A Comparison of the Effectiveness of Three Language Intervention Strategies: Imitation, Modeling, Combination

Margaret I. Slattery

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A Comparison of the Effectiveness of Three Language Intervention Strategies: Imitation, Modeling, Combination.

BY

MARGARET I. SLATTERY

THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

Master of Science

IN THE GRADUATE SCHOOL, EASTERN ILLINOIS UNIVERSITY

CHARLESTON, ILLINOIS

1988

YEAR

I HEREBY RECOMMEND THIS THESIS BE ACCEPTED AS FULFILLING THIS PART OF THE GRADUATE DEGREE CITED ABOVE
ABSTRACT

The literature on language acquisition and the treatment of language disorders in children has been dominated by two variables. These variables are imitation and modeling. Research regarding the best technique for eliciting, generalizing and changing overall language performance in children has been inconclusive.

This study compared the effectiveness of three language intervention strategies: imitation, modeling, and a combination of imitation and modeling in eliciting and generalizing basic concepts and improving pre and post treatment scores on three standardized tests. Six language delayed kindergarten children served as subjects. The subjects were seen twice a week for five weeks.

No significant differences were found among the three treatment techniques in eliciting or generalizing the seven basic concepts trained. No significant differences were found among pre and post treatment scores of the three standardized measures when compared among the strategies. The standardized measures were the Peabody Picture Vocabulary Test-Revised, the Boehm Test of Basic Concepts-Revised, and the Developmental Sentence Score.

These findings suggest that imitation, modeling and a combination are all effective intervention strategies. The model of the sessions were consistent for all of the strategies. The results suggest that the organization of
the four part model and the efficient time use may have contributed to the overall effectiveness of intervention rather than the specific intervention strategy.
Acknowledgements

I would like to thank all of the students and the faculty of the Department of Communication Disorders and Sciences for their support. A special thanks to the chair of my thesis committee, Dr. Robert Augustine, for his guidance and direction. Thank you to my committee members, Dr. Carl Dell, Department of Communication Disorders and Sciences and Dr. Andrew Bruelle, Department of Special Education. I would also like to thank my graduate clinicians for their time and dedication to this project. Shelley Harper, Jean Forrest, and Sheila McNamera.
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Introduction

The study of two variables has dominated the literature on language acquisition and the treatment of language disorders in children. These variables are imitation and modeling. Imitation is defined as the exact repetition of the stimulus immediately following presentation of the stimulus (Ervin, 1964; Brown & Bellugi, 1964; Lovell & Dixon, 1967; Slobin, 1968). Modeling is defined as passive listening to the stimulus repeated or expanded a specified number of times (Bandura & Harris, 1966; Whitehurst, 1975). The research regarding which is the best technique for eliciting, generalizing, and changing overall language performance however, has been inconclusive.

Within the literature on treatment, studies by Courtright and Courtright (1976, 1979) and Prelock and Panagos (1980) have determined that modeling was superior to imitation as a technique for generalizing linguistic forms from earlier treatment sessions. These researchers found that subjects displayed more correct responses on the generalization tasks if they received the modeling instruction technique. Connell, Gardner-Getty, Dejewski, Parks-Reinick (1981) replicated the Courtright and Courtright study and determined that the subjects in their study did not show the same generalization effects as related to modeling. Similarly, Cole and Dale (1986) examined the difference between imitation and modeling and
concluded that there were no significant differences between imitation and modeling as related to treatment effectiveness.

The question of the most effective language intervention technique remains an area of controversy. The consistent finding throughout the studies comparing the two techniques, however, is that imitation and modeling are successful methods of language intervention to a significant degree (Courtright & Courtright, 1976, 1979; Prelock & Panagos, 1980; Cole & Dale, 1986). Cole and Dale indicated the need to examine a language intervention strategy that incorporates a combination of both techniques as compared with the intervention of the modeling technique alone and intervention of the imitation technique alone. The purpose of this study was to compare the effects of imitation, modeling and a combination of these techniques, in eliciting and promoting the generalized use of language skills in language delayed children.

Six kindergarten children diagnosed as language delayed served as subjects. The subjects were randomly assigned to one of three groups. In the imitation group, the subjects were required to repeat the stimulus immediately following presentation. In the modeling group, the subjects were required to listen to expanded repetitions of the stimulus. In the combination group, subjects were required to listen to expanded repetitions of the stimulus initially, then begin
directly repeating the stimulus immediately following presentation. The training stimuli were seven basic concepts not produced or identified correctly by any subjects in a pretest condition. Treatment sessions were 20 minutes, twice weekly, lasting 5 weeks. Dependent variable measures included the number of occurrences of each concept per session, the total number of occurrences of the concepts 6 weeks after treatment ended, and pre and posttest treatment scores on the Developmental Sentence Score (Lee, 1974), the Boehm Test of Basic Concepts-Revised (Boehm, 1986), the Peabody Picture Vocabulary Test Revised (Dunn, 1981).

Analysis of variance revealed a significant difference only for the pre and post treatment scores of the Peabody Picture Vocabulary Test Revised. Analyses of variance for all other measures were not significant. These findings support the Cole and Dale (1986) findings due to the lack of significant differences in the 3 dependent variables among the treatment techniques. The Peabody Picture Vocabulary Test Revised was the only standardized measure sensitive to progress from treatment.
REVIEW OF THE LITERATURE

A recurring theme of investigation in the communication literature has been the relationship between imitation and the acquisition of language. The complex nature of this relationship continues to challenge researchers; however, several important studies have had considerable influence on the clinical assessment and treatment of language disorders in children. An early study of the role of imitation and language acquisition that influenced theories of acquisition and guided other studies was the work of Fraser, Bellugi, and Brown (1963). Fraser et al., (1963) wanted to know if imitation of 10 selected grammatical categories was different from comprehension or production of these same categories in three year old children. Sentence pairs were presented with picture stimuli. The experimenter verbally presented the sentence pairs in three contrasting tasks. In the imitation task, the child was asked to immediately repeat the sentence pairs. In the comprehension task, a picture pointing paradigm was used. The experimenter verbally presented the sentences and the child was asked to point to the correct picture. In the production task, the experimenter produced sentence pairs matched with pictures. The child was then asked to describe each picture as the experimenter pointed to it. Fraser et al., (1963) determined that imitation scores were significantly higher
than comprehension scores which were significantly higher than production scores in all 10 grammatical categories. They concluded that imitation exceeded comprehension which exceeded production in three year old children; therefore, imitation is one of the most important tools for acquisition of language.

In a follow-up study, Lovell and Dixon (1967) examined the role of imitation and language acquisition by replicating the procedures of Fraser et al. (1963) using normal children aged 2 to 6 years and children aged 6 and 7 years who had a diagnosis of mental retardation. Lovell and Dixon (1967) also found imitation scores to be superior to both comprehension scores and production scores. Lovell and Dixon (1967) concluded that imitation precedes both comprehension and production and is an important component of acquisition for both normal and handicapped populations.

Studies in the 1970's offered additional information about the role of imitation and language acquisition. Whitehurst and Novak (1973) examined the relationship between reinforcement and imitation. Whitehurst and Novak (1973) wanted to know if verbal reinforcement increased exact imitations of phrase types in four year old children. Their study examined imitations in two conditions. In the first condition, the experimenter described a picture and subsequently asked the child to describe the same picture. The number of phrase repetitions within the child's
description was counted. These same procedures were followed in the second condition; however, the experimenter reinforced correct exact phrase imitations by the child.

Whitehurst and Novak found that reinforcement resulted in more frequent imitation of phrase types. In addition, the phrase imitations were not previously observed in the subject's spontaneous productions. Whitehurst and Novak (1973) concluded that reinforcement of exact imitations was crucial to acquisition of phrase types. Whitehurst and Novak (1973) further concluded that novel language constructions can emerge from reinforced imitations. They implied that the role of imitation is a critical component in the language acquisition of 4 year old children.

In contrast to Fraser et al., (1963), Lovell and Dixon (1967) and Whitehurst and Vasta (1973), the results of several important studies have shown that imitation does not play a definitive role in language acquisition. Ervin (1964) examined spontaneous imitations in the speech of five children. Ervin (1964) divided the utterances found in each child's speech sample into two categories. An utterance that was an exact repetition of the adult verbalization was categorized as an imitation. The remaining utterances were categorized as spontaneous. Ervin (1964) hypothesized that if imitation was necessary for acquisition, then the rules for word order in a child's imitations should exceed the rules derived from spontaneous
utterances. The rules of word order were determined from the sample of each child's spontaneous and imitative utterance sample. Ervin (1964) found no difference between the imitative and spontaneous utterances. Ervin (1964) hypothesized that imitations were not grammatically progressive; nor were they more advanced than the spontaneous utterances in these children. Ervin (1964) concluded that imitation is not important to the acquisition of language.

Bloom, Hood and Lightbrown (1974) examined four children, 19-36 months of age in home settings. Bloom et al., (1974) wanted to examine the difference between spontaneous and imitative speech in a naturalistic environment. Imitations were considered to be whole or part exact repetitions of an adult utterance. They were not elicited. Bloom et al., (1974) found that two children imitated frequently; two children imitated rarely. Bloom et al., (1974) observed that all of the children's imitations consisted mainly of words and word orders that had recently appeared in spontaneous speech. Bloom et al., (1974) concluded imitation functions to stabilize linguistic forms recently acquired spontaneously; not necessarily to acquire new more advanced forms. In addition, not all children may show evidence of this strategy since not all of the children in this study were frequent imitators.
In addition to the relationship between imitation and language acquisition, a second theme has also been consistently pursued by professionals in the field of communication disorders. The second theme addressed the relationship between modeling and language acquisition. Throughout the literature, imitation is defined by researchers as an exact repetition of adult verbalization (Fraser et al., 1963; Lovell & Dixon, 1967; Ervin, 1964; Whitehurst & Vasta, 1975; Bloom et al., 1974). The definition of modeling has been less consistent in the research literature. Zimmerman and Rosenthal (1974) have identified the most widely accepted definition of modeling in their research on generalizing. The typical procedure in studies using the modeling method do not require an immediate response from the subject. The experimenter provides a model or models of a specific communication or linguistic structure embedded within a clause or sentences. The models may be supported with the aid of objects or pictures. The effects of the models are examined by measuring the frequency of the communication or linguistic structure in novel utterances produced by the child. This process is typically called "generalization" of the structures.

Modeling was examined by Bandura and Harris (1966) in an early study. Bandura and Harris (1966) wanted to know if grammatical skills would increase with a modeling
reinforcement type of intervention with normal second grade children. The targeted language behavior was modeled by a third person. When the model of language behavior was a correct language model that had been targeted, it was rewarded. Errors were not rewarded. Errors were intermittently given by the third person so the child would be able to discriminate among correct and incorrect responses. The child was then asked to perform the same task. The experimenter presented a baseline phrase and the child was asked to create a sentence from these single words. Correct grammatical language behaviors were rewarded. Errors in language behavior were not rewarded. Bandura and Harris found that the child's passive constructions increased slightly above their baseline measure. Prepositional phrases that they found increased significantly above the child's base rate. Bandura and Harris concluded the modeling-reinforcement technique is facilitating to the acquisition of syntactic skills in normal second grade children.

A later study involved second and fourth grade children. Harris and Hassemer (1972) examined the length and complexity of sentences following an adult model. The experimenter modeled a simple or complex sentence about pictured stimulus. The child was then asked to describe similar pictures. The length and complexity of the child's responses were measured and noted if they followed a simple
sentence model or a complex sentence model. (The child's responses were compared with baseline sentences the child used before the pictures were presented). Harris and Hassemer (1972) found that the simpler adult models resulted in shorter and simpler sentences from the child. Longer and more complex sentences from the child were found after complex models from the adult. Harris and Hassemer concluded that the adult model has a direct effect on the length and complexity of the child's utterances.

Wilcox and Leonard (1978) examined the effect of modeling procedures on the generalization ability of 23 children with language impairment. Each child was asked to listen to a series of models in which correct responses were reinforced. Wilcox and Leonard (1978) hypothesized that the child would be able to problem-solve and derive a rule for correct responses. (Specifically, Wilcox and Leonard (1978) were training the wh-questions: who, where and what and the auxiliaries: "is" and "does"). One sentence was presented to a group of children until they reached a pre-set criterion of mastery. The children were then measured on their ability to generalize to untrained examples following picture presentation. Wilcox and Leonard (1978) found that the subjects were successfully able to generalize the trained form of wh questions to other examples. The same results were not found with the auxiliaries is and does, however. The children were not able to generalize to other
auxiliary forms after being trained by experimenter. Wilcox and Leonard (1978) concluded that this modeling technique was effective for training wh-questions.

Researchers have compared imitation and modeling as treatment techniques and found conflicting results. Courtright and Courtright (1976) used these two treatment approaches to train 8 grade school children the correct use of the pronoun "they". A baseline measure was taken by showing each child 20 pictures and noting their responses. The instruction techniques were administered by the child's school speech clinician during their regularly scheduled twenty minute session. During three consecutive sessions of intervention, either the imitation technique or the modeling technique of instruction was employed by the school clinician. In the imitation procedure, the child was asked to immediately repeat the clinician's one sentence description of a displayed picture. The clinician correctly used the pronoun "they" for all 20 of the pictures and offered no reinforcement of the child's responses. In the modeling procedure, the school clinician displayed a picture and correctly used "they" in a single sentence description. The child was not asked to respond until each model and picture had been presented 20 times. The child was then asked to respond to all the pictures individually in a single sentence. The clinician offered no reinforcement. The generalization measure was taken one week after the last
instruction session. Each child was shown 20 new pictures and asked to respond in a single sentence. The total number of correct responses was measured. Courtright and Courtright (1976) found that both the imitation technique and the modeling technique improved the children's overall performance. However, the children receiving the modeling instruction showed a greater increase in retention and ability to generalize to new pictures. The researchers concluded that the modeling method of instruction was superior to the imitative method in teaching the pronoun "they" to school aged children.

Courtright and Courtright (1979) replicated the 1976 study and introduced two new variables. The researchers again compared imitation and modeling as treatment approaches. One variable added was reinforcement. The second additional variable studied was the effect of a third person model. The sample consisted of 36 language delayed grade school children. The children were randomly divided into six equal groups. During three consecutive sessions, a nonsense grammatical form of present progressive was trained in sentences under one of six conditions. All the conditions utilized several sets of 20 stimulus cards. In the imitation conditions, the child was asked to immediately respond following the clinician's one sentence description of a picture. In one condition, no reinforcement was given to the child. In the second condition, if the children
responded correctly they were directly reinforced by tokens and verbal praise. In two of the four modeling conditions, the verbal model was given by the clinician while displaying the pictures. The child was not asked to respond until all the pictures were shown. The clinician offered self-reinforcement of tokens and verbal praise for correct answers in one condition; no reinforcement was given in the second condition. The two other modeling conditions required a third person model. The third person model was an adult who assumed the role of the clinician and presented the sentences and displayed picture cards to the clinician while the child observed. Under one condition, the third person model offered token and verbal reinforcement to the clinician for the correct answer. Under the second condition, the clinician received no reinforcement. The generalization ability of each of the 36 children was measured one week after the final session. Each child was shown a new set of 20 picture cards and asked to respond with a sentence. The number of sentences that contained the correct nonsense present progressive form were counted. Courtlight and Courtright (1979) found that the modeling approaches were more effective in training a nonsense form of present progressive although all the treatment conditions had positive results. The effectiveness of the four modeling techniques did not vary significantly. The third person model conditions achieved similar results as the
clinician model conditions. The researchers claim the presence or absence of reinforcement did not have a significant influence on the effectiveness of treatment under any of the conditions. Courtright and Courtright (1979) suggested that reinforcement and a third person model are not variables needed in imitation or modeling therapy. Courtright and Courtright concluded that modeling approaches were more effective than an imitation approach in training a present progressive nonsense form thus replicating the finding of the earlier Courtright and Courtright (1976) study.


The researchers followed the procedures outlined by Courtright and Courtright (1979). The clinician modeling condition was replicated and no reinforcement given. The clinician provided a verbal model of a nonsense present progressive verb while displaying 20 pictures. The child was not required to respond. The procedure was followed for three therapy sessions. The child was tested for generalization ability when responding to a new set of 20

Prelock and Panagos (1980) studied the effectiveness of imitation and modeling therapy with 12 subjects with mental retardation. Prelock and Panagos wanted to know which method would be more effective in training Agent-Action-Object (AAO) sentence constructions. The subjects were enrolled in a summer program for individuals labeled trainable mental retarded (IQ=50 or below) in addition to participating in the study. The subjects ages ranged from 8 years, 2 months to 19 years, two months. The subjects were randomly assigned to two equal groups. Each subject received five individual therapy sessions lasting 30 minutes. In the imitation sessions, the clinician displayed 30 pictures individually while saying a stimulus sentence. Each subject was instructed by the clinician using the phrase: "say what I say" after each picture. The subject received verbal praise for every correct response. In the modeling sessions, the clinician displayed 30 pictures individually while saying a stimulus sentence. After all the 30 pictures were shown, the clinician showed the subject the same pictures with the carrier phrase, "What is
happening in this picture?" Following every correct response the child received verbal praise from the clinician. A new set of 30 pictures were used to test for generalization following the fifth session. The first 15 of the pictures were presented using the imitation method, the remaining 15 were presented using the modeling method and correct AAO responses were counted. A sample of 25 spontaneous utterances was also collected for each subject during free play.

The researchers found both groups of subjects improved their Agent-Action-Object responses. The subjects in the modeling group achieved significantly more correct AAO responses on the generalization test and in free play. The researchers hypothesized that the pragmatic technique of the modeling method may account for the transfer of AAO constructions into the subject's spontaneous speech during free play. Prelock and Panagos (1980) conclude that the modeling method of language instruction is more facilitating in teaching Agent-Action-Object constructions to subjects labeled as mentally retarded.

A recent study comparing the effectiveness of imitation and modeling therapy in improving a variety of skills was conducted by Cole and Dale (1986). Cole and Dale (1986) wanted to know which type of language intervention would promote generalization skills most effectively in the areas of semantics, syntax and pragmatics. The subjects
were 44 preschool children who exhibited a language delay and ranged in age from 38 months to 69 months. The children were randomly assigned to either a direct instruction classroom which utilized an imitation method or an interactive instruction classroom which utilized a modeling method of language instruction. The study included two direct language instruction classrooms and three interactive instruction classrooms. The children were given a battery of pre and post language tests. During the 32 weeks of intervention, the children were seen 5 days a week for 2 hours. The staff in each classroom consisted of a head clinician and two assistant clinicians. The direct language instruction was based on the DISTAR Language I program (Englemann & Osborn, 1976). The program contains a materials set and a predetermined goal sequence. These goals include syntax, semantics and pragmatic skills. The clinician initiates the interaction with the child. The child is prompted to imitate the utterance or communicative acts. If the child responds appropriately, verbal praise is given by the clinician.

The interactive language instruction was based on procedures outlined in McLean and Synder-McLean (1978) and Rieke, Lynch, and Soltman (1977). The child was encouraged to initiate communicative activities. Individual goals in the areas of syntax, semantics and pragmatics were determined and incorporated into language activities. The
clinician provided verbal and non-verbal models when interacting with the child in a conversational setting. The clinician would not attempt to elicit any direct responses or ask for imitations from the child.

Cole and Dale (1986) found significant differences in the pretest and posttest scores of the children in both the direct and interactive language instruction. The researchers concluded that there was little difference in the effectiveness of the direct language instruction program (imitation) and the effectiveness of interactive language instruction program (modeling) in promoting generalization skills of language delayed preschool children. Cole and Dale's (1986) findings contradicted the conclusions of Courtright and Courtright (1976, 1979) and Prelock and Panagos (1980); who concluded that modeling instruction was more facilitating in training language skills to language delayed children and individuals diagnosed as mentally retarded.

Cole and Dale (1986) stated the need for further research comparing imitation and modeling. Based on their data, Cole and Dale (1986) hypothesized that rapid acquisition of a language skill may be acquired through imitation. The intervention should then continue using modeling to promote generalization. This blend, according to Cole and Dale (1986), may be a more facilitating language intervention strategy than the exclusive use of imitation or
modeling alone. In the present study, this approach is called the combination approach.

The present study examined the relationship between the imitation strategy, the modeling strategy and the combination strategy in eliciting and promoting the use of a variety of basic concepts children with language delays.
Method

Subjects

Six kindergarten children, 4 boys and 2 girls, with an existing diagnosis of delayed language served as subjects. The subjects were currently receiving speech-language services in the public school system. In order to be considered for participation in the study, all subjects had to meet the following standardized test criteria: 1. A Peabody Picture Vocabulary Test-Revised (Dunn & Dunn, 1981) quotient score that was at least one standard deviation below the mean, 2. A Developmental Sentence Score (Lee, 1974) score that was below the 50th percentile, 3. A Boehm Test of Basic Concepts-Revised (Boehm, 1986) score that was below the 25th percentile. In addition to guiding subject selection, these initial test scores were used for comparison to post treatment scores.

The subjects ranged in age from 61 months to 72 months with a mean age of 68 months. The subject profile is located in Table 1. No subject had a diagnosis of mental retardation or hearing impairment. A permission slip (Appendix A) signed by the subject’s parent or legal guardian was obtained prior to participation in the study. This study also met the designated qualifications for use of human subjects in experimental research (Appendix B).
Insert Table 1 here
Table 1
Subject Profile

<table>
<thead>
<tr>
<th>Group</th>
<th>Age Range in months</th>
<th>Mean Age in months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imitation Group (n = 2)</td>
<td>66-75</td>
<td>70.5</td>
</tr>
<tr>
<td>Modeling Group (n = 2)</td>
<td>64-67</td>
<td>65.5</td>
</tr>
<tr>
<td>Combination Group (n = 2)</td>
<td>66-72</td>
<td>69.0</td>
</tr>
<tr>
<td>Totals</td>
<td>64-75</td>
<td>68.3</td>
</tr>
</tbody>
</table>
Procedure

Subjects were randomly assigned to one of three treatment groups. The clinicians providing the treatment were also randomly assigned to treatment groups. The three clinicians were graduate students in the department of Communication Disorders & Sciences with at least 150 clock hours of supervised undergraduate clinical experience.

Seven basic concepts served as the treatment targets for the study. These concepts were the most frequently missed test items on the **Boehm Test of Basic Concepts-Revised**. The concepts included "below", "wide", "left", "pair", "different", "forward", "third".

Treatment sessions were 20 minutes in length and divided into four 5 minute activities. The activities included a picture activity, an object manipulation activity, a physical activity, and a free play activity. The picture activity focused on pictured representations of the 7 concepts. The pictures were on 5 by 7 inch white index cards and had been drawn by the experimenter. The object manipulation activity was performed by the clinician and focused on physical manipulation of a series of 3 dimensional objects (see Appendix C). For example, the clinician picked up a ball and put it **beside** a toy car. During the physical activity, the clinician performed a series of actions to represent the concept. For example, the clinician stood **beside** a chair. During the free play
activity, subjects were encouraged to talk about the pictures, objects and actions used during the training session. The clinician did not name the concept being trained during free play. All 4 activities utilized the same reinforcement schedule. This included verbal praise following every fifth presentation of the stimulus sentences. The reinforcement was the phrase, "You are doing a nice job." The four activities were always presented in the order described above. The picture activity first, followed by object manipulation, physical activity, and free play.

The treatment techniques included three different procedures. These included imitation procedures alone, modeling procedures alone, and a combination of both imitation and modeling procedures. In the imitation sessions, the following verbal directive was given for the picture activity: "I want you to listen carefully. I am going to show you some pictures and tell you about them. I want you to say what I say. Say what I say!" (see Appendix D) The clinician held up one picture at a time and said a stimulus sentence. The subject repeated the utterance. If the subject failed to respond the directions were repeated prior to the next item. In the object manipulation activity section, the clinician followed the same procedure except the clinician manipulated one of the objects and said: "Listen and watch carefully, I am going to move these
objects around and tell you about it. I want you to say what I say. Say what I say!" The clinician presented 20 stimulus sentences. During the physical activity section, the clinician gave the instructions: "Listen and watch carefully, I am going to move around the room and tell you about it. I want you say what I say. Say what I say!" The clinician physically moved to an appropriate position in the room while saying the stimulus sentence. A total of 20 stimulus sentences were presented by the clinician in the third part.

During the free play section of the imitation session, six of the stimulus materials from the preceding three parts were used. The clinician said initially, "Look at the picture and tell me about it." The clinician presented six of the training pictures, one at a time. If the subject failed to respond to a stimulus item within 15 seconds, the clinician repeated the directions and showed the next picture card. The clinician then manipulated six objects, one at a time, after saying, "Watch what I do and tell me about it." The clinician repeated the directions and presented the next object if the subject failed to respond within 15 seconds after a stimulus was presented. In the final part of free play, the clinician said, "Watch what I do and tell me about it," for 6 trials.

In the modeling procedure sessions, the clinician gave these directions, for the picture activity: "Listen
carefully. I am going to show you some pictures and tell you about them, just listen!" (see Appendix E) The clinician showed the series of 20 picture cards while saying three stimulus sentences for each picture. The first stimulus sentence described the basic relationship of the concept. In the second stimulus sentence, an action verb was added. The third stimulus sentence contained the basic relationship, an action verb and a noun phrase. The following is an example of three stimulus sentences used in training the concept "beside":

1. The dog is beside the tree.
2. The dog is running beside the tree.
3. The dog is running beside the tree that is green.

The clinician followed this pattern of three stimulus sentences for every picture card. The subject was not asked to respond.

During the object manipulation activity section, the clinician said: "Listen and watch carefully, I am going to move these things around and tell you about them, just listen!" The clinician moved the objects for 20 trials while saying three stimulus sentences in the same pattern as previously described for each trial. The same procedure was followed for the physical activity section of the session. The clinician said: "Listen and watch carefully. I am going to move around the room and tell you about it, just listen!" The clinician physically moved around the room and said three stimulus sentences following the pattern
previously described. The fourth part of the session was a free play activity. The free play activity followed the exact same procedures outlined in the imitation sessions.

In the combination procedures sessions, the clinician followed the modeling procedures for the first 10 stimulus items of each of the three parts. The final 10 stimulus items of each part were administered according to the imitation procedures. The session cycled through the picture activity (see Appendix F), the object manipulation activity, and the physical activity. The free play part followed the same procedures consistent with the imitation and modeling sessions (see Appendix G).

In all the sessions, the clinician recorded the subject's utterances in the free play session. The number of times the concept being targeted was used correctly was tallied. Six weeks following the final training session, each subject was seen for 20 minutes for a free play session. The same procedures used in the free play sections of the treatment sessions were followed. Two stimulus pictures, two objects, and two actions from each of the seven training sessions were selected. The clinician presented each stimulus one at a time and said, "Tell me about it." The subject was allowed 30 seconds to explain the stimulus. The clinician repeated the directions if the subject failed to respond within 30 seconds and presented
the next stimulus. The clinician did not verbalize any concept at any time during the free play session.

Post-treatment measures were also taken following this free play session. The experimenter re-administered the Peabody Picture Vocabulary Test-Revised, Form L and obtained a spontaneous speech sample so a Developmental Sentence Score could be calculated. The public school speech-language pathologist re-administered the Boehm Test of Basic Concepts-Revised.

Reliability

Two independent participants observed 25% of the treatment sessions. Interjudge reliability was calculated by comparing the scores gathered by a graduate student clinician with the scores gathered by a certified speech-language pathologist. Interjudge reliability averaged across 10 sessions, 2 observers, and 13 criteria (see Appendix H) was 93.3%.
Results

An analysis of variance was applied to the 5 dependent variables measured to examine differences among the three treatment procedures. The first dependent variable was the frequency of occurrence of the targeted concept immediately following treatment. The data revealed no significant differences ($F = .991; p < .467$) among the three intervention strategies in eliciting targets immediately following treatment.

The second dependent variable was the frequency of occurrence of the trained concepts following treatment termination. The data was obtained 6 weeks after the final treatment sessions. An analysis of variance indicated no significant differences ($F = 3.595; p < .218$) among the three intervention strategies in eliciting the targets 6 weeks post-treatment.

Post-treatment standard scores for the Peabody Picture Vocabulary Test-Revised, the Developmental Sentence Score, and the Boehm Test of Basic Concepts-Revised were also compared to examine changes as a result of the three different treatments. An analysis of variance for each variable revealed no significant differences for the Peabody Picture Vocabulary Test-Revised ($F = 5.128, p < .050$), the Developmental Sentence Score ($F = 1.235, p < .355$), and the Boehm Test of Basic Concepts-Revised ($F = .575, p < .591$).
The Analysis of Variance Summary Table for Treatment Sessions is located in Table 2.

Insert Table 2 here

Analysis of Variance procedures were also applied to pre-treatment and post-treatment scores obtained on the Peabody Picture Vocabulary Test-Revised, the Developmental Sentence Score, and Boehm Test of Basic Concepts-Revised to identify significant effects of treatment. There was a significant treatment effect \((F = 32.194, p < .001)\) for the Peabody Picture Vocabulary Test-Revised indicating that single word receptive vocabulary had increased as a result of intervention. There were no significant differences for the Developmental Sentence Score \((F = 12.780, p < .012)\) indicating expressive syntax had not changed. There were no significant differences for the Boehm Test of Basic Concepts-Revised \((F = 4.298, p < .084)\) indicating that receptive conceptual knowledge had not changed. See Table 3 for the Analysis of Variance Summary Table to Pre-/Post-Treatment Comparisons.
Table 2

Analysis of Variance Summary Table for Treatment Sessions

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>DF</th>
<th>Sum of SQ</th>
<th>Mean SQ</th>
<th>F Ratio</th>
<th>F Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediate</td>
<td>2</td>
<td>0.056</td>
<td>0.028</td>
<td>0.991</td>
<td>0.467</td>
</tr>
<tr>
<td>Delayed</td>
<td>2</td>
<td>0.022</td>
<td>0.011</td>
<td>3.595</td>
<td>0.218</td>
</tr>
<tr>
<td>PPVT-R</td>
<td>2</td>
<td>428.167</td>
<td>214.083</td>
<td>5.128</td>
<td>0.050</td>
</tr>
<tr>
<td>DSS</td>
<td>2</td>
<td>2.896</td>
<td>1.448</td>
<td>1.235</td>
<td>0.355</td>
</tr>
<tr>
<td>BTBC-R</td>
<td>2</td>
<td>0.012</td>
<td>0.006</td>
<td>0.575</td>
<td>0.591</td>
</tr>
</tbody>
</table>
Insert Table 3 here
Table 3

Outcome of the Analysis of Variance of Pretest and Posttest scores compared Among the Three Intervention Strategies

<table>
<thead>
<tr>
<th>MEASURE</th>
<th>DF</th>
<th>Sum of SQ</th>
<th>Mean SQ</th>
<th>F Ratio</th>
<th>F Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPVT-R</td>
<td>2</td>
<td>428.167</td>
<td>214.083</td>
<td>5.128</td>
<td>.050</td>
</tr>
<tr>
<td>DSS</td>
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<td>1.448</td>
<td>1.235</td>
<td>.355</td>
</tr>
<tr>
<td>BTBC</td>
<td>2</td>
<td>.012</td>
<td>.006</td>
<td>.575</td>
<td>.591</td>
</tr>
</tbody>
</table>
Discussion

The present study compared the effectiveness of treatment among the imitation intervention strategy, the modeling intervention strategy and the combination intervention strategy. The findings of this study indicated there was no difference among the three treatment strategies in eliciting or generalizing basic concepts in language delayed children. The results of the present study support earlier studies comparing treatment techniques. Both Friedman and Friedman (1980) and Cole and Dale (1986) determined that there were no significant differences between imitation and modeling as treatment techniques.

Cole and Dale (1986) suggested that the most effective intervention strategy might be a blending of the imitation technique and the modeling technique. The present study was designed to examine this relationship by merging imitation and modeling into a combination approach. This study found that there was not a significant difference in the effectiveness of the combination approach as compared to the imitation only approach and modeling only approach.

In the present study, the progress of all of the subjects due to treatment was demonstrated to be statistically significant by the pre and post treatment scores on the Peabody Picture Vocabulary Test-Revised. The Peabody Picture Vocabulary Test-Revised is an instrument
designed to measure changes in receptive vocabulary. The significant post treatment finding suggests that treatment resulted in increasing the vocabulary skills of these subjects. As the 4 part treatment model was designed to do this, the results confirm that the treatments were effective.

The Developmental Sentence Score did not show significant changes as a result of treatment. This finding was not surprising. The Developmental Sentence Score is designed to measure changes in expressive syntax. The treatment procedures were not designed to increase expressive syntax skills and the scores indicated that the level of receptive vocabulary did not automatically increase syntactic skills.

A surprising finding was the lack of significant differences in the pre and post treatment Boehm Test of Basic Concepts-Revised scores. Because the training items were specifically chosen from this instrument, it was anticipated that a significant difference would be observed in the post treatment scores. The Boehm Test of Basic Concepts-Revised is designed to measure changes in receptive conceptual knowledge. The raw scores were converted to standardized percentile ranks rather than standardized scores, and this difference between the Boehm Test of Basic Concepts-Revised and the Peabody Picture Vocabulary Test-Revised contributed to the lack of significant
differences between pre and post treatment scores. It appears that the 
Boehm Test of Basic Concepts-Revised
percentile ranks were not a sensitive enough measure of the 
changes due to treatment. This supports the hypothesis of 
researchers such as McCauley and Swisher (1986). These 
researchers examined the use and misuse of norm references 
tests and suggested that some standardized tests may not be 
valid estimates for assessing treatment progress. Although 
it was not in the scope of this study, research in the area 
of accurately documenting progress is greatly needed as 
demonstrated by the pre and post treatment Boehm Test of 
Basic Concept-Revised scores.

In the present study, it was anticipated that the 
blending of the imitation and the modeling techniques would 
be the most facilitating treatment strategy. In the 
combination approach, the order of presentation of the 
training stimuli was based on a model similar to the 
phonological approach developed by Hodson and Paden (1983). 
Hodson and Paden believe that auditory stimulation is the 
important first step and kinesthetic feedback is the second 
step in the remediation of articulation disorders. In the 
present study, the first step of the combination approach 
presented the target concept in 180 sentences thus 
bombarding the subject with auditory stimuli. The second 
step of the combination approach required the subject to 
verbally repeat the sentence containing the concept thus
providing tactile feedback. The lack of significant differences among the combination approach, the imitation alone approach and the modeling alone approach suggest that the phonological model of remediation may not be generalized to the area of language learning. Various combinations utilizing imitation techniques and modeling techniques need to be examined by future researchers. Perhaps, a conversational approach in which imitations are elicited naturally throughout a session focusing on a modeling approach would be an effective combination of the two strategies.

The imitation alone strategy, the modeling alone strategy, and the combination strategy differed in the presentation of the stimulus sentences and requirements for subject response. The 4 part model, the picture cards, 3 dimensional objects, and the physical actions were consistent throughout the strategies and no significant differences were found among the strategies. This suggests that the effectiveness of the intervention strategies in increasing receptive vocabulary, eliciting and generalizing basic concepts, may be due less to the technique employed and more to the general organization of the sessions, efficient time use and the wide variety of training items. This finding was also previously supported by Cole and Dale (1986).
An important variable in promoting language skills in language delayed children that was not examined in this study was accounting for individual subject differences. Friedman and Friedman (1980) compared imitation and modeling groups of children and found no significant differences among them in increasing Developmental Sentence Scores. When they incorporated individual differences into the comparisons, Friedman and Friedman found interesting results. The subjects in the modeling group showed greater improvement in expressive syntax if they had relatively high pre treatment cognitive scores. The subjects in the imitation group, showed a greater improvement in expressive syntax if they had a relatively low pre treatment cognitive scores. These findings suggest that there may be a relationship between the cognitive level of the subject and the effectiveness of the intervention technique utilized. It would appear that the cognitive level of the child should be examined by the speech-language pathologist when considering which language intervention approaches to employ with language delayed children.

Future research in the area of language intervention strategies should include a replication of the present study with a larger sample and a greater number of training sessions. It would be beneficial to include a control group containing subjects with normally developing language. Standardized measures that are sensitive to treatment
progress need to be considered when used as pre and post treatment measures. A merging of imitation and modeling techniques in different forms would yield powerful information. Most importantly, the subjects should be compared individually for cognitive differences in addition to comparing the groups for overall effectiveness.
References


Appendix: A
Request for Permission Form

October 22, 1987

STUDENT: ____________________________
GRADE: ______________________________
TEACHER: ____________________________

Dear ____________________________,

Your child has been selected to participate in a project promoting language skills. The project’s goal is to teach the basic concepts (for example: "under" or "beside") to kindergarden age children. Your child would be given individualized attention twice a week for five weeks for 20 minutes by a graduate student clinician from Eastern Illinois University in the speech room at Jefferson School. Your child’s name will not be used in any report of the results. If you have any questions, please call Susie Hay, Speech Pathologist at Jefferson School, 345-7078.

Please sign below and return this form to Jefferson School as soon as possible so we can begin this exciting project.

Meg Slattery, B.S.
Graduate Student,
Eastern Illinois University

I consent for my child to participate in the project promoting language skills at Jefferson School.

Parent Signature: ______________________________

Date: ______________________________
Appendix B
Permission for Use of Human Subjects

MEMORANDUM

TO: Bob Augustine, Speech Pathology and Audiology
FROM: Bud May, Director of Grants and Research
DATE: October 7, 1987
RE: Human Subjects Research-Meg Slattery

This memorandum is to confirm a conversation I had with Jill Nilsen on October 7, 1987 regarding the appropriateness of Human Subjects Review by our Institutional Review Board (IRB) of Meg Slattery's research project. At that time Jill and I discussed the project and I indicated that it would be appropriate to start the research. I had tried to reach you at an earlier time but was not successful. I felt that it would be better to contact Jill and have her convey this approval than to delay the research any further. I apologize for not getting back to you earlier on this matter.

As you know, the Department of Health and Human Services (HHS) does not, at this time, require that a research project not seeking funds from them be reviewed by an IRB. As a result of this criteria, Slattery's project is not, by federal regulation, subject to compulsory IRB review. In an effort to adhere to the spirit of HHS regulation and to insure the absolute and complete protection of human subjects on our campus, Eastern Illinois University has, in past years, adopted a policy of using HHS guidelines as nonbinding criteria in determining whether any or all University proposals using human subjects should be screened by our IRB.

It is my judgement, based on review of HHS policy and University policy, that Slattery's research project is exempt from prior internal IRB review because it meets the requirements dictated by the Department of Health and Human Services's exempt criteria as described in categories listed in section 46.101 of the January 26, 1981 Federal Register, p. 8389.

In addition, it is my belief that the spirit of HHS regulation and the letter of HHS regulation have been adhered to relative to you parental/subject informed consent form.

It is conceivable that the University's IRB could, after review of current policy and grant activity on campus, desire an interim report from you or Slattery concerning the project. If this situation were to occur, I would inform you far enough in advance of the report due date so as not to cause an inconvenience. In addition, I would inform you of the criteria used by the IRB to evaluate the ongoing research.

Best wishes for a successful research project.

em

xc: Jill Nilsen
Appendix C
List of 3 Dimensional Objects
used in the Treatment Sessions

aluminum foil  
balloons  
balls, plastic  
balls, styrofoam  
bells, small  
bird, plastic  
books, children's  
books, reference  
blocks, wooden  
bracelets  
candles, birthday  
candy canes  
cards, playing  
cars, toy  
cat, plastic  
chairs, large wooden  
chairs, small plastic  
coins, dime: penny  
combs  
computer discs  
cotton swabs  
coupons  
crayons  
cups, plastic  
deer, plastic  
dolls  
dominoes  
earrings  
envelopes  
erasers, rubber  
eyes, plastic  
farm animals, plastic  
farmer, plastic  
finger paint  
fork  
frog, plastic  
frying pans, plastic  
golf clubs, miniature  
grapes  

hair ribbons  
hanger, clothes  
jacks  
kleenex tissues  
knives, plastic  
ladybug, plastic  
leaves  
magic markers  
magnets  
matches  
mouse, plastic  
nails  
notebook  
pants  
pantyhose  
paper, colored: white  
paperclips  
pecans  
pencils  
pens  
pins, bobby: push  
pipe cleaners, colored  
plates, paper  
popcorn  
rubberbands  
shapes, paper  
shoes  
screws  
spaghetti, uncooked  
socks  
stickers  
sticks  
straws, bendable  
swan, plastic  
table, wooden  
trucks, plastic  
tapes, cassette  
tongue depressors
Appendix D
Clinician's Directions for
Imitation, Step 1, Pictures

Concept: FORWARD

Listen carefully. I am going to show you some pictures and
tell you about them. I want you to say what I say. SAY
WHAT I SAY!

1. The girl is leaning forward.
2. The redheads are turned forward.
3. The red eyes are looking forward.
4. The man is running forward.
5. The man is pulling the dog forward.*
6. The bunny is hopping forward.
7. The storm is moving forward.
8. The football is being thrown forward.
9. The dog is chasing the cat running forward.
10. The car is driving forward.*
11. The mom is facing forward.
12. The girl is pointing forward.
13. The girl jumped forward.
14. The blue dress is facing forward.
15. The man is pushing the lawn mower forward.*
16. The men are marching forward.
17. The drink spilled forward.
18. The elephant's trunk is forward.
19. The boy is swinging forward.
20. The X is above the forward bird.*

* = "You are doing a good job."

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Appendix E
Clinician's Direction's for
Modeling, Step 1, Pictures,

Concept: FORWARD

Listen carefully. I am going to show you some pictures and tell you about them. I want you to just listen and not talk yet, please. JUST LISTEN!

1. The leaning is forward.
The girl is leaning forward.
The girl is leaning forward to pet the cat.

2. The redheads are forward.
The redheads are turned forward.
The redheads are turned forward to see better.

3. The blue eyes are forward.
The blue eyes are looking forward.
The blue eyes are looking forward toward the sky.

4. The running is forward.
The man is running forward.
The man is running forward towards the finish line.

5. The pulling is forward.
The woman is pulling the dog forward.
The woman is pulling the dog on the leash forward. *

6. The hopping is forward.
The bunny is hopping forward.
The bunny is hopping forward down the trail.

7. The storm is forward.
The storm is moving forward.
The storm is moving forward towards the house.

8. The throwing is forward.
The football is being thrown forward.
The football is being thrown forward in a pass.

9. The chasing is forward.
The dog is chasing the cat running forward.
The dog is chasing the cat who is running forward.

10. The driving is forward.
The car is driving forward.
The car is driving forward down the street. *

* = "You are doing a nice job."
(continue on next page with 11-20)
Appendix F
Clinician’s Directions for
Combination, Step 1, Pictures,

Concept: FORWARD

Listen carefully. I am going to show you some pictures and
tell you about them. I want you to just listen and not talk
yet, please. JUST LISTEN!

1. The leaning is forward.
The girl is leaning forward.
The girl is leaning forward to pet the cat.

2. The redheads are forward.
The redheads are turned forward.
The redheads are turned forward to see better.

3. The blue eyes are forward.
The blue eyes are looking forward.
The blue eyes are looking forward toward the sky.

4. The running is forward.
The man is running forward.
The man is running forward toward the finish line.

5. The pulling is forward.
The woman is pulling the dog forward.
The woman is pulling the dog on the leash forward.*

6. The hopping is forward.
The bunny is hopping forward.
The bunny is hopping forward down the trail.

7. The storm is forward.
The storm is moving forward.
The storm is moving forward towards the house.

8. The throwing is forward.
The football is being thrown forward.
The football is being thrown forward in a pass.

9. The chasing is forward.
The dog is chasing the cat running forward.
The dog is chasing the cat who is running forward.

10. The driving is forward.
The car is driving forward.
The car is driving forward down the street.*

* = "You are doing a nice job."
(continue on next page with 11-20)
Combination, Continued

Listen carefully. I am going to show you some pictures and tell you about them. I want you to say what I say. SAY WHAT I SAY!

11. The mom is facing forward.
12. The girl is pointing forward.
13. The girl jumped forward.
14. The blue dress is facing forward.
15. The man is pushing the lawn mower forward. *
16. The men are marching forward.
17. The drink spilled forward.
18. The elephant’s trunk is forward.
19. The boy is swinging forward.
20. The X is above the forward bird. *

* = "You are doing a good job."
CONCEPT: FORWARD

Now it's your turn to talk! Look at the picture and tell me about it.
SHOW PICTURE 1:

Look at the picture and tell me about it.
SHOW PICTURE 2:

Look at the picture and tell me about it.
SHOW PICTURE 3:

Look at the picture and tell me about it.
SHOW PICTURE 11:

Look at the picture and tell me about it.
Show Picture 12:

Look at the picture and tell me about it.
Show Picture 13:
Appendix H
Form for Independent Observer

Name: 
Child: 
Date: 

TIME 

Concept Presentation/Total of 5 minutes

Step 1: 
Step 2: 
Step 3: 
Step 4: 

Extra time, was concept EVER used? yes/no

DIRECTIONS

Specified directions read accurately? yes/no 

Directions followed:

Step 1: yes/no 
Step 2: yes/no 
Step 3: yes/no 
Step 4: yes/no 

REINFORCEMENT SCHEDULE
"You are doing a nice job"

Specified phrase accurate? yes/no 

Presented after every 5th trial? yes/no 

No additional verbal reinforcement was given? yes/no 

Total: /13 points 

Comments: