		p
	$\bar{x}$	SD	$\bar{x}$	SD	
Total No. of Utterances					
	(N=7)		(N=6)		
Pre-Test	74.86	87.66	39.17	41.02	.269
Post-Test	67.57	85.95	67.33	47.01	
MLU					
	(N=3)		(N=2)		
Pre-Test	1.41	.28	1.19	.01	.513
Post-Test	1.39	.27	1.36	.28	
TTR					
	(N=3)		(N=2)		
Pre-Test	.43	.10	.34	.03	.830
Post-Test	.45	.06	.38	.02	
One-Word Utterances					
	(N=7)		(N=6)		
Pre-Test	31.14	30.50	28.50	26.49	.538
Post-Test	31.57	38.22	37.67	20.23	
Two-Word Utterances					
	(N=7)		(N=6)		
Pre-Test	7.57	11.40	2.00	2.76	.517
Post-Test	6.71	11.59	5.50	9.14	

TABLE I  
 MEANS, STANDARD DEVIATIONS, AND MANOVA FOR LANGUAGE  
 VARIABLES OF EXPERIMENTAL AND CONTROL GROUPS  
 (continued)

	Parent Training		No Parent Training		p
	$\bar{x}$	SD	$\bar{x}$	SD	
Three-Word Utterances					
	(N=7)		(N=6)		
Pre-Test	3.71	8.58	1.33	2.07	.483
Post-Test	2.57	3.36	2.17	2.64	

## DISCUSSION

### Subject Selection

These results might be explained in a number of ways. Many of Howlin's (1984) criteria for an adequate experimental design were met, including collection of baseline information, detailed descriptions of treatment procedures, reliability data, objective recording of behavior changes, and the use of a control group. However, small sample size and wide variability among subjects weakened the power of the study to prove a significant difference. The experimental group exhibited a bimodal distribution on both pre-test and post-test measures for the dependent variables of total number of utterances and number of words per utterance.

Three experimental subjects were essentially nonverbal (3 or fewer utterances) while 3 other subjects used a range

of 116-231 total utterances. Only 1 subject fell in between with a score of 40 total utterances. This variability occurred in spite of the fact that all subjects in the experimental group scored similarly on the SICD-R, the instrument used for subject selection. SICD-R scores ranged from a 9-month language delay to an 18-month language delay (Appendix D).

Because the subjects scored similarly on the SICD-R, but were not homogeneous according to their number of utterances, a Pearson Product Moment correlation coefficient ( $\underline{r}$ ) was used to evaluate the relationship between the SICD-R scores and the total number of utterances on the pre-test measurement (N=13). The resulting ( $\underline{r}$ ) was .31 ( $\bar{p} < .01$ ). Despite the significance at the .01 level, the magnitude of the correlation ( $\underline{r} = .31$ ) is not as much as would be expected. If SICD-R results do not correlate highly with subjects' total number of utterances, the validity and reliability of the SICD-R as a subject selection instrument becomes questionable. In retrospect, a more homogeneous group could have been attained by using more than one instrument for subject selection and eliminating the nonverbal children.

MLU and TTR scores showed less variability among subjects (see Table I). However, the sample sizes were extremely small, i.e., 3 experimental subjects and 2 controls. The remaining subjects in the study were eliminated from the MLU and TTR analyses because they presented less than 50

utterances during the 30-minute language sample. The small sample size further reduced power to show a significant difference.

Finally, Table I makes it clear that little language growth occurred in either the experimental or control group. In some instances, the mean scores of the experimental group actually decreased. Individual growth in total number of utterances among the experimental group was extremely variable. While the 3 nonverbal children gained only a few utterances during the 3-month period, 2 of the verbal children gained about 100 utterances each. The number of utterances used by the remaining 2 subjects decreased dramatically (-45, -128). Their behavior during the language sample indicated they were having a "bad day" and chose not to talk. This sort of variability among individual subjects was not as evident in the control group. Scores were more evenly distributed, and language growth was relatively moderate except for 1 subject who used fewer utterances (-32).

#### Efficacy of ILS

Despite problems with subject selection, the lack of a significant difference in language growth between the experimental and control groups casts doubt on the efficacy of ILS as it was used in this project. Not only was there no significant difference, but the average scores of both the experimental and control groups showed little growth. Ironically, the control group showed more growth, but it was not

significant. Perhaps 3 months was not a long enough time period to show significant growth. Also, it is possible that 15 minutes a day, 5 days a week, was not intensive enough. Kemper (1980) and Carpenter et al. (1973) showed language growth after 3 months and 2-1/2 months, respectively. However, they used a trainer-oriented approach and the training offered the parents was more intensive than in this study. Seitz and Hoekenga (1974) and Seitz and Riedell (1974) showed language growth using a child-oriented approach over a 2-month period. In their studies, the parents observed a professional working with their children the first 6 weeks (3 sessions a week for an hour each session) and did not completely take over treatment until the last 2 weeks. It is highly likely that the language growth occurred because of professional, rather than parent, treatment.

In consideration of these studies, ILS may be effective if the professional spends more time working with the mother-child dyad. Unfortunately, increased SLP supervision will increase the cost to the parents and place more demands on scarce professional time.

Another possibility for affecting growth would be to require that the entire family use ILS all day. According to Harlan (1985), "appropriate communication is not something one does in a special 15-30 minute session 3 times a day; it is a style of talking, of interacting with a child. Communication occurs during all of a child's waking hours" (p. 212). Since ILS is merely an extension of the way many

parents already talk, it would be relatively easy for them to use the facilitating techniques (i.e., parallel play, self-talk, and expansion) whenever they are with their child. However, the amount of time spent using ILS would be difficult to measure for the purposes of research. It is possible that ILS could be used all day with LD children and not be effective. As mentioned earlier, many parents already use ILS or a modified version and still have LD children.

### Lack of Individualization

Another possible problem with ILS as it was used in this study is that it was not individualized. The same facilitating techniques were taught to all parents, in spite of the fact that children have diverse language needs. ILS may be effective if different facilitating techniques are taught for different children. Also, some children may benefit from ILS, while others will not. In this study, the nonverbal children showed less language growth, indicating they may not benefit from ILS.

Howlin (1981b) found in her study of autistic children that, although overall differences between the experimental and control groups were insignificant, children at the single-word level showed considerable language growth compared with controls at a similar level. Nonverbal children, especially those with delayed receptive language, showed little growth. Harlan (1985) suggested that SLPs interact with the children first and determine which

facilitating techniques would be most effective in fostering language and then teach those techniques to the parents. There is a need for further research in this area to see if individualizing ILS might increase its efficacy and whether certain children benefit more from ILS than others.

#### Pressure on the Child to Talk

Perhaps ILS is too restrictive and needs to be expanded. Harlan (1985) emphasized the importance of turn-taking, a technique that was not formally addressed in this study. She reported that parents need to put some pressure on their children to talk, pausing frequently and indicating with body language that they expect them to take a turn in the communicative process. Harlan even suggested that parents use prompts and facilitative questions to increase the children's verbalizations. Yoder (1989) studied 5 LD pre-school children and their mothers and found that the mothers who used more information-seeking questions had children who showed greater mastery of auxiliary use 12 months later. By contrast, ILS puts no pressure on the children to talk and the parents tend to dominate the conversation. Although this may be useful for children with delayed receptive language, children with normal receptive and delayed expressive language may need to practice verbalizing in order to improve linguistically.

### Measuring Change

It is possible that linguistic improvement occurred among the experimental subjects of this study, but was not measured. The dependent variables may not have been sensitive or broad enough to measure change. For example, prelinguistic communication, which is nonverbal and a prerequisite to verbal communication, was not examined in this study. Joint attention is a type of prelinguistic communication that may have increased with the nonverbal subjects in this study, but was not examined. Further research might videotape the children during play to determine if ILS increases prelinguistic communication.

Also, to maintain consistency, this study used the same researcher to obtain all language samples before and after treatment. Perhaps a more accurate representation of the children's language would have been obtained if the mothers obtained the language samples in their natural environments on a "good," or at least representative, day. According to McDade and Varnedoe (1987), children are more verbal playing with their parents at home than they are during a taped session in a clinical setting. Conversely, the problem with this approach is that the experimental subjects may benefit from, or actually be disadvantaged by, the ILS techniques their parents would likely use during the post-test language sample. Additionally, elicitation techniques would not be consistent from parent to parent; whereas, one researcher

eliciting all the language samples could maintain more consistency.

### Parent Behavior

Employing the parent to elicit the pre-treatment and post-treatment language samples would enable the researcher to examine changes in parent nonverbal behavior and communicative style. This researcher informally monitored parent use of the facilitating techniques during two training sessions. Individual parents were observed playing with their children while the researcher wrote suggestions on how to improve communication. Although the parents took these written suggestions home and attempted to implement them, there was no formal recording of their success or failure to do so. Pre-treatment and post-treatment videotapes of the parent-child interaction would have documented parent success in using ILS. These data might have helped explain why some children exhibited language growth and some did not.

Videotapes of the parent-child dyads in the control group would also have been useful. It is possible that the parents of the control group also changed their communication style. They were told that their children were LD and were instructed to spend 15 minutes a day, 5 days a week, in a play situation. Stevenson et al. (1982) reported an incident in which just telling a mother in a control group that her child was LD affected the child's environment. The mother quit work and removed her child from a poor babysitting

environment. The child made more progress than any other subject in the study. Even if the parents in a control group do not change their communicative style, growth may occur because of normal development or the halo effect (i.e., spending additional time with the child may increase language). It would have been helpful, for the purposes of this study, to have had a control group of children with normal language. Then the language growth of normal and delayed children over a 3-month period could have been compared to determine whether growth equaled or exceeded normal language development.

#### Need for Follow-Up Study

A possibility for further research would be to conduct a follow-up study 6 months or 1 year after treatment. Koegel, Rincover, and Egel (1982) found few differences in immediate post-treatment language scores between experimental autistic children and a control group. At follow-up, however, the children whose parents received training had significantly improved their language skills as compared to the control group. The latent effects of ILS may not have appeared in the experimental group's language for an extended period of time and a follow-up study might reveal that they will experience growth spurts that will not occur with the control group. However, there are two problems with such a study. First, the control group would be denied treatment for a longer period and many of the parents might seek professional language treatment, adding a variable to the study. Second,

the parents of the experimental group would be required to stop using ILS. This would be extremely difficult to do because ILS is easily incorporated into daily life. Although allowing the parents to continue using ILS would add another variable to the study, this may be the optimal method to determine long-term benefits.

## CHAPTER V

### SUMMARY AND IMPLICATIONS

#### SUMMARY

Numerous studies have reported the efficacy of parent training programs in improving the language skills of LD pre-school children. However, most of these studies have used poor methodology, required extensive training of highly structured treatment techniques, and restricted their subjects to MR children.

The purpose of this research project was to determine whether a child-centered parent training program requiring minimal training would increase the language skills of LD pre-school children who have normal receptive language. Seven experimental subjects and 6 control subjects were randomly selected from a pool of middle-class families who answered a newspaper advertisement. The parents of the experimental group received 3 individual training sessions over a 3-month period. They were instructed to spend 15 minutes a day, 5 days a week, for 3 months, in a free play situation with their children using the language stimulation techniques they had learned, i.e., parallel talk, description, self-talk, and expansion. To eliminate a possible "halo effect" from the attention given the children in the

experimental group, the parents in the control group were instructed to spend 15 minutes a day, 5 days a week, for 3 months, playing individually with their children.

To measure language growth, this researcher elicited pre-treatment and post-treatment language samples from all 13 subjects. A MANOVA revealed no significant differences between the experimental and control groups on any of the variables examined, i.e., total number of utterances, mean length of utterance (MLU), number of different word roots, number of one-word utterances, number of two-word utterances, and number of utterances of three or more words.

Despite a lack of significant differences between the experimental and control groups in this study, more research should be done before eliminating ILS as an effective parent training program. Further research should examine larger, more homogeneous samples of LD children and implement more intensive treatment over a longer time period.

## IMPLICATIONS

### Research

More research needs to be done examining the effect of parent training on LD pre-school children with normal receptive language. Researchers must use an adequate experimental design, i.e., baseline information, detailed descriptions of treatment procedure, reliability data, and objective recording of behavior changes (Howlin, 1984). Using a control group is

particularly important when examining the language growth of children whose parents have learned an indirect child-centered approach because the techniques are incorporated into daily life and cannot be easily terminated to determine whether progress levels off. Even studies using a more direct trainer-oriented approach should use a control group to eliminate normal maturation as the reason for growth. To encourage homogeneity within and between the experimental and control groups, more than one measurement should be used for subject selection. The measurements should be highly correlated to avoid wide variability among subjects. As with most research in the social sciences, a dearth of studies exists which use large sample sizes, an important ingredient when proving significant differences. Researchers need to find more creative and expedient ways to attract and retain subjects in their projects.

Because the average post-test scores of both the experimental and control groups in this study showed little growth, further research should alter the procedures that were used to determine if ILS can be made more effective. Perhaps a longer, more intensive treatment period would result in language growth. Tailoring the program to each child's individual needs might also make treatment more effective. More research needs to be done to determine which facilitating techniques help which types of children and whether ILS can be effective with all LD children. Perhaps ILS is helpful only if the children are also receiving more

direct professional treatment at the same time or maybe it improves only the language of MR or disadvantaged children. Parents of culturally disadvantaged children may not use any of the facilitating techniques naturally and may benefit from formal training in ILS. This study revealed differences in growth of raw scores between verbal and nonverbal children. Using larger sample sizes, researchers could group children according to whether they are verbal or nonverbal and determine if there is a significant difference in their language growth when their parents use ILS. Perhaps there is a time-lapse before language growth occurs with children whose parents use ILS. Follow-up studies should be done to see if subjects in the experimental group exhibit more language growth than controls, 6 months or 1 year after treatment has been terminated. Also, it would be useful to have a control group of normal children to compare their growth with the LD subjects.

Further research should investigate more than the variables that were examined here. It is possible that changes occurred that were not measured, e.g., joint attention and turn-taking. Videotaping mother-child interaction would reveal changes in nonverbal communication and provide an opportunity to assess parental verbal behavior and skill using ILS techniques. Using the mother to elicit the language sample might give the researcher a more representative picture of the child's language abilities. The control dyads could also be videotaped to determine whether any changes in mother-child interactions had occurred.

Finally, researchers should study the efficacy of other parent training programs because it is possible that ILS is not effective in any form. Since ILS is an extension of what many parents already do, formalizing it by teaching specific techniques may not create enough of a difference in parent-child interaction to increase language growth. Many LD children are informally exposed to ILS on a daily basis but, for some as yet unknown reason, do not integrate what they hear into their speech. They may need more direct, highly structured methods of language stimulation.

### Clinical

Based on problems with methodology, SLPs should not take the results of this study very seriously. However, few methodologically adequate studies have reported that parent training improves the language growth of LD pre-school children. Therefore, SLPs must use their own professional experience and judgment in deciding whether to incorporate parent training into a language program. The results of this study would seem to recommend against using ILS alone without any SLP treatment. However, used in conjunction with SLP treatment, ILS would probably not do any harm and might alleviate some of the frustrations parents of LD children have. At the very least, ILS can improve parent attitudes by giving them techniques that might increase their children's language.

## SELECTED REFERENCES

- Arnold, S., Sturgis, E., & Forehand, R. (1977). Training a parent to teach communication skills. Behavior Modification, 1, 259-276.
- Bidder, R., Bryant, G., & Gray, O. (1975). Benefits to Down's syndrome children through training their mothers. Archives of Disease in Childhood, 50, 383-386.
- Carpenter, R. & Augustine, L. (1973). A pilot training program for parent clinicians. Journal of Speech and Hearing Disorders, 38, 48-58.
- Cheseldine, S. & McConkey, R. (1979). Parental speech to young Down's syndrome children: An intervention study. American Journal of Mental Deficiency, 83, 612-620.
- Clements, J., Evans, C., Jones, C., Osborne, K., & Upton, G. (1982). Evaluation of home-based language training program with severely mentally handicapped children. Behavior Research and Therapy, 20, 243-249.
- Cooper, J., Moodley, M., & Reynell, J. (1979). The developmental language program. Results from a five year study. British Journal of Disorders of Communication, 14, 57-69.
- Culatta, B. & Horn, D. (1981). Systematic modification of parental input to train language symbols. Language, Speech, and Hearing Services in the Schools, 12, 4-13.
- Fey, M. (1986). Language intervention with young children. Boston, MA: College-Hill Press, Inc.
- Forehand, R. & Atkeson, B. (1977). Generality of treatment effects with parents as therapists: A review of assessment and implementation procedures. Behavior Therapy, 8, 575-593.
- Girolametto, L., Greenberg, J., & Manolson, A. (1986). Developing dialogue skills: The Hanen early language parent program. Seminars in Speech and Language, 7, 367-382.
- Harlan, N. (1985). One to one parent training that works. Journal of Childhood Communication Disorders, 8, 211-222.

- Harris, S., Wolchik, S., & Weitz, S. (1981). The acquisition of language skills by autistic children: Can parents do the job? Journal of Autism and Developmental Disorders, 11, 373-384.
- Hedrick, D., Prather, E., & Tobin, A. (1984). The sequenced inventory of communication development-revised. Seattle: University of Washington Press.
- Hemsley, R., Howlin, P., Berger, M., Hersov, L., Holbrook, D., Rutter, M., & Yule, W. (1978). Treating autistic children in a family context. In M. Rutter and E. Schopler (eds.), Autism. New York: Plenum Press.
- Howlin, P. (1981a). The effectiveness of operant language training with autistic children. Journal of Autism and Developmental Disorders, 11, 89-105.
- \_\_\_\_\_. (1981b). The results of a home-based language training programme with autistic children. British Journal of Disorders of Communication, 16, 21-9.
- \_\_\_\_\_. (1984). Parents as therapists: A critical review. In D. Muller (ed.), Remediating Children's Language, pp. 197-230. San Diego: College-Hill Press, Inc.
- Hubbell, R. (1977). On facilitating spontaneous talking in young children. Journal of Speech and Hearing Disorders, 42, 216-232.
- Kemper, R. (1980). A parent-assisted early childhood environmental language intervention program. Language, Speech, and Hearing Services in Schools, 11, 229-235.
- Koegel, R., Rincover, A., & Egel, A. (Eds.) (1982). Educating and understanding autistic children. Houston: College Press.
- Kysela, G., Hillyard, A., McDonald, L., & Ahlsten-Taylor, J. (1981). Early intervention: Design and evaluation. In R. Schiefelbusch and D. Bricker, Early Language: Acquisition and intervention. Baltimore: University Park Press.
- MacDonald, J. D., Blott, J. P., Gordon, K., Spiegel, B., & Hartmann, M. (1974). An experimental parent-assisted treatment program for preschool language-disordered children. Journal of Speech and Hearing Disorders, 39, 395-410.

- McConkey, R., Jeffree, D., & Hewson, S. (1979). Involving parents in extending the language development of their young mentally handicapped children. British Journal of Disorders of Communication, 14, 203-218.
- McDade, H. & Varnedoe, D. (1987). Training parents to be language facilitators. Topics in Language Disorders, 7, 19-30.
- Seitz, S. & Hoekenga, R. (1974). Modeling as a training tool for retarded children and their parents. Mental Retardation, 12, 28-31.
- Seitz, S. & Marcus, S. (1976). Mother-child interactions: A foundation for language development. Exceptional Children, 42, 445-449.
- Seitz, S. & Riedell, G. (1974). Parent-child interactions as the therapy target. Journal of Communication Disorders, 7, 295-304.
- Shames, G. & Wiig, E. (Eds.) (1986). Human communication disorders. Columbus, OH: Charles E. Merrill Publishing Co.
- Stevenson, P., Bax, M., & Stevenson, J. (1982). The evaluation of home-based speech therapy for language delayed pre-school children in an inner city area. British Journal of Disorders of Communication, 17, 141-148.
- Superior, K. & Lelchok, A. (1986). Family participation in school-based programs. Seminars in Speech and Language, 7, 395-405.
- Weybright, G. & Tanzer, J. (1982). Oh, say what they see. Videotape. Portland, OR: Portland Center for Hearing and Speech.
- \_\_\_\_\_. (1986). Putting it into words. Tucson, AZ: Communication Skill Builders, Inc.
- Williams, S. (1986). Family focused treatment: A speech-language pathologist's role in a home-based parent training program. Seminars in Speech and Language, 7, 383-393.
- Yoder, P. (1989). Maternal question use predicts later language development in specific-language-disordered children. Journal of Speech and Hearing Disorders, 54, 347-355.

## APPENDIX A

## PARENT PERMISSION--EXPERIMENTAL GROUP

I agree to let my child \_\_\_\_\_ participate as a subject in the study entitled "Parent Training." This study is carried out by Lynn Krupa under the supervision of Mary Gordon, thesis director, Speech and Hearing Sciences Program, Portland State University.

The purpose of this study is to see if a particular type of parent training program will improve children's language skills.

My child and I may not receive any direct benefit from participation in this study, but our participation may help to increase knowledge which may benefit others in the future. I have been assured that all information I give will be kept confidential and that the identity of all subjects will remain anonymous.

There are no risks or dangers inherent in the procedures of the study. My child will participate in conversations with Lynn Krupa during a 3-month period.

I agree to participate in a parent training program that will include viewing a 30-minute videotape and practicing modeling techniques taught by Lynn Krupa. Also, I agree to spend 15 minutes, 5 times a week, with my child using the techniques I have learned. I will meet with Lynn Krupa 2 times to review the modeling techniques. I understand that it is important to adhere to the schedule outlined and I will keep a log of my activities. I am free to withdraw my child from the study at any time without jeopardizing any relationship I might have with Portland State University.

I have read and understand the foregoing information.

\_\_\_\_\_  
Signature of Parent or Guardian

\_\_\_\_\_  
Date

Birthdate of Child \_\_\_\_-\_\_\_\_-\_\_\_\_

If you experience problems that are the result of your participation in this study, please contact the secretary of the Human Subjects Research and Review Committee, Office of Grants and Contracts, 303 Cramer Hall, Portland State University, 464-3417.

## APPENDIX B

## PARENT PERMISSION--CONTROL GROUP

I agree to let my child \_\_\_\_\_ participate as a subject in the study entitled "Parent Training." This study is carried out by Lynn Krupa under the supervision of Mary Gordon, thesis director, Speech and Hearing Sciences Program, Portland State University.

The purpose of this study is to see if a particular type of parent training program will improve children's language skills.

My child and I may not receive any direct benefit from participation in this study, but our participation may help to increase knowledge which may benefit others in the future. I have been assured that all information I give will be kept confidential and that the identity of all subjects will remain anonymous.

There are no risks or dangers inherent in the procedures of the study. My child will participate in conversations with Lynn Krupa during a 3-month period.

I agree to spend 15 minutes, 5 times a week, for 3 months, playing with my child. I understand that it is important to adhere to the schedule outlined and I will keep a log of my activities. I am free to withdraw my child from the study at any time without jeopardizing any relationship I might have with Portland State University.

I have read and understand the foregoing information.

\_\_\_\_\_  
Signature of Parent or Guardian

\_\_\_\_\_  
Date

Birthdate of Child \_\_\_\_\_-\_\_\_\_\_-\_\_\_\_\_

If you experience problems that are the result of your participation in this study, please contact the secretary of the Human Subjects Research and Review Committee, Office of Grants and Contracts, 303 Cramer Hall, Portland State University, 464-3417.

## APPENDIX C

## INDIRECT LANGUAGE STIMULATION

**Self Talk:** Describe out loud to your child what you are seeing, hearing, doing as you do it (for example, "Wash the dish, dry the spoon, I put the plate away"). Use short, simple sentences, and let your child know there are words to describe all sorts of activities and feelings. Give the child words for what you are doing.

**Parallel Talk (child-centered):** Describe out loud what your child is seeing, hearing, thinking, and doing as the child does it: "You're throwing the ball"; "In goes the car"; "Johnny has a rock"; "Push the bike, you're pushing the bike." Give the child words to describe the action he does or the thing he sees.

**Description (object-centered):** A labeling or explaining phrase or statement: "That's a big ball." "There's mommy." "That dog is a poodle." "It's hot." "The pillow is soft." "The water is cold." "There's a fire truck."

**Expansion:** Repeat your child's baby sentences the way an adult would say them. This shows that you understand and at the same time gives a good model. You are revising and completing the child's speech (for example, the child says, "Doggy run," and you say, "Yes, the doggy is running").

**Expansion Plus:** Expand the child's response to an adult sentence, as above, then add an additional related comment (for example, the child says, "Car go," and you say, "The car is going. It's a red car." The child says, "Oh, oh, baby cry" and you say, "The baby is crying. He's hungry.").

**SOURCE:** Weybright, G. & Tanzer, J. (1986). Putting it into words. Tucson, AZ: Communication Skill Builders, Inc.

APPENDIX D

TABLE II  
RAW DATA

Experimental Group															
Subj.	CA <sup>a</sup>	Total Utterances		MLU		TTR		Words/ Utterance			SICD-Rb	Mean Age			
		Pre	Post	Pre	Post	Pre	Post	Post							
								1	2	3+					
1	34	116	155	1.48	1.18	.42	.40	43	16	3	62	4	5	18	
2	25	3	5					3	0	0	5	0	0	9	
3	25	46	1					40	3	0	0	0	0	9	
4	28	0	2					0	0	0	2	0	0	12	
5	33	128	204	1.10	1.30	.33	.43	76	4	0	94	31	5	17	
6	26	0	3					0	0	0	3	0	0	10	
7	36	231	103	1.64	1.70	.53	.52	56	30	23	55	12	8	16	
Avg. Total Mean CA		29.5													

TABLE II  
RAW DATA  
(continued)

Subj. CA <sup>a</sup>		Control Group												Mean Age	
		Total Utterances		MLU		TRR		Words/ Utterance				SICD-R <sup>b</sup>			
		Pre	Post	Pre	Post	Pre	Post	Pre	Post	1	2		3+		
8	39	18	28					71	5	4	59	24	7	23	
9	30	100	149	1.18	1.56	.36	.39	9	0	0	18	1	0	6	
10	28	9	20					52	6	4	24	3	2	12	
11	34	83	51	1.20	1.16	.32	.36	8	1	0	64	3	1	14	
12	26	10	85					13	0	0	41	2	3	6	
13	30	15	71					18	0	0	20	0	0	14	
Avg. Total Mean CA 31.2															12.5

<sup>a</sup>CA = chronological age in months.

<sup>b</sup>SICD-R scores are in number of months below CA.