Planning treatment for language-disordered children | Target selection

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PLANNING TREATMENT FOR LANGUAGE - DISORDERED CHILDREN:
TARGET SELECTION

By
Jamie J. Ruffatto
B.A., Carroll College, 1982

A Professional Paper Presented In Partial Fulfillment Of The Degree Of
Master of Communication Sciences and Disorders
UNIVERSITY OF MONTANA
1985

Approved by:

Chairman, Board of Examiners

Dean, Graduate School

Date
# TABLE OF CONTENTS

Chapter One .................................................. 1

Introduction
Normal Acquisition of Grammatical Morphemes
Acquisition of Grammatical Morphemes in Language Disordered Children
Theories Underlying Current Language Intervention Programs
Application of Language Intervention Programs in the Treatment of Grammatical Morphemes
Purpose of Study

Chapter Two .................................................. 9

Methods
Subjects
Treatment Target Selection
Treatment Procedures
Generalization Measures
Scoring Procedure
Design and Measurements
Reliability

Chapter Three ................................................ 15

Results
Treatment Results
Generalization Results of Treatment Targets
Generalization Results of Nontreatment Targets
Summary of Results

Chapter Four .................................................. 26

Discussion
Comparison Between the Results and Current Literature
Factors Influencing the Results
Observations and Conclusions

Appendix A ..................................................... 30
Appendix B ..................................................... 31
References ..................................................... 32
LIST OF TABLES

Table 1: Number of trials required to meet criterion for each level of difficulty for both treatment morphemes . . . . . . . . . . . . . . . . . . . . 16

Table 2: Irregular past tense verbs produced by Subject A in the weekly language samples probing for generalization . . . . . . . . . . . . . . . . . . . . 20

Table 3: Irregular past tense verbs produced by Subject B in the weekly language samples probing for generalization . . . . . . . . . . . . . . . . . . . . 21
LIST OF FIGURES

Figure 1: Subject A's performance on weekly probes and language samples for the possessive morpheme. .................................. 17

Figure 2: Subject A's performance on weekly probes and language samples for the irregular third person singular morpheme ............. 17

Figure 3: Subject B's performance on weekly probes and language samples for the possessive morpheme. ................................. 18

Figure 4: Subject B's performance on weekly probes and language samples for the irregular third person singular morpheme ............. 18

Figure 5: Subject A's performance on weekly probes and language samples for the irregular past tense morpheme. ......................... 24

Figure 6: Subject B's performance on weekly probes and language samples for the irregular past tense morpheme. ......................... 24
CHAPTER ONE

INTRODUCTION

The development of phonological, semantic, syntactic, and pragmatic aspects of language typically follows a relatively consistent sequence across children with respect to specific structures e.g., /m/ (Templin, 1957 as cited in Bernthal and Bankson, 1981), agent-object relations (Goldin-Meadow, Seligman, and Belman, 1976), verb tense (Brown, 1973), politeness markers (Lakoff, 1973) and the time frame in which those structures appear. Children whose language skills are delayed or do not follow this normal developmental sequence are identified as language disordered. A comparison between the normal sequence of development and the skill level of a specific child aids in the identification of a disorder as well as determining its severity and in planning treatment. This paper will focus on one specific aspect of syntactic development, that of grammatical morphemes, and the planning of treatment for language disordered children with deficits in this area.

During the early stages of normal syntactic development children begin to elaborate their utterances by adding grammatical morphemes to connect their two-to-three word strings of content words. In a longitudinal study of three children Brown (1973) studied the acquisition of fourteen grammatical morphemes from each morpheme's appearance until the children produced it in ninety percent of obligatory contexts. From an analysis of this data Brown concluded a consistent order of development of grammatical morphemes exists in normal children. Research in studies employing strict controls on stimuli and responses as well as those which employ the analysis
of spontaneous speech samples have supported this consistent order of
development as presented by Brown (deVilliers and deVilliers, 1973;
Menyuk, 1963a b, 1964a b, Miller and Ervin, 1964, Brown and Frazer,

Brown (1973) proposed two primary hypotheses to explain why this
order remains consistent across children. The first maintained that those
morphemes which are the least complex semantically and syntactically will
develop earlier than the more semantically and syntactically complex
morphemes (Brown, 1973, Slobin, 1973). By way of explanation of semantic
complexity, Brown (1973) indicated some of the morphemes have unitary
meaning (i.e., in: containment, plural: number) whereas others combine
two or more ideas in their meaning (i.e., uncontractible copula: number:
earliness, articles: specific; nonspecific). Brown predicted the morphemes
with the least complex meaning would be acquired earlier and these predic­
tions were born out by analysis of his data. Brown (1973) also applied a
cumulative approach to Jacob's and Rosenbaum's (1968) derivations of the
morphemes in question to rank order their syntactic complexity. This
approach held that "a construction Y is more complex transformationally
than a construction X only if Y involves all the transformations involved
in X plus one or more others" (p.377). The results of this analysis
revealed the order of acquisition predicted for syntactic complexity was
the same as that predicted for semantic complexity and therefore he con­
cluded both syntactic and semantic complexity are determinants of
acquisition order but each may be interpreted as the other.

Brown's (1973) second hypothesis was that the frequency with which
parents modeled specific morphemes for their child would affect the order
in which the child acquired those morphemes. He indicated that frequency
typically facilitates learning and therefore he hypothesized those morphemes occurring frequently in parental speech will be acquired earlier than those occurring less frequently. To test this hypothesis Brown tallied the production frequency of each of the fourteen grammatical morphemes in obligatory contexts for a specific number of utterances from both parents and children. The comparative results of obligatory morphemes between parents and children indicated no significant relation between frequency of occurrence and order of acquisition. He concluded children must hear a morpheme before they can acquire it, but the frequency with which they hear that morpheme is not a significant factor in its order of emergence.

Brown's data were recently subjected to reanalysis by several researchers (Block and Kessel, 1980; Moerk, 1980). Block and Kessel determined Brown's analyses were inappropriate for his data. Therefore they employed multiple regression analyses to determine possible joint and interactive effects of semantic complexity, syntactic complexity, and parental input frequency. They also considered Brown's sample size too small to draw valid conclusions so they included the data obtained in deVilliers and deVilliers (1973) study. Their results indicated semantic and syntactic complexity were significant factors in the acquisition order whereas parental input frequency was not. However, their results also indicated neither semantic nor syntactic complexity was "significant as a unique factor/predictor"(p.185), so they concluded that there must exist some third factor underlying both predictors that determines the order of acquisition. The existence of this third factor is more a hypothesis than a factual conclusion to be drawn from the data. In actuality Block and Kessel (1980) admit "this sort of interpretation is in no sense strongly
determined by the results of our reanalysis" (p.187). Further, in response to Block and Kessels' study, Pinker (1981) comments that regression were well suited to the multivariate data obtained but the results were the same as those obtained by Brown (1973) and de Villiers and de Villiers (1973). Therefore the conclusions drawn should also be the same.

Moerk's (1980) reanalysis addressed the issue of parental input as a significant factor in a child's grammatical morpheme acquisition order. Moerk (1980) stated that his reanalyses suggested Brown's data provides "strong evidence for effects of input frequency" (p.116). Pinker's (1981) comments regarding Moerk's study indicated the presence of numerous methodological errors and therefore he discounted Moerk's conclusions.

Pinker's conclusions regarding the two previously cited reanalyses of Brown's and de Villers and de Villiers' data appear well justified and have been supported by Leonard (1984) in his discussion of recent findings in normal language acquisition. Therefore, to date, research continues to support Brown's original conclusions that the consistent order of grammatical morpheme acquisition is governed by the semantic and syntactic complexity of those morphemes.

How language disordered children acquire language as compared with the normal sequence of language development is not simply an academic question but rather is of great interest to speech-language clinicians in their attempt to plan efficient and effective treatment. Analyses of conversation samples from language disordered children have revealed two major findings regarding the acquisition of grammatical morphemes: (1) acquisition order was much the same as that for a normal child, and (2) although a number of morphemes appeared at the earliest stages of development, consistent use (present in 90% of obligatory contexts) was not evident
until later than is normal (Johnston and Schery, 1976; Steckol, 1976; Ingram, 1972a as cited in Johnston, 1982; Menyuk, 1974 as cited in de Villiers and de Villiers, 1978). If this sequence of development is the same but requires more time, then the clinician faced with a language disordered child has several options: (1) provide no treatment and allow the child to develop at his own rate; (2) attempt to enhance his language learning by enriching the language experience to his environment; or (3) follow a developmental model and begin training language skills a step beyond his current level of development (de Villiers and de Villiers, 1978). If however, the sequence of development for a particular language disordered child is different than the normal sequence, then other considerations must be made. Although the previous discussion has focused on morphology which is a single aspect of syntax, other aspects of language may also have some involvement in this acquisition order. For example, in normal children the regular plural morpheme appears early in the child's development of Brown's fourteen grammatical morphemes. The meaning it conveys is relatively simple in comparison to many of the other morphemes in that it has unitary meaning rather than two or three meanings. However, even though the child has the cognitive ability and the semantic concept required to convey plurality, if his phonological system is limited by a final consonant deletion process he may be unable to produce that morpheme. Therefore the clinician needs to look at where the breakdown occurs (i.e., phonology, syntax, pragmatics, or a combination of these) and structure treatment to take advantage of or compensate for these differences (Menyuk, 1975).

Language treatment programs are faced with determining what aspects of language to train and the sequence and procedures best for training them.
Obviously the major goal is to teach the child to communicate effectively; however, much of the information required to best plan that treatment (primarily that regarding generalization of targets to spontaneous speech) is unavailable. What we do know about where and why breakdowns occur in language disordered children is not sufficient to answer what and how to teach them. Neither is our knowledge of normal language acquisition sufficient to answer these same questions.

There are three major theories on which current language intervention programs are based (deVilliers and deVilliers, 1978). These theories provide the speech-language clinician with some guidance for determining appropriate treatment targets. The first bases its programs on Piagetian stages of cognitive development, emphasizing the cognitive pre-requisites for the acquisition of referential language (e.g., Bricker and Bricker, 1974). Cognitive skills are trained through non-verbal tasks and language training does not begin until these skills have been mastered. The second theory stresses the underlying semantic relations which constitute language (e.g., Miller and Yoder, 1974). This type of program uses a single, frequently occurring experience to teach a semantic relation which can then be extended to other familiar or unfamiliar experiences. Programs based on these first two theories use the normal developmental sequence as the basis for their training procedures. The third theory focuses on the functional aspects of language and programs based on this theory teach specific linguistic structures which allow the child some control over his environment (e.g., Guess, Sailor, and Baer, 1974). In an integrative view of these three schools of thought, Bloom and Lahey (1978) concluded the primary method of planning treatment is based on the research of normal acquisition and "adult intuition about which linguistic forms are simplest, easiest to
learn, easiest to each, and most important" (p.376).

Practical application of the previously cited treatment planning methods for training specific communicative behavior requires considerable thought in terms of the interaction between the various linguistic (i.e., semantic, syntactic, phonological, pragmatic) skill levels of each child. The clinician treating a language disordered child, specifically a child who consistently omits numerous grammatical morphemes from obligatory contexts, is faced with the question of which morpheme to train first. In keeping with those intervention programs emphasizing the functional aspects of language, it would seem that the "most important" morpheme would be the obvious choice. However, since grammatical morphemes are not typically essential to the communication of basic meaning, it may be difficult to ascertain which is the most important. A developmental approach, as advocated by those emphasizing the cognitive prerequisites to language and those stressing the underlying semantic relations, would seem to suggest that the "simplest" or least semantically complex morphemes would also be the "easiest to learn" and therefore the optimal choice for treatment target. This, however, may not necessarily be the case. A morpheme which is simple semantically may prove difficult for some children as the result of another linguistic aspect of that morpheme (e.g., syntax, phonology). The case of the child mentioned earlier in this paper who could not convey plurality because of a phonological problem versus a syntactic problem is a prime example. In other words, the "simplest" may be the "easiest to learn" but "simple" needs to be defined for each individual child in terms of his own semantic, syntactic, and phonological skill levels. Finally, although training the morpheme which is the "easiest to teach" (i.e., in terms of devising training tasks, gathering materials, data collection)
appears to focus on the clinician rather than the child it may indeed prove to be a viable plan. The possibility exists that following the training of the "easy to teach" morpheme the child may progress more quickly in the training of other morphemes. Explanations for this phenomenon may include similar response classes (Hedge, 1981), an increased awareness of obligatory structures or possibly even that the child was trained how to attend to the clinician and to learn what was being taught.

In a continuing effort to provide efficient and effective treatment speech-language pathologists require more research-based data regarding generalization to spontaneous speech to aid the decision-making process of choosing treatment targets. At the present time research providing this specific type of data is limited. The purpose of the present investigation was to examine the issues of choosing targets in terms of simplicity and the resulting ease of learning of grammatical morphemes. Specifically this study addressed the question, "Do language-disordered children learn earlier-emerging grammatical morphemes at a faster rate than later-emerging grammatical morphemes in treatment?"
CHAPTER TWO

METHODS

Subjects

The subjects were male twins, age seven years; three months at the onset of the study. Both subjects (A and B) were of low-average intelligence as measured by the Stanford-Binet Intelligence Scale and were attending Grade One at the Glenrose School Hospital in Edmonton, Alberta, Canada. At the time of enrollment in the Glenrose, fourteen months prior to the beginning of this study, both subjects' speech and language was reported to be characterized by numerous phonological processes affecting intelligibility, by receptive and expressive vocabulary delays and by utterances ranging in length from one to three words. Audiological assessment revealed normal auditory functioning bilaterally for both subjects.

Following enrollment in the Glenrose School Hospital both subjects received two hours of speech and language treatment per week for a period of nine months. Initial stages of treatment focused on articulation because reduced articulatory skills appeared to be limiting expressive language skills. Progress was slow and generalization was limited. Emphasis was then placed on expressive language skills; specifically pronouns, articles, plurals, and the phrase "I don't". As with articulation, progress on language goals was slow and minimal carryover into spontaneous speech occurred.

An assessment of communication skills immediately prior to the onset of this study indicated an overall delay of language skills. Receptive language skills for subject A as measured by the Miller-Yoder Test of Linguistic Comprehension (MY) (Miller and Yoder, 1984) and the Peabody
Picture Vocabulary Test-Revised (PPVT-R) (Dunn and Dunn, 1981) revealed age levels of five to six years and five years, six months, respectively. These results indicated a one to one-half-year receptive language delay for subject A. Subject B's performance on the MY (Miller and Yoder, 1984) and the PPVT-R (Dunn and Dunn, 1981) yielded age levels of six to seven years and five years, eight months, respectively. These results indicated a receptive language delay of one-half to one-and-one-half-years. An analysis of spontaneous language samples yielded MLU's of 4.5 and 3.2 for subjects A and B, respectively. This measure placed subject A in the predicted 40.3 to 52.9 month age range, a three to four year delay from his chronological age. Subject B's MLU placed him in the predicted 29.5 to 43.1 month age range, a four to five year delay from his chronological age. These low MLU scores were manifested by the omission of most grammatical morphemes and minimal attempts at complex sentences. Articulatory difficulties noted were cluster reduction of /s/ blends and inconsistent stopping, final consonant deletion, vowelization, and voicing errors.

These subjects were assigned to the author's clinical caseload and were then chosen for this study because of the similarities in their language skills and previous exposure to language and speech-language intervention.

Treatment Target Selection

Language samples obtained in a conversation elicited through a predetermined set of questions (Appendix A) were analyzed for the percentage of Brown's fourteen grammatical morphemes present in obligatory contexts. Each morpheme was then probed through the Multilevel Informal Language Inventory (MILI) (Goldsworthy and Secord, 1982) to provide a more structured opportunity for its production. One earlier-learned (possessive: Brown's
stage III) and one later-learned morpheme (irregular third person singular: Brown's stage V+) which neither child produced in obligatory contexts were chosen as treatment targets.

Baseline performance on both morphemes was measured by presenting stimulus pictures designed to elicit each morpheme. Ten opportunities for the production of each morpheme were provided (Appendix B). The irregular third person singular stimuli were divided into two sets of five stimuli each. One set was designed to elicit "has" and the other to elicit "does." Elicitation procedures involved the presentation of the stimulus pictures and accompanying verbal stimuli. For example:

Clinician (C): This girl doesn't have a star. Tell me about this girl.
Subject (S): She does.

(C): This girl has a star. Now tell me about this girl.
(S): She has a ________.

(C): This ball belongs to John. We say it is John's. Now the ball belongs to _______. We say....
(S): It is ________'s.

Each response was scored as correct or incorrect according to the presence or absence of the grammatical morpheme. A baseline consisting of ten responses for each morpheme was obtained over a period of three consecutive sessions (total of 30 responses) prior to the onset of treatment.

Baseline performance was also measured for one nontreatment morpheme (irregular past tense) which failed to occur in obligatory contexts in either the language sample or the MILI (Goldsworthy and Secord, 1982) probes. This morpheme difficulty level was between the targeted morphemes in Brown's (1973) predicted acquisition order. Stimuli and measurement procedures were similar to those described for treatment targets. This nontreatment morpheme was monitored weekly as a control for the effect of maturation.1
Treatment Procedures

Treatment consisted of two individual training sessions per week with ten minutes of treatment for each of the morphemes per session. The order of treatment for each morpheme was alternated every session.

In treatment for each morpheme, the subject was presented with 10 3X5" cards depicting the target structures and was instructed to produce the targets in response to the pictures and the clinician's models. Targets and modelling were presented according to the following progression:

1. one-word imitation
2. one-word elicitation with a model
3. one-word elicitation without a model
4. two-word imitation
5. two-word elicitation with a model
6. two-word elicitation without a model
7. simple sentence imitation
8. simple sentence elicitation with a model
9. simple sentence elicitation without a model

The criterion for advancement to the next highest level of difficulty was 100% accuracy in the initial production for two consecutive sets of ten stimuli presentations within a treatment session.

Generalization Measures

Generalization of treatment was monitored in two ways. First, both treatment and nontreatment morphemes were probed once per week always using the same stimuli (visual and verbal) and procedures used during baseline. The picture stimuli used for these probes were different from those used during treatment. Ten opportunities for the elicited production of each morpheme was provided. No feedback was provided regardless of the response. Second, a language sample designed to provide at least three opportunities for the production of both treatment and nontreatment morphemes was obtained weekly.
Scoring Procedures

The subject's initial response to the elicitation stimulus during training was scored as correct or incorrect. Correct responses were those in which the subject accurately produced the treatment morpheme at the level of difficulty being trained. Correct responses were initially rewarded with a token reinforcer along with verbal praise. The use of tokens was gradually faded out and verbal praise was the only reinforcement provided. If the initial response to any elicitation stimulus was incorrect, the subject was informed of his error and a correct model was provided. Following an incorrect initial response two additional opportunities for an accurate response were provided. These two opportunities were not figured into the percentage of correct responses to the elicitation stimuli. Self-corrections on the first opportunity for production were scored as a correct response. A 1:1 reinforcement schedule was followed.

Scoring for the generalization probes was the same as that for treatment except only one opportunity to respond to an elicitation statement was provided and the subject was not given feedback regarding the accuracy of his response. From the language samples the percentage of each subject's production of the targeted morphemes in obligatory contexts was calculated.

Design and Measurements

This study employed a multiple-baseline design across targeted morphemes for two subjects. Measurements obtained during treatment were percentages of accurate elicited responses for treatment morphemes. Measurements obtained from the weekly generalization sessions were percentages of accurate elicited responses for each of the three targeted morphemes in two situations, one similar to the treatment procedures and the other being elicited language samples.
Reliability

On-line scoring was performed by an independent observer for 2/15 or 13% of the treatment sessions and 1/7 or 14% of the generalization probe sessions. Point-to-point analysis (agreement on each instance of the observed behavior) indicated 100% agreement between clinician and observer for the treatment sessions and the ten generalization probes for each of the targeted morphemes. Reliability measures were not obtained for the weekly language sample.

1Throughout this paper the term "targeted" morphemes will refer to the possessive, irregular third person singular and the irregular past tense morphemes. "Treatment" morphemes will refer to the possessive and the irregular third person singular morphemes; "nontreatment" morphemes will refer to the irregular past tense morpheme.

2Throughout this paper "probes" will refer to the ten opportunities for each of the targeted morphemes to occur as a generalization measure. "Probes" will not refer to the three opportunities provided for each of the targeted morphemes to occur in the weekly language sample.
CHAPTER THREE

RESULTS

The purpose of this study was to determine if language-disordered children learn an earlier-emerging grammatical morpheme at a faster rate than a later-emerging grammatical morpheme in treatment. Stable baselines were obtained for treatment targets prior to the beginning of treatment. Treatment results indicated there was no clinically significant difference in the time required to train the treatment morphemes in highly structured tasks for subject A or for subject B (Table 1). Although subject B required ten additional trials to meet criterion for the possessive morpheme, actual treatment time was thirty minutes. Generalization probes indicated both subjects made consistent improvements on the irregular third person singular morpheme weekly probes and for the most part performance was markedly better than for the possessive morpheme probes. Generalization to the possessive morpheme probes was slower and generally less successful. On the final probe however, subject A increased from 0% to 90% correct production of the possessive morpheme, surpassing the success level of the irregular third person singular morpheme by 30%. No such improvement was noted in subject B's performance. The second generalization measure, an analysis of the weekly language samples for the percentage of the treatment morphemes produced in obligatory contexts, revealed both subjects were more consistently accurate in their inclusion of the possessive morpheme than the irregular third person singular morpheme (Fig. 1, 2, 3, and 4). However, further investigation of the data revealed the linguistic function of one exemplar of the irregular third person singular morpheme
TABLE 1  Number Of Trials Required To Meet Criterion For Each Level Of Difficulty For Treatment Morphemes.

<table>
<thead>
<tr>
<th></th>
<th>Subject A</th>
<th></th>
<th>Subject B</th>
<th></th>
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<tbody>
<tr>
<td></td>
<td>Possessive</td>
<td>Irregular Third Person Singular</td>
<td>Possessive</td>
<td>Irregular Third Person Singular</td>
</tr>
<tr>
<td>One-Word Imitation</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>One-Word Elicitation</td>
<td>2</td>
<td>5</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>With A Model</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>One-Word Elicitation</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>3</td>
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<tr>
<td>Without A Model</td>
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<tr>
<td>Two-Word Imitation</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>3</td>
</tr>
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<td>Two-Word Elicitation</td>
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<tr>
<td>With A Model</td>
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<tr>
<td>Two-Word Elicitation</td>
<td>2</td>
<td>5</td>
<td>11</td>
<td>3</td>
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<tr>
<td>Without A Model</td>
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<tr>
<td>Simple Sentence</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Imitation</td>
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<tr>
<td>Simple Sentence</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>4</td>
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<tr>
<td>Elicitation With A Model</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Simple Sentence</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Elicitation Without A Model</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Number Of Trials</td>
<td>27</td>
<td>29</td>
<td>40</td>
<td>30</td>
</tr>
</tbody>
</table>
Figure 1. Subject A's performance on weekly probes and language samples for the possessive morpheme.

Figure 2. Subject A's performance on weekly probes and language samples for the irregular third person singular morpheme.
Figure 3. Subject B's performance on weekly probes and language samples for the possessive morpheme.

Figure 4. Subject B's performance on weekly probes and language samples for the irregular third person singular.
has: auxiliary verb) in treatment was different from that elicited in the
language samples (has: main verb). This difference in procedures may have
yielded misleading results for this morpheme. Therefore the data was
reduced to include only the exemplar which was trained and elicited in the
language samples for the same linguistic function (does: auxiliary verb).
This reduced set of data was then reanalyzed for the percentage of correct
production in obligatory contexts. The reanalysis revealed the following
comparative results for subject A: 100% vs. 20% (reanalysis vs. original
analysis), 33% vs. 40%, no data vs. 0%, no data vs. 0%, no data vs. no
data; and these comparative results for subject B: 0% vs. 0%, 25% vs. 25%,
100% vs. 50%, no data vs. 0%, no data vs. no data. Because of this lack
of data from the reanalysis, no comparison could be made between the
learning rates of the treatment morphemes.

In sum, these results indicated no clinically significant difference
existed between the learning rate of the earlier-emerging (possessive) and
later-emerging (irregular third person singular) grammatical morphemes in
highly structured activities. A comparison of learning rate as measured
by generalization probes indicated consistently better performance on the
irregular third person singular morpheme for both subjects; however, the
final probe indicated better performance of the possessive morpheme for
subject A. Comparisons between language sample elicitation procedure
results could not be made due to the limited data available for the irreg-
ular third person singular morpheme.

Weekly probes of the nontreatment morpheme indicated no change in the
percentage of correct production for either subject across the treatment
period. Because both subjects' production of the irregular past tense
morpheme during the weekly language samples was much better than expected
TABLE 2  Irregular Past Tense Verbs Produced By Subject A In The Weekly Language Samples Probing For Generalization

<table>
<thead>
<tr>
<th>GENERALIZATION</th>
<th>Base</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<th>7</th>
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<td>did*</td>
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<tr>
<td>drew</td>
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<td>forgot</td>
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<td>gave</td>
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<td>TOTAL % CORRECT</td>
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<td>47</td>
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<td>% CORRECT EXCLUDING AUXILIARY VERBS</td>
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<td>0</td>
<td>0</td>
<td>40</td>
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</table>

*Auxiliary verb
TABLE 3  Irregular Past Tense Verbs Produced By Subject B In The Weekly Language Samples Probing For Generalization

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<td>wrote</td>
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</tbody>
</table>

| TOTAL % CORRECT | 100 | 75 | 31 | 62 | 33 | 38 |
| % CORRECT EXCLUDING AUXILIARY VERBS | -   | 50 | 27 | 50 | 50 | 50 |

*Auxiliary verb
based on baseline performance, a reanalysis of the baseline data was conducted. This reanalysis revealed those verbs which could function as auxiliary verbs as well as main verbs (e.g., had, did, was) were not counted in the original analysis of the baseline language sample. Inclusion of these verbs in that analysis revealed actual production of the irregular past tense morpheme in obligatory contexts was 86% and 100% for subjects A and B, respectively.

The irregular past tense morpheme data from the language samples were analyzed in two ways (Table 2 and Table 3). The first analysis involved calculating the percentage of correct production of all irregular past tense verbs in obligatory contexts. This analysis included verbs which can function only as main verbs and those which can also serve an auxiliary function. The second analysis involved calculating the percentage of correct production of only those verbs which cannot serve as auxiliary verbs.

The curve representing subject A's data (Fig.5) from the first analysis showed an increase of 17% from the first to the third sample and then a decrease of 7% from the third to the fifth (final) sample. Although it was impossible to predict the direction of the next data point, no consistent upward trend was evident, suggesting that increases in language skills were not due to maturation. The curve representing the second analysis of subject A's data indicated a consistent upward trend across the five language samples. This analysis was highly suggestive that maturation may have accounted for changes in language skills. The interpretation of these two analyses is obviously contradictory. Much of the problem arises as a result of the small number of occurrences (1-3) of this morpheme in each language sample. However, in conjunction
with the generalization probe data which indicated no change across the treatment period, there appears to be a stronger argument for attributing the changes in language skills to the effects of treatment rather than maturation for subject A.

The curve representing subject B's data (Fig. 6) from the first analysis failed to show any systematic increase or decrease of performance over time suggesting that changes in language were not due to maturation. The second analysis also revealed a fairly consistent performance across time at approximately the 50% level indicating no change. Together with the generalization probes these data suggest that treatment rather than maturation was the significant factor in subject B's performance of the treatment morphemes.

To summarize, the data indicated that for both subjects there was no clinically significant difference in the rate of learning for the earlier-learned morpheme than for the later-learned morpheme in highly structured training tasks. In generalization tasks similar to training tasks better performance and more consistent improvement across time were noted for the irregular third person singular for both subjects. A dramatic improvement was noted in subject A's production of the possessive morpheme for the final probe; however, being the last probe his performance beyond that point could not be determined. Although some increases were noted in performance levels for the "does" exemplar of the irregular third person singular morpheme for subject B, three out of five language samples for subject A and two out of five language samples for subject B yielded no data. This absence of data made a comparison with the data representing the learning rate of the possessive morpheme for both subjects impossible and therefore no conclusions regarding the generalization of
Figure 5. Subject A's performance on weekly probes and language samples for the irregular past tense morpheme.

Figure 6. Subject B's performance on weekly probes and language samples for the irregular past tense morphemes.
the treatment targets to less structured tasks can be drawn. The non-treatment data for subject B strongly suggested that linguistic maturation was not a primary factor in the progress noted for the treatment morphemes. Most of the nontreatment data for subject A supported the same conclusion as that drawn for subject B; however, there were some contradictory results which weaken the argument for change as a result of treatment.
CHAPTER FOUR

DISCUSSION

The discussion of this study will begin with a comparison between the results obtained and the literature pertinent to this topic. Next, specific factors which may have influenced the results will be presented and discussed. Finally, conclusions regarding this study and directions for further research will be presented.

According to the generalization probe results (language sample comparisons could not be made) for both subjects, generalization occurred more quickly and to a greater degree for the irregular third person singular morpheme. The development of the irregular third person singular morpheme prior to the possessive morpheme is in opposition to Brown's (1973) predicted order of acquisition which he based on semantic and syntactic complexity.

Another area of linguistic difficulty to be considered deals with the phonological characteristics of the treatment morphemes. The possessive morpheme involves the addition of /s/, /z/, or /lz/ to the end of a word depending on the features of the preceding phoneme. This may require the production of consonant clusters which is a later developing articulatory skill (Templin, 1957 as cited in Bernthal and Bankson, 1981). In comparison, the irregular third person singular morpheme involves the production of an entire word; however that word typically consists of relatively simple articulatory construction (i.e., CVC). The phonological complexities of these two morphemes may therefore provide support for the irregular third person singular as the easier morpheme to produce, which in turn may provide an explanation for the order of development in terms of production for these subjects.
Following the completion of the study several problems were noted in the treatment and monitoring procedures used. These problems may have had an effect on the data and the conclusions drawn from that data.

In the training of the possessive morpheme, all possessors were common nouns, e.g., cow, rabbit, girl. The ten probe targets however were unfamiliar proper names, e.g., Jay, Bill, Joe. It is possible that this difference had some effect on the subjects' abilities to generalize and may in part account for the large discrepancy between the learning rate of the trained targets and the generalization probes.

The training procedures for the irregular third person singular morpheme consisted of presenting "has" as an auxiliary verb, e.g., he has washed. The probes and language sample elicitation procedures designed to monitor the generalization of this word however elicited "has" as the main verb, e.g., she has the ball. This discrepancy between treatment and generalization measures did not affect those five "has" probes which were similar to the training task because "has" and "does have" were both acceptable responses and the subjects often responded with the latter. The discrepancy had its major effect on the language sample data because those elicitation procedures were designed to elicit "has" and no other response was acceptable. Since elicitation procedures to elicit "has" were designed to elicit only main verbs, the data collected were not reflective of either subjects' rate of learning of the auxiliary verb "has". In addition to not reflecting the learning rate of "has" this discrepancy in procedures yielded misleading results for the morpheme in general.

As noted in the results section, the irregular third person singular reanalysis yielded minimal data. This lack of data resulted from the
difficulties encountered in providing pragmatically appropriate opportunities for the obligatory production of the irregular third person singular morpheme in the language samples. Although a minimum of three opportunities for the production of both "has" and "does" were provided, both subjects responded appropriately yet in ways in which the elicited morpheme was neither obligatory nor present, e.g., C: I don't think Rudolf has a red nose. What do you think? S: I think so.

In view of the data available it is impossible to compare the generalization rates of the treatment morphemes in spontaneous speech. Therefore the author would like to present a few observations and then draw some conclusions.

In a highly structured teaching/learning paradigm each subject progressed as a similar rate for both morphemes, regardless of semantic, syntactic, and phonological complexities involved. When the paradigm was altered slightly to probe for generalization both subjects performed better on the morpheme which required the most similar response to the training response, the irregular third person singular. It is possible that this morpheme placed less emphasis on linguistic complexities than the possessive morpheme between the generalization and the training task and therefore the response was rote. The possessive response required the production of entirely new words to which the possessive morpheme was added. This factor may have made the accurate response for the possessive morpheme more difficult to produce.

Conclusions that can be drawn from this data include: (1) despite differences in semantic, syntactic, and phonological complexities, each subject learned both possessive and the irregular third person singular morphemes in a highly structured training program within a similar length
treatment time; and (2) in tasks similar to treatment generalization occurred more quickly for the morpheme which required the least change in linguistic complexity. The crucial issue, which cannot be addressed on the basis of this study is what generalizes most quickly to spontaneous speech. Future research needs to address that concept.

Aside from the specifics of this study, several issues have been raised for the author. The first deals with the importance of literature review prior to the onset of the study. Not only does this help to build the case but it also prevents replication of other studies and making similar mistakes. Second is the importance of carefully choosing targets, methods for treatment, and generalization measures tailored to the needs of the child. In addition assuring that the data obtained reflects the generalization to spontaneous speech of what is being taught is of prime importance. Without exercising this care we will never know if our services are beneficial or if they are the cause for change. Finally, this study made clear the difficulties encountered in trying to implement good research methodology in the school setting. The major difficulty was time constraints. The amount of time required to set up and implement a study limits the available time for planning and providing quality treatment to other clients in the clinician's caseload. However if we are indeed concerned with providing efficient and effective treatment, the school setting is where research needs to take place and treatment providers are the ones responsible for doing it.
APPENDIX A

The predetermined set of questions used to obtain the initial language sample from each of the two subjects.*

How old are you?
Who is in your family?
Do you have any brothers and sisters?
Who are they?
How old are they?
What kinds of things do you like to do together? (or)
What kinds of things do you like to do at home?

Do you have any pets?
What kind?
What is its name?
Who takes care of your pet?
What do they have to do to take care of it? (or)
How do they take care of it?

Where do you go to school?
What grade are you in?
Who is your teacher?
Do you like school?
What is your favorite thing to do in school?
Is there anything you don't like to do in school?
What is it?
What don't you like about it?

What sports/games do you like to play?
I've never played that game. Can you tell me how to play it?

Have you been reading any books?
What is your favorite book?
Tell me what that book is about?
Have you been watching TV?
What's your favorite TV show?
What's that show about? (or)
What happened on that show?

*Devised by Christine Dollaghan and Tom Campbell in an attempt to begin standardizing language sampling procedures.
## APPENDIX B

### Trained Targets

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<tr>
<th>Possessive:</th>
<th>Generalization Probes</th>
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<tr>
<td>bear's</td>
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</tr>
<tr>
<td>bee's</td>
<td>Bill's</td>
</tr>
<tr>
<td>boy's</td>
<td>Gail's</td>
</tr>
<tr>
<td>bunny's</td>
<td>Jay's</td>
</tr>
<tr>
<td>cow's</td>
<td>Jill's</td>
</tr>
<tr>
<td>doll's</td>
<td>Joe's</td>
</tr>
<tr>
<td>girl's</td>
<td>May's</td>
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<tr>
<td>kitty's</td>
<td>Paul's</td>
</tr>
<tr>
<td>monkey's</td>
<td>Phil's</td>
</tr>
<tr>
<td>puppy's</td>
<td>Ray's</td>
</tr>
</tbody>
</table>

### Irregular Third Person Singular:

- does have a hat
- does have boots
- does have pockets
- does have a sled
- does have mittens
- has washed
- has fallen
- has brushed
- has dressed
- has showered

### Irregular Past Tense:

- fell
- flew
- rode
- drew
- hung
- read
- grew
- broke
- ran
- wrote
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