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AN INVESTIGATION OF THE EFFECT OF THE
LINGUISTIC ENVIRONMENT ON PASSIVE
CONSTRUCTIONS IN CHILDREN FROM FIVE TO SEVEN.
THE UNIVERSITY OF OKLAHOMA, PH.D., 1977

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AN INVESTIGATION OF THE EFFECT OF THE LINGUISTIC
ENVIRONMENT ON PASSIVE CONSTRUCTIONS
IN CHILDREN FROM FIVE TO SEVEN

A DISSERTATION
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1977

AN INVESTIGATION OF THE EFFECT OF THE LINGUISTIC
ENVIRONMENT ON PASSIVE CONSTRUCTIONS
IN CHILDREN FROM FIVE TO SEVEN

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ABSTRACT

This investigation sought to determine the effect of manipulation of the linguistic environment on language production of children from five to seven-years-old. A single grammatical construction, the passive verb form, was chosen for manipulation. Ten child-mother pairs were exposed to reading materials containing a controlled percentage of passive verb constructions for a six-week period. Eleven child-mother pairs were exposed to the same reading materials without the passive verb forms as a control condition. Weekly interviews were conducted with each child and mother to determine the effect of the exposure to the reading materials. Both mothers and children in the experimental group increased their production of passive verb forms as compared to the control group. However, there was no difference between the three age groups in either the experimental or control group. Utilizing the computer simulation technique of Renshaw (1975) it was determined that the increase for the children resulted in a quadratic equation, while the mothers' reactions more closely resembled the tanh equation form proposed by the simulation model.

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Introduction

Child language development is a multifaceted area of study. Currently, no single area in the social sciences dominates the advances in our knowledge of how a child acquires and continually gains proficiency in language behavior. Divergent interest areas such as linguistics, psychology and anthropology with related scholars in sociolinguistics and psycholinguistics have all contributed invaluable insight into the domain of language study. Thus, it is only fitting that communication as a discipline begin to play a vital role in the search for an understanding of the processes underlying language development.

The present study was an investigation into the reaction of five to seven-year-old children and their mothers to the linguistic environment. One-half of the mother-child pairs was exposed to reading materials containing an increased percentage of passive verb forms. The second half was exposed to the same materials without the increased percentage of passive verbs. The purpose of this investigation was to discern the effect of increased exposure to a particular grammatical construction on one's subsequent language behavior.

Chapter I represents an attempt to integrate information from various interest areas to provide a rationale for the present research project. Research questions and expectations are also presented.

Techniques of data collection and analysis are detailed in Chapter II. In similar manner to the rationale, many design decisions resulted from integration of a variety of approaches. Hypotheses are also presented in this chapter.

Chapter III presents the experimental results of the present investigation. Discussion and interpretation of the data together with a critical evaluation and implications for future research follow in Chapter IV.

AN INVESTIGATION OF THE EFFECT OF THE LINGUISTIC
ENVIRONMENT ON PASSIVE CONSTRUCTIONS
IN CHILDREN FROM FIVE TO SEVEN

Lack of research on the contribution of the linguistic environment to the acquisition of language may be largely attributable to contemporary emphasis on innate universal principles. MacClay and Osgood (1954) and Bever, Fodor and Weksel (1965) assume that adult utterances decoded by a child are random and ungrammatical samples of the English language. This assumption lends underlying support for the view that a child is preprogrammed for language learning. A child abstracts or selects words from the environment, but the combination of those words into grammatical utterances is possible through employment of "innate principles." This position, however, appears to be unsupported in fact. According to Labov (1970),

The ungrammaticality of everyday speech appears to be a myth with no basis in fact. In the various empirical studies that we have conducted, the great majority of the utterances--about 75%--are well-formed sentences by any criterion. When rules of ellipses are applied, and certain universal editing rules to take care of stammering and false starts, the production of truly ungrammatical and ill-formed sentences falls to less than two percent. (p. 42)

Brown and Bellugi (1964), Drach (1969), Waterson (1971) and Halliday (1972) add support to Labov's contention.

If the linguistic environment of the child is not random, it can dictate a powerful influence on the child's acquisition of language. Surveying available data on the effect of linguistic input on a child's acquisition of language, Landes (1975) concludes:

. . . the current neglect of environmental factors in favour of "innate ideas" has been unfortunate, for the proper course to follow in the investigation of language acquisition is to specify the nature of the linguistic environment, identify possible sources of information available to the infant, then discover which of these possible sources are used. (p. 376)

The present study sought to discern the relation between the linguistic environment and the development of language. The linguistic environment refers to all aspects of language to which one is exposed. This includes grammatical, phonological and lexical properties of a language. A second interest area concerned the effect of age on reaction to the linguistic environment. Thirdly, the present investigation explored the impact of selective input on maternal speech and its consequent effect on the child's language production. The following research questions established the guidelines for the present investigation:

- Will the linguistic environment influence a child's language behavior?
- Will older children produce language that corresponds more closely to the linguistic environment than younger children?
- Will a mother react to the linguistic environment, and what effect will her reaction have on the language behavior of the child?

In order to answer these questions, a restricted portion of the grammatical aspect of the linguistic environment of

both the mother and child was manipulated. To allow for increased precision in assessment of the effect of the environment on language behavior, a single variable, the passive verb construction, was selected. Several issues including the grammatical description of a passive verb form and the emergence of the passive in the child's language determined its selection.

First, the selection of active or passive verb forms may be a pragmatic strategy employed by users of English. Speculations on this strategy center around the issue of emphasis--emphasis as a method of receiver adaptation or emphasis as reflecting the intent of the speaker. This issue is suggested by a grammatical definition of the active and passive voice. Active voice is a grammatical classification applied to sentences when the subject (actor) of a sentence "acts" in some way. The verb may be transitive, intransitive or include linking verbs.

Passive voice can be defined notionally or formally. A notional definition of the passive is ". . . passive voice is the form used when the subject is the receiver of the action. Or more simply, . . . the passive states that something is done to the subject" (Roberts, 1954, p. 126). Utilization of this notional definition presents difficulty in sentence classification. For example "His play reads well, but it won't act" would be classified as a passive under the terms of the notional definition.

A formal definition of the passive voice attempts to alleviate this difficulty in classification. According to Roberts (1954) ". . . the passive voice is always expressed in a verb phrase consisting of some form of the be auxiliary plus the past participle form of the principal verb. . . ." (p. 126). Using this criteria, the following sentences are passives:

Stanley was struck by Edgar.
Mulroy was being closely watched.
The baby was rocked to sleep.

Several other restrictions are also applied to the categorization of passive sentences. First, the verb must be a transitive verb, that is, the principal verb must be an action verb of incomplete predication; it requires a direct object (LaPalombara, 1976, p. 42). Thus, intransitive or linking verbs cannot be included in a passive sentence.

Although the primary definition of Roberts (1954, p. 126) states that the past participle form of the principal verb is always included in a passive sentence, he notes that there is an increasing tendency to use the past, present and future tense form of the verb be in the construction of passive sentences (p. 129). The following sentences are examples of the three tenses:

Scott was whipped by his father.
Scott is being whipped by his father.
Scott will be whipped by his father.

Finally, a relatively new occurrence of the passive construction, accepted in general English, is the inclusion

of the got passive, when got is substituted for the auxiliary be (Roberts, p. 129). The following are examples of this substitution:

Harold was shot by the thief.
Harold got shot by the thief.

LaPalombara (1976) adds the further restriction that a passive sentence must contain a prepositional phrase, usually containing the words by or with. The following set of sentences are examples of the inclusion of the prepositional phrase:

Stanley was slapped by Edgar.
Stanley was being slapped with Edgar's hand.

However, in actual language use, the prepositional phrase may be excluded. In this case, the passive sentence is labeled a truncated passive. A test of the classification of truncated passives is that for a sentence to be passive a prepositional phrase can be deduced from the context of the utterance and added to the sentence.

These criteria are traditional descriptions of a passive sentence. Studies presented as part of the rationale for the present investigation utilized similar definitions of a passive construction.¹ To allow for continuity of research variables, this investigation utilized these criteria to identify passive constructions.

¹The majority of the studies did not explicitly state the criteria for identification of passive constructions.

Utilizing this set of criteria for identification of the passive and active voice, in the active voice the first noun phrase (hereafter designated as NP₁) contains the subject of the sentence and the second noun phrase (hereafter designated as NP₂) contains the object of the action. According to Roberts (1954) and Turner and Rommetveit (1968, p. 543) NP₁ establishes the focus of attention for a listener, or allows the speaker to place emphasis on the subject as opposed to the object. Because of this focus of attention, NP₁ is placed in the dominant or primary position for processing of the sentence. NP₁ may also establish limits on the following words in the sentence. In the passive voice, where NP₁ contains the object of the action, the object is the focus of attention in processing the sentence. Thus, the question of emphasis is of central concern in the determination of the strategy involved in the use of passives.

A second issue involved in the selection of the passive voice in the present investigation is the age of the child in relation to the emergence of the passive construction. In the process of language acquisition, most grammatical constructions (i.e., sentence types) are acquired by the age of four or five (Brown, 1972; Menyuk, 1964). The child knows and expresses the simple active sentence, compound sentences, complex and embedded sentences and past, present and future tense verbs (Brown, 1972). The passive voice emerges at a later stage in the child's language development. At age five,

a child is capable of limited imitation of the passive sentence. Also at age five, the child demonstrates limited comprehension of passive sentences.² Spontaneous production of passive constructions does not develop with regularity until around age seven (Fraser, Bellugi and Brown, 1963; Turner and Rommetveit, 1967b). Thus, there is approximately a two-year difference between acquisition of the ability to imitate and comprehend a passive sentence and the spontaneous production of passive sentences.

The combination of late development of the passive voice in relation to other grammatical constructions and the difficulties in denoting the passive form provides an intriguing area of research in child language acquisition. Within the context of this area of research several theoretical issues are of importance. First, research on the transformational decoding hypothesis has highlighted the controversy surrounding the grammatical description of the passive voice. A second issue involved in investigation of the passive is the delineation of abilities involved in the processes of imitation, comprehension and production. Underlying this issue is the argument surrounding the distinction between competence and performance. Thirdly, exposure of the child to language within his linguistic environment might be a contributing factor in the development of the passive voice.

²Certain issues such as reversible and nonreversible sentences are quite important in determining the level of imitation and comprehension. This distinction will be discussed later in this chapter.

In this chapter, discussions of the transformational decoding hypothesis, the interplay of imitation, comprehension and production and the effects of the linguistic environment are presented as part of a rationale for a six-week investigation of the child's verbal reaction to the language environment. Based on this rationale, research questions are advanced in an attempt to assess the effect of the linguistic environment on language behavior.

Transformational Decoding Hypothesis

The transformational decoding hypothesis proposes that a passive sentence must be transformed to an active sentence structure before the sentence may be placed in the information processing system of an individual. Gough (1965) devised an experiment to test this hypothesis. Students were first presented with a passive or an active sentence. Next, they were asked to verify a picture as depicting or not depicting the meaning of the sentence. Subjects verified the active sentences in a shorter time than they verified the passive sentences.

Gough does not claim that his results support the transformational decoding hypothesis. Instead he suggests that verification time of the pictures may rest on a scanning order. In the pictures, the actor was usually obvious, which facilitated the verification of active sentences. When the passives were verified, the object was usually not as obvious and this may account for the increased verification time.

Gough concludes that this differential focus scanning may result in the variation of time, not the act of transforming the passive to an active kernel in order to verify the pictures.

A pair of experiments conducted by Johnson-Laird (1968a, 1968b) seriously question the validity of the hypothesis. In the first experiment (1968a) subjects read one of the following sentences: "Red follows blue" or "Blue is followed by red." Subjects were then asked to illustrate the sentence by coloring a rectangle in red and blue and to draw a vertical line to separate the colors. For the active sentence, the grammatical subjects were represented by larger areas than grammatical objects. This disparity increased when illustrating the passive sentences. In the illustrations of the passive sentence, the grammatical subject received a larger space than the grammatical subject in the active sentence.

These results seem to indicate the different semantic interpretations applied to passive and active sentences. Subjects illustrated the relations between subject and object of a sentence differentially based on the grammatical structure of the sentence. These results also may indicate the increased focus of attention on the grammatical subject in a passive sentence.

To further clarify the notion that the semantic interpretation of an active and a passive sentence is different for each sentence type, Johnson-Laird (1968b) conducted a

second experiment. Subjects reacted to active and passive sentences by interpreting the meaning of the sentence. Results indicated that voice determines the level of emphasis while word order determines what is emphasized. Subjects reported that the active voice was more emphatic than the passive voice, and that the first noun phrase (NP_1) established the object of emphasis in the sentence.

The results of these three studies seriously question the validity of the transformational decoding hypothesis. Not only do respondents react to the syntactic variation of passive and active sentences, but the two sentence types are not recognized as semantically equivalent.³

Numerous investigations discussed in the following section on imitation, comprehension and production of the passive voice are concerned with the relationship between active and passive sentences.

Imitation, Comprehension and Production

Research on the development and use of the passive voice has typically concentrated on the separation or the interaction of abilities involved in the processes of imitation, production and comprehension. The studies presented in this section utilized similar criteria for identification

³The issue of semantic distinctiveness or semantic similarity between active and passive sentences is a point of considerable debate between transformational grammarians and generative semanticists. For explication of this controversy see Chomsky (1957), Lakoff (1972) and Chomsky (1972).

of passives that will be applied in the present investigation.

For the imitation condition, respondents are usually presented a sentence, then asked to reproduce the sentence. Between the ages of three and five children continually gain proficiency in this task. The most common error in the imitation task for both adults and children is the reconstruction of passive sentences to active sentences. Comprehension chronologically follows imitation, with proficiency gradually gained between the ages of five and seven. In the comprehension condition respondents are usually required to act out the action present in the contents of a sentence or to determine the equivalence of an active and passive sentence. However, a confounding variable in many of the investigations is the assumption that passive and active sentences are semantically equivalent. For the production condition, the frequency of the passive in spontaneous language or in response to picture stimuli is measured. Children do not reliably spontaneously produce passives until approximately age seven.

Overall it seems that a child may achieve competence in the areas of imitation and comprehension by five years of age but the production of passives in the natural language environment does not automatically follow the acquisition of these abilities.

Imitation

Novinski (1968) asked five-year-olds to judge equivalence and non-equivalence of sentences in three conditions: recognition, imitation and comprehension. Equivalence was defined as sameness of meaning. In the recognition condition, subjects listened to two sentences (one active and one passive) and judged their equivalence. In the imitation condition, the subjects imitated the first sentence, heard a second sentence, then judged their equivalence. To determine comprehension, subjects heard a sentence (either active or passive) then selected a picture which corresponded to the sentence. They then listened to a second sentence and determined equivalence of the two sentences.⁴

Judgements were most accurate in the imitation condition and least accurate in the recognition task. Novinski postulated that children pay more attention to syntactic information in the imitation process than in the comprehension condition, where semantic factors seem to receive increased attention. Thus, when the child is allowed to participate in some action, the passive is judged as equivalent to an active sentence. Novinski's assumption of equivalence differs from the position presented in this paper. He posited that the active and passive constructions were equivalent

⁴Novinski does not detail the controls utilized to insure that the picture actually corresponded to the sentence type. Nor does he present the controls utilized in choosing the corresponding sentences. Also, there is no discussion of the comprehension abilities involved in each of the three conditions.

in meaning. The decreased accuracy in the comprehension and recognition tasks may indicate that young children do not judge passive and active sentences as semantically equivalent.

Fraser, Bellugi and Brown (1963) found that three-year-olds imitated passive constructions correctly, but they did not comprehend their meaning. The authors hypothesized that children at age three process passives in a similar manner to that in which they process actives. In other words, they reconstruct the Object-Verb-Subject (O-V-S) order of the passive to the Subject-Verb-Object (S-V-O) order of an active sentence (p. 133). This may demonstrate a lack of comprehension of the variance in meaning due to the reversed word order. "Processing the sentence in this way would enable the child to maintain the generality of the usual rule of English word order in which the subject precedes the object" (p. 133). Because the three-year-olds imitated the passives correctly, but did not comprehend the meaning, the authors concluded that imitation could likely be viewed as a perceptual motor skill not dependent on comprehension. They also concluded that the three-year-olds concentrate more on the grammatical aspects of language than on semantic aspects.

Neither of the preceding studies mentioned controls they placed on the passive sentences utilized in the imitation conditions. The features of reversibility and truncated versus full passives may heavily influence the results and subsequent interpretation. The concept of reversibility

involves the placement of nouns in a sentence and the effect of this placement on the logic of the sentence. A sentence is reversible if NP_1 and NP_2 can be reversed and still retain their logical correctness. For example, "Mary washes John" can be constructed as "John is washed by Mary" or "John washes Mary." Each of these sentences is logically and grammatically correct even though the possible interpretations of meaning are not held constant. A sentence such as "The baby was delivered by the doctor" cannot be reversed to "The doctor was delivered by the baby" and still retain its logical correctness.

Turner and Rommetveit (1968) hypothesized that children would be able to recall reversible sentences with a greater facility than they would be able to recall nonreversible sentences. They related reversibility to the focus of attention and hypothesized that the focus of attention would influence the choice of sentence subject in recall. Children from kindergarten to third grade reacted to the following types of sentences: nonreversible active (NRA), reversible active (RA), nonreversible passive (NRP) and reversible passive (RP). Subjects were presented with a picture as the experimenter read a corresponding sentence. They were then asked to recall the sentence.

The four conditions of stimulus materials did not result in a significant difference in the number of recalled sentences and transformations. There was a significant increase

in the number of passive sentences recalled with an increase in age. And, when the retrieval picture was congruent with the original voice of the presented sentence, facilitation of correct recall resulted.

Typically, when a noncongruent picture (one different from the voice in the original sentence) was presented, the subjects transformed the sentence to agree with the picture. When only the actor, or the total picture was presented in retrieval, active sentences were recalled correctly and passives were transformed to actives. Passives were recalled correctly when the acted-upon element picture was presented. Overall, however, the frequency of active sentences in recall was much greater than passive sentences. Turner and Rommetveit concluded that the subject of a sentence is the most salient semantic element of the sentence. The focusing of attention on NP₁ may indicate the semantic difference recognized by subjects.

Although reversibility does not seem to be a contributing factor in imitation, Sinclair-de-Zwart (1969) asserts that this aspect does play an important role in comprehension. These findings coincide with the conclusion of Fraser, Bellugi and Brown (1963) that young children attend to the grammatical aspect in imitation and then shift to an emphasis on the semantic aspects of a sentence for comprehension of the sentence.

An area neglected by Novinski (1966) and Fraser, Bellugi and Brown (1963) is the difference between the full passive

and the truncated passive. The truncated passive contains NP₁ and the auxiliary verb plus the principal verb. The prepositional phrase is not included. Beilin and Sacks (1975) estimate that seventy percent of all passives are presented in the truncated form (p. 11). Examples of the truncated form are "He was hit" and "John was loved." The truncated is usually acceptable only if the agent or actor (NP₂) is mentioned previously in the context of the communication.

Despite the predominance of the truncated passive form, Sinclair-de-Zwart (1969) claims that only the full passive provides a basis for determining whether a child understands the logical structure of the passive, since the truncated form does not confirm the existence of an actor. It would be hasty, however, to accept this assertion. The truncated passive is recalled with greater efficiency than the full passive, but the truncated form is recalled to a lesser extent than active sentences.

Slobin (1968) investigated recall of active, truncated passive and full passive sentences. Subjects were children from kindergarten to sixth grade and adults. The experimenter read brief stories in which all of the sentences were passives. Series A contained full passives and Series B consisted of truncated passives. The stories were designed to attract the interest and attention of the various age groups. Each subject (except for the kindergarten subjects) heard a story from

each series. Subjects then retold the story to the experimenter.

Sentences which were retold were classified into four categories: 1) corresponding active--subjects used a sentence whose verb was contained in the story; 2) other active--subjects used a sentence whose verb was not present in the story; 3) full passive or 4) truncated passive.

Truncated passives were recalled verbatim more frequently than full passives. On the average, sixty percent of the truncated passives were retained, while subjects changed seventy-five percent of full passives to another form. For each age group, truncated passives were recalled significantly better than full passives. Also, truncated passives were never recalled as full passives.

Slobin concludes that in the truncated passive ". . . the syntactic form is not totally irrelevant to the meaning of the sentence" (p. 879). Truncated passives should not be discounted until there is further evidence that speakers and listeners perceive the truncated form as a syntactically and semantically separate construction.

Overall, these studies demonstrate that active sentences are imitated and recalled with far greater proficiency than passive sentences. Truncated passives are recalled with a greater proficiency than full passives. Slobin (1968) and Turner and Rommetveit (1968) found that subjects reconstructed passives to active sentences during storage and retrieval.

Several authors attempted to correlate reconstruction of the passive to the active with the process of comprehension. A change in sentence structure implies comprehension of the original sentence. The following investigations employed various techniques to test comprehension, including acting out a sentence or judging equivalence of meaning.

Comprehension

Beilin and Sacks (1975) explored comprehension using nursery school through second grade subjects. In the comprehension condition, an experimenter produced an active or a passive sentence. Subjects then imitated the sentence and acted out the content of the sentence. For the production condition, the children were shown a picture and asked to construct a sentence to describe it.

The children had no difficulty in any condition with the active sentences. For the passives, there was a substantial increase in correctness for all tasks with age. For the nursery school children, eighty-five percent of the passive sentences were correctly imitated while only fifty-three percent were correctly enacted. Twenty-one percent of the nursery school children produced passives while eighty-five percent of the first graders produced passives.

The children also determined the synonymity between active and passive sentences. Comprehension of synonymity was not achieved until about seven years, and only in linguistically expressed statements, not in pictorial equivalence.

Children can comprehend the passive before they can make correct judgements of the semantic equivalence of actives and passives.⁵

Using the same technique, Sinclair and Ferriero (1970) found the same increased accuracy due to age. The four to five-year-olds achieved 63.8 percent accuracy in comprehension while the seven-year-olds responded with 83.6 percent accuracy. Production of passives in free description also increased with age, as did accuracy in imitation.

Decreased accuracy in the equivalence tests as compared to imitation and comprehension tests is consistent with the findings of Johnson-Laird (1968a, 1968b) who employed adults to investigate the question of semantic equivalence. These investigations found that adults do not judge passive and active sentences as semantically equivalent. The following investigation by Slobin (1966) demonstrates that young children seem to concentrate on syntactic information while adults rely more on semantic aspects. This may contribute to an explanation for the variance between children's and adults' judgements of passive and active equivalence.

Slobin (1966) researched the effect of reversibility on sentence comprehension of children and adults. By investigating

⁵It may be that demonstrating comprehension through acting out the action described in a sentence is not the equivalent of demonstrating comprehension through judging equivalence of two or more sentence constructions. This may explain the ambiguity surrounding the results of the comprehension condition.

comprehension, Slobin sought to determine the interaction of transformations and semantics. Subjects viewed pictures demonstrating reversible or nonreversible action, then heard a sentence and responded if the sentence was true or false with respect to the picture. Reaction time (RT) was the dependent measure.

The main effect of grammatical construction was significant. The structures in hierarchical order were active sentences, passive sentences, negative active sentences and negative passive sentences. RT and errors diminished considerably with age. However, the difference between the age groups was not striking.

Overall, the results indicated a decrease in errors and RT with an increase in age. Slobin concluded that the decrease in verification time reflects a concentration on semantic features instead of syntactic features. The effect of concentration on syntactic or semantic features of passive and active sentences is illustrated in the following investigations of errors committed during the process of comprehension.

Investigating errors committed by young children, Hayhurst (1967) sought to distinguish reconstruction from comprehension. Subjects of five, six and nine years of age heard sentences describing pictures. They were given a second set of pictures and asked to describe the pictures with a sentence like the one they heard from the experimenter.

The overall rate of errors decreased significantly with age. In the young subjects, errors reflected a lack of comprehension; they would reproduce a passive sentence with only the subject included (truncated form) failing to identify the object. This error could indicate a lack of attention span, not a decrease in comprehension. Young children may attend to the first phrases of a sentence with greater concentration than they use to attend to the remaining phrases. Older subjects tended to reconstruct the sentence to active kernels, not even attempting to produce the passive voice. Overall, the maximum correct constructions did not exceed fifty percent, indicating at even nine years, a child is not totally proficient in use of passives.

Ruddell and Graves (1968) investigated errors of children in comprehension of passive sentences. First graders, divided into a High socio-economic status and a Low socio-economic status group based on the occupations of the fathers, were shown a picture. The children then heard two sentences, produced a response (imitated) and matched their response to the original pictures. Overall, the High group produced 30 errors while the Low group produced 56 errors (out of 90 possible responses). The errors centered around inability to determine the primary actor and changing the word order in the response phase of the investigation. Ruddell and Graves did not address the interaction of semantic and syntactic aspects of the passive sentence in relation to errors produced by children.

The following study conducted by Turner and Rommetveit (1967a) utilized more detailed conditions for production of passives that may help to clarify the processes involved in production of passives.

Production

Turner and Rommetveit (1967a) assumed the function of the passive voice may be a pragmatic concern for emphasis. The agent is de-emphasized to reduce its importance in the sentence. "In other words, the most important or most salient stimulus is encoded as the subject of the sentence" (p. 179). To demonstrate the salience aspect, the authors manipulated word order (focus of attention) through questions asked of the subjects. In the first experiment, subjects from kindergarten to fifth grade were shown two reversible and two nonreversible pictures in one of the following conditions: naming (the subject described a picture), scanning (subject described a picture where the agent appeared first or the acted upon object appeared first), controlled scanning (subject described a picture where the acted upon element was presented first accompanied by a passive sentence, or the agent appeared first along with an active sentence).

The effects of grade level and sentence reversibility were all significant. Older children produced more passives than young children only in the controlled scanning task and more nonreversible sentences were produced than

reversible sentences. More passives were produced in the scanning condition than in the naming task, and more passives were produced in the controlled scanning condition than in the scanning task. The interaction between grade and task was insignificant.

These results showed some support for the hypothesis that voice can be manipulated by visual scanning. The lack of increased production with age (except for the controlled scanning task) may have resulted from a lack of structure in the other situations. In an attempt to clarify these results the authors conducted a second experiment. Kindergarten through third-graders responded to one of the following four questions concerning a picture:

1. What is (the actor) doing?
2. What is happening in the picture?
3. What is being done to (the acted upon)?
4. What is happening to (the acted upon)?

The children answered the questions in reaction to three reversible and three nonreversible pictures.

Answers to questions 1 and 2 elicited only active sentences, with increased passives in response to questions 3 and 4. The difference between answers to questions 1 and 2 and questions 3 and 4 was highly significant at each grade level with no difference based on reversibility. There was a significant increase in production of passives with age, with the kindergarten subjects producing no passives.

Experiment I indicates the interplay of imitation involved in the production of passives. Children as young as

five years produce passives when imitating an adult model. However, in Experiment II, where no imitation was involved, the effect of age was clearly demonstrated. Spontaneous construction of the passive voice increased with an increase in age. The older children were capable of responding in the voice corresponding to the syntactic demands of the questions.

In a second investigation, Turner and Rommetveit (1967b) attempted to discern the relation of active and passive development with respect to the processes of imitation, comprehension and production.

Turner and Rommetveit (1967b) used the technique of Fraser, Bellugi and Brown (1963) but employed reversible and nonreversible sentences. Children responded correctly on the imitation task before they could respond correctly on the comprehension task. Comprehension was also achieved before proficiency in the production task.

Active sentences were responded to more accurately than passives. The order of difficulty was: nonreversible active, reversible active, nonreversible passive, reversible passive. Younger subjects also tended to reverse word order more frequently than the older children. "This finding suggests that younger children accept semantically anomalous sentences more frequently than older children do" (p. 659).

Turner and Rommetveit propose similar processes in the development and use of passives. In a child's early life,

the passive serves no function in his expressions. When the subtleties of de-emphasis or interest become meaningful the passive voice is learned by the child in order to express these relations. This pragmatic view may explain why the passive voice is a late development of children's language. The following studies of the frequency of passives in the natural language of the child tend to support this assumption.

O'Donnel, Griffin and Norris (1967) collected spontaneous oral and written language samples from children aged five to fourteen in a classroom situation. Passive constructions accounted for less than one percent of the sentence constructions for any age group, although there was a definite increase in use with age.

Strange and Hocker (1965) used spontaneous oral samples of first graders collected in the classroom, at parties, on class trips and in various other communication situations. The passive voice did not appear in the language of any of the respondents in any situation.

Menyuk (1964) analyzed spontaneous speech responses in the classroom and during a conversation. Her subjects ranged in age from 2:10 to first-grade age. Overall, less than fifty percent of the children used passives, and the overall frequency was below two percent passive constructions. Beilin and Sacks (1975) found that when describing a picture, twenty-one percent of the nursery school children tested used passives and eighty-five percent of the first graders

produced passives, but they did not mention the frequency of occurrence. Francis (1975) asked children from five to seven to describe a set of pictures. She discovered that only a few five-year-olds produced the full passive, but by seven years, forty percent of the children tested used the passive verb form.

These studies demonstrate the infrequent production of passives by children from nursery school age to fourteen years. All of the samples analyzed were oral, spontaneous samples of language behavior. Thus, in the natural language environment a small percentage of one's sentence constructions are passive. This lack of use of the passive by the child may be a significant feature of the linguistic environment, and may ultimately influence the acquisition and development of the passive voice.

In summary, the research reported in this paper lends credibility to the assumption that active and passive sentences are syntactically and semantically distinct. Active sentences are imitated, comprehended and produced with greater efficiency at an earlier age than passive sentences. Turner and Rommetveit (1967b) proposed that this development is pragmatic--the passive serves no function in a child's language repertoire. An expansion explanation may be available through investigation of the child's linguistic environment. This next section will discuss the possible impact of the environment on the development of the passive voice.

The Linguistic Environment

Language researchers from various theoretic positions assume that the linguistic environment helps to shape language behavior (see for example Bernstein, 1961; Labov, 1970; and Landes, 1975). However, as Landes (1975) concluded, the impact of environmental factors has been virtually neglected in language investigations. Limited evidence does exist which suggests the influence of the environment on child language development and use.

Noel (1953) found that grammatical errors present in children's language correlated ($r_{107} = .52$) with errors produced by their parents. Moerk (1974) found that the average statement length of the mother was similar to that of the child. Bowerman (1973) concluded that the two Finnish children she investigated used the dominant word orders of their mothers' in the same hierarchial pattern.

The results of these investigations are certainly not definitive, concrete proof that the linguistic environment determines the language development of the child. Instead, the results raise many questions. However, if this assumption is credible, then the occurrence of the passive voice in the natural language environment of the child may govern the age of development and relative frequency of the passive.

Few investigations have determined the frequency of passives in the language environment. The findings of Menyuk (1964), Strange and Hocker (1965) and O'Donnel, Griffin and

Norris (1967) result in an average of less than one percent of the total sentence constructions are passives. Thus, in the school atmosphere, few passives are produced.

Using adult respondents, Goldman-Eisler and Cohen (1970) also found limited use of passives in various communication contexts. The authors analyzed messages ranging in formality from oral interviews with psychiatrists to speeches delivered before the British House of Commons. The proportion of passive constructions appearing in the language decreased as planning and intellectuality of the situation decreased. Overall, less than four percent of the sentence constructions were passives, and the majority of the passives were truncated. In the interviews with psychiatrists, .7 percent of the sentences were passives, while 10.8 percent of the sentences in the speeches delivered before the House of Commons were passives. The authors concluded that presence of the passive voice may indicate ". . . a general degree of maturation which manifests itself as 'control' over more primitive levels of function and a capacity for sophisticated constructions" (p. 164).

One of the most interesting findings of Goldman-Eisler and Cohen is the increased use of the passives in the formal situations. They noted that the speeches delivered before the House of Commons were presented from written texts. It may be that written language contains a higher frequency of

passives than spontaneous oral language.⁶ If this condition in fact exists, then children around age seven (when the passive emerges in spontaneous production) may be exposed to written material to a greater extent than children in younger age groups.

The overall conclusion resulting from the research on the impact of the linguistic environment is that there is a compelling need for investigations in this area. The present investigation is designed to attempt to provide some preliminary answers to the questions concerning the effect of the environment on language behavior.

Research Expectations

This preceding review of investigational research highlights the difficulties associated with passive constructions. Around the age of five, children imitate passive sentences with a high degree of efficiency. Between the ages of five and seven, children develop the ability to comprehend passive sentences with regularity. However, it is not until approximately age seven that the child spontaneously constructs passives with any proficiency.

Three major problem areas are dominant in this line of research. First, many of the studies employed pictorial

⁶The present author collected oral and written language samples from the same subjects on the topic of inflation (Gorcyca, 1976). The written messages contained two percent passive sentences, while the oral sample contained .2 percent passives.

stimuli for elicitation of the passive sentences. Few researchers controlled for the possibility that the child would not perceive the object as the dominant figure in the picture (for example, Novinski, 1968). Only the Controlled Scanning task of Turner and Rommetveit (1967a) attempted to control this aspect. Also, if the child is very young (under age seven) the passive may not be in his linguistic repertoire. Thus, the picture task may indicate when the passive emerges, but does not explain why or how the passive occurs. By utilizing reading material containing a controlled percentage of passives, the present study aims to explore not only (1) the age of emergence of the passive, but also (2) the effect of age on reaction to the linguistic environment.

A second line of criticism is that there is a lack of extended research to answer the age development questions. All of the studies reviewed in this paper used a one-time-task. An extended research program could establish linguistic environmental effects on the development of the passive voice, not only upon the children, but also upon the mothers exposed to the same environment. The corresponding effect of maternal speech upon children may also yield interesting findings on the impact of the language environment.

The third problem area is the identification of a sentence. In written language, the encoder establishes a sentence through the use of punctuation. However, in oral

language the encoder is not afforded this opportunity. The studies which measured the percentage of passives did not detail the criteria established for determination of a sentence. Because of the difficulty in identification of sentences in oral language, the present study will utilize the number of passive verbs divided by the total number of verbs. This percentage will be utilized in data analysis.

The present research project was a six-week study that manipulated the language environment with respect to the passive voice. A secondary purpose was to assess the degree of learning involved in attainment of passive construction proficiency. Finally, this study sought to determine the "shaping" relationship between the proportion of passives in the stories and the proportion of passives produced by children and mothers.

Previous research suggests that we should expect children who are exposed to reading material containing an increased use of passive constructions to conform by increasing the proportion of occurrence of their own passive constructions. In addition, we would expect that the older the child the higher the rate of that conformity. Specific hypotheses are presented in Chapter II.

Summary

The purpose of this chapter was to establish a rationale for a six-week study of the effect of the linguistic environment on the language behavior of the child. Numerous studies

were cited that investigated the process of imitation and comprehension with respect to the passive voice. Relatively few studies investigated the development of production of passive constructions. In the linguistic environment of the child, there is a low frequency of occurrence of passive sentences. This study proposed to manipulate the frequency of passives in one portion of a child's language environment and to assess the effect of increased exposure on the production of passive verb forms by children from five to seven years of age.

CHAPTER II

RESEARCH DESIGN AND ANALYSIS

The purpose of this study was to investigate the effect of increased exposure to the passive voice of the child's production of passive verbs. The following research questions were advanced in order to help accomplish this purpose: (1) What is the relation between increased exposure and the child's spontaneous production of passive verbs? (2) Will the amount of increased production differ in relation to a child's age? (3) What is the effect of reading increased passives on the language of mother? and (4) Will the mother's reaction effect the production of passives by the child?

In order to answer these questions, one group of children and mothers (Group I) was exposed for a six week period to reading materials containing a controlled percentage of passive verbs. A control group (Group II) was exposed to the same reading materials without the controlled percentage of passive verbs. Weekly interviews were conducted with each child and mother to determine the increase in passive verbs over time.

Prior research of the passive voice on an extended time basis is limited. Therefore many decisions regarding the

research procedure were designed to contribute information on the effect over time of the linguistic environment.

Procedure

Participants

Children Subjects were twenty-one children from five to seven years of age. The subjects were divided by age into either the experimental or control group.

Mothers The families employed in this investigation were all members of a religious church in a midwestern community. The mothers were informed that this was an investigation into the language behavior of the child.¹ Mothers who agreed to read a story to the child for five days each week for six weeks were chosen for this investigation. A detailed description of the subject population is presented in Appendix A.

Originally, twenty-one mother-child sets participated in the experiment (seven children for each age group). One mother chose not to continue following the week 4 interview (control subject), and another mother chose not to continue following the Week 5 interview (experimental subject). Both mothers informed the experimenter that they did not have time to read the stories to the children.

¹Specifically, this research was interested in the language environment in the home (maternal speech), the child's language behavior, and the relationship of both to language presented in the stories. The mothers were informed that the passive was one language variable, among many, of interest in this research project.

Interviewers Five volunteer speech and hearing undergraduate student females were selected to conduct the weekly interviews with the children and mothers. They were selected on the basis of their demonstrated academic success in their coursework indicating knowledge of children's language. They were not informed of the specific purpose of the research project. Each volunteer participated in a practice interview before initiation of the investigation.

Data Collection

Baseline Using the Controlled Scanning Technique of Turner and Rommetveit (1967a), all children viewed four pictures. The experimenter read two active and two passive sentences corresponding to the scene presented in the picture. Each child was then asked to describe the picture. This procedure was necessary to establish the baseline for each age group and to establish the proficiency for each subject in passive constructions.

Group I Subjects in Group I were exposed to stories containing a controlled percentage of passives. Mothers read a selection of prose for five out of seven days each week for six weeks. Each story contained ten percent passive verbs, corresponding to the maximum found by Goldman-Eisler and Cohen (1970).

The stories were selected from Walt Disney's Story Land. Stories which were likely to be familiar to the children, such as "Snow White," were eliminated from consideration.

Fifteen stories were selected, the total verb count was computed, then ten percent of these verbs were changed to the passive voice. During Weeks 1 through 3 the mothers read this set of stories to the children. During Weeks 4 through 6 the same set of stories were repeated with the addition of pictures. (A control group story is presented in Appendix B. An experimental group story is presented in Appendix C.)

Once each week for six consecutive weeks the interviewer presented the child with a series of pictures that tell a story. The child was then asked to compose a story describing the pictures and relate this orally to the interviewer. The child was then asked to relate his/her favorite story that the mother read during the past week. This interview was tape-recorded.

Group II Group II served as the control group. The children were exposed to the same stories but without an increase in the percentage of passive verbs. Interviews were conducted in the same manner.

Mothers Interviews were conducted with the mother of each child before the experimental stage of the research.²

In the same manner, interviews were conducted once a week for six weeks following the interviews with the child. The

²The topic of conversation was to discuss the typical activities of the child. The interviewers did discuss the research project. However, it was not the dominant topic of conversation. The purpose of this interview was to obtain an indication of the frequency of passives employed by the mothers of the children, before the increased exposure.

purpose of these interviews was to determine the effect of increased passives on language behavior of the mothers who read the stories and the subsequent effect on the language behavior of the child. The topics of these weekly interviews varied, depending on the general reaction of the mothers. Some topics that were discussed were "Women's liberation," "Children and the media," and "Open education in the school."

The mothers were also asked to keep a diary relating to the child's reaction to the stories. This diary was to help to determine if there was an immediate reaction to the amount of passives presented in the stories. A sample copy of the diary utilized during Weeks 1 through 3 is presented in Appendix D. A revised version was utilized during Weeks 4 through 6 and this copy is presented in Appendix E.

Controls

In a natural language environment, as opposed to a laboratory, the potential sources of error are numerous. Many of these sources were beyond the control of the present investigation. These include the interaction between child and mother, child and father, and child and both parents, the interaction between child and teacher, the interaction between child and peers, and any learning that might occur during the progression of school studies.

The most significant area of control for this study was the possibility of demand effects during the interviewing

situation. For this reason, naive interviewers were employed, i.e., the interviewers were not told the purpose of the study. Also, each interviewer was instructed in the language to be used during the interview. Each interviewer was instructed to only ask questions that would prompt the respondents to relate the story. Such expressions selected were "What happened next?," "What's next?," "And then?," and "Then what?" Such techniques were commonly used in obtaining spontaneous language samples.

A second area of concern was the behavior of the mothers. Each mother was briefed as sketchily as possible on the purpose of the experiment. They were told that the passive was one variable under consideration, but that there were also a number of other variables of interest. The diaries of the mothers should have helped to determine the effect of each mother on the child.

Data Classification

For a sentence to have been classified as passive it must have met the following criteria:

1. The verb consists of at least two words.
 2. The verb (principal verb) is transitive.
 3. The verb contains the be auxiliary.
- or
- The verb contains got.
 4. The auxiliary be may be in any tense (past, present or future).
 5. If the sentence were constructed in the active form, the subject of the passive sentence would become the object of the active sentence and the object would become the subject.

IF THE SENTENCE MEETS THESE CRITERIA, MARK PASSIVE AND CONTINUE TO ANSWER THE FOLLOWING:

6. If there is a prepositional phrase, containing by or with, mark the verb form as full passive.
7. If no prepositional phrase is included in the sentence, but a prepositional phrase can be added to the sentence from the context of the utterance, mark the verb as truncated passive.
8. If a prepositional phrase cannot be supplied from the context, mark the verb as no passive.

Each interview was transcribed from the tape. Because these language samples were oral, it could have been difficult to systematically discern sentence boundaries. Therefore, the total number of verbs was counted. The number of passive verbs divided by the total number of verbs was the proportion utilized in data analysis.

The language sample was a randomly selected five-minute segment from each interview for both children and mothers. For the children, the first two minutes of the interview were designated as warm-up and were excluded from analysis. Two and one-half minutes were randomly selected from the picture description phase and two and one-half minutes were randomly selected from the relating of the story. For the mothers, the first two minutes were designated as warm-up and excluded from analysis. A five minute segment was randomly selected from the remainder of the interview.

Hypotheses and Data Analysis

The following research hypotheses were generated from previous research on the effect of manipulation of the linguistic environment.

- H₁: There will be a significant increase in the proportion of passive verbs utilized by children exposed to the reading material containing the controlled percentage of passives as compared to the control group.

The children exposed to the reading material containing the controlled percentage of passives should have reacted to this increase in passives. To test the hypothesis, a Runs test (Siegel, 1956) was calculated to determine the overall effect of the experimental condition. A low value for the Runs test would indicate an increase in passives had occurred for the experimental group. If the experimental subjects produced equal to or less than the proportion of passives emitted by the control group, a high value would have occurred.

- H_{1a}: There will be a significant shaping relation between the proportion of passive verbs in the stories and the proportion of passives produced by children and mothers.

This hypothesis was developed as a corollary to Hypothesis 1. Hypothesis 1a is presented as an attempt to assess the relation between the passives presented in the stories and the subsequent effect over time this increase has on a child's and mother's language behavior.

The language presented in the stories should effect the language of the mother and child. Also, the extent of change in the mother's language may further effect the amount of change in the child. To determine the reaction of child and mother to the language environment, analysis was performed utilizing the computer simulation model (ICOMB) developed by

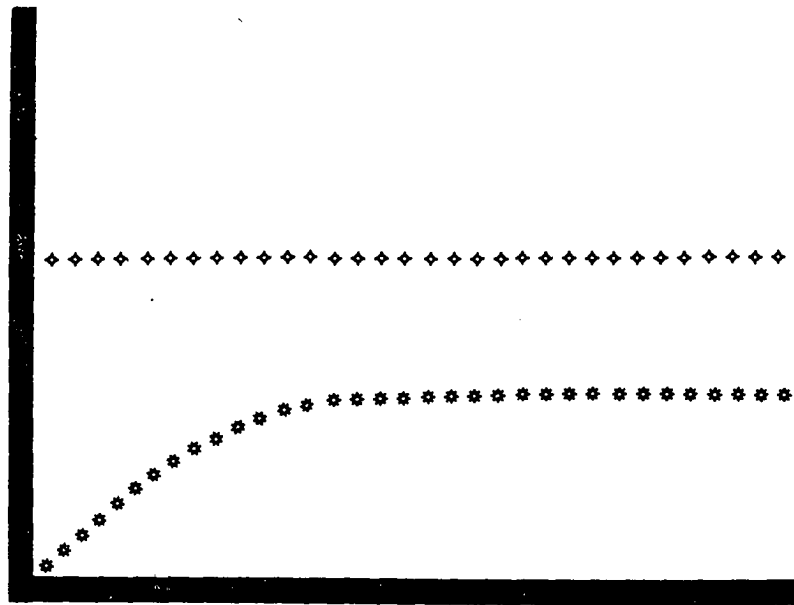
Renshaw (1975). This model predicts the shaping of language behavior based on periods of continued interaction. For the present study, the following set of equations were utilized:

$$\begin{array}{ll} \text{Child} & W = (T_1) \tanh(t) + (T_0) \\ \text{Mother} & W = (T_1) \tanh(t) + (T_0) \\ \text{Story} & W = (.10)\tanh(t) + (.10) \end{array}$$

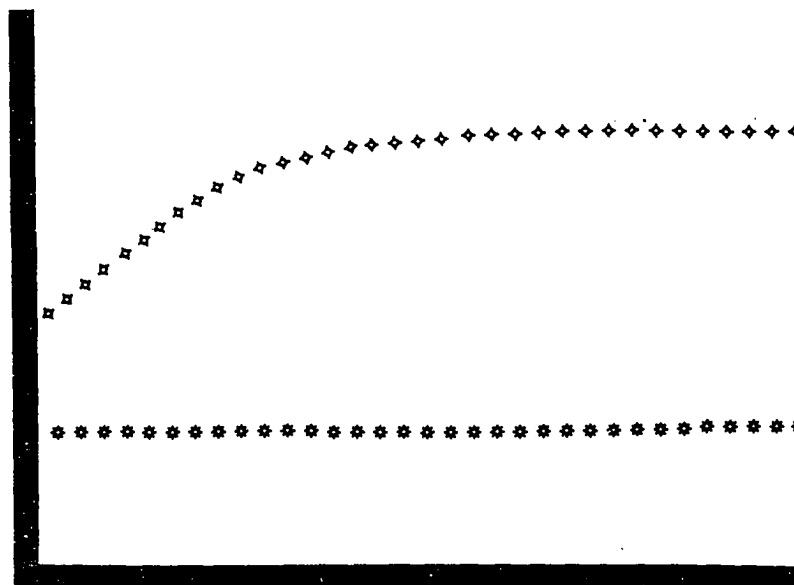
Essentially, the above equation is a hyperbolic tangent, showing hypothesized curvilinear relationships over time between two or more persons. Renshaw (1975) showed four relations which involved shaping (Figure 1), countershaping (Figure 2), mutual effect (Figure 3) and counter mutual effect (Figure 4). Of course, no change over time would be represented as 2 + n parallel lines. The relation hypothesized in 1a should conform to Figure 1. T_0 indicates the proportion of passives produced during Week 1 interviews. T_1 refers to the proportion of passives produced during the interview at Week 2. (The proportion of passives in the stories remained stable at .10.) From this equation, a simulation of the predicted shaping relation was obtained. The models predicted values for Week 3 through 6. The descriptive relation of the observed difference scores and the expected difference scores was based on the product moment coefficient used as a goodness-of-fit test. A chi-square test was calculated to determine if the shaping model as compared to alternative models (Renshaw, 1975) was the best fit for a particular set of scores. Both mean proportions

Figure 1. Example of shaping model.

Figure 2. Example of countershaping model.



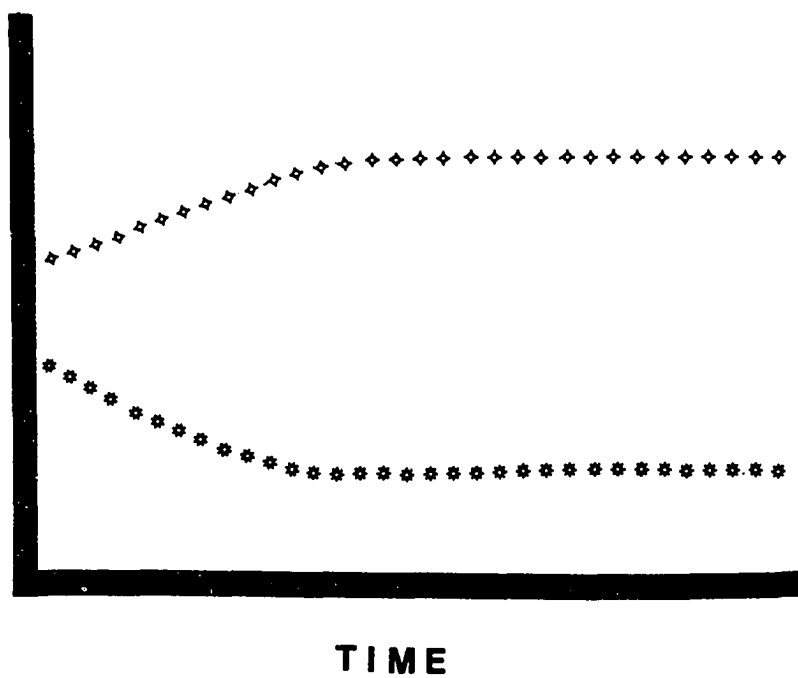
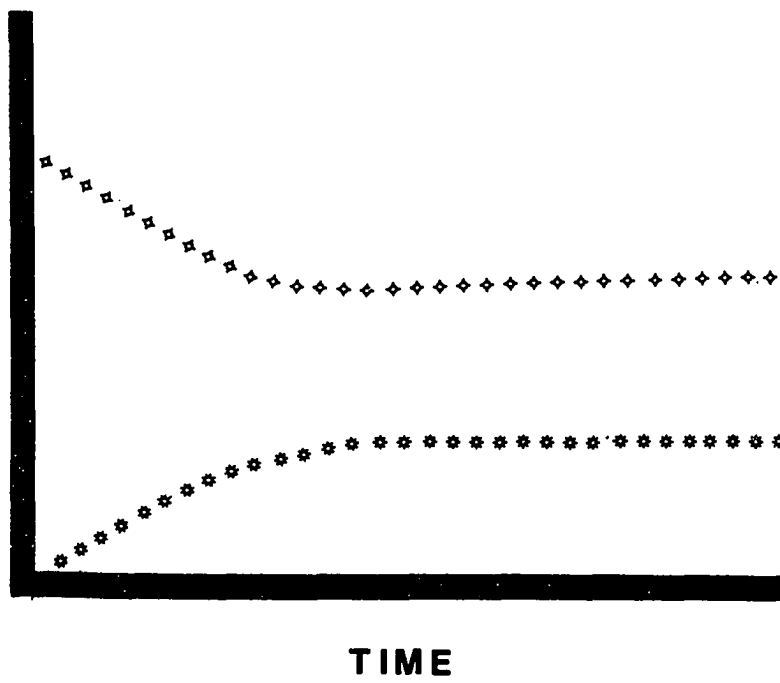
TIME



TIME

Figure 3. Example of mutual effect model.

Figure 4. Example of countermutual effect model.



and individual proportions were utilized in assessing the goodness of fit.

H₂: There will be a significant increase in the proportion of passive verbs produced with an increase in age.

A Kruskal-Wallis one-way-analysis-of-variance test was calculated to determine the difference between age groups in the experimental condition (Siegel, 1956). In order to assess differences due to time but not experimental manipulation, a second ANOVA was calculated to discern the difference in proportions for the three age groups in the control group.

Summary

Children ages five to seven were exposed to reading materials for a six-week period. The experimental group was exposed to materials containing a controlled percentage of passive verbs; the control group was exposed to the same material without the increase in passive verbs. Weekly interviews were conducted with each child and mother to determine the effect of the exposure to the passive verb form. To test the effects, a Runs test was conducted between the experimental and control group. A Kruskal-Wallis one-way-analysis-of-variance was calculated to test the differences between the age groups. Finally, the proportions obtained in Weeks 1 and 2 were entered into analysis by the computer simulation program (ICOMB) developed by Renshaw (1975).

CHAPTER III

RESULTS

This chapter includes the results of the present investigation. Possible interpretations of the data are detailed in Chapter IV. The purpose of this separation is to avoid confusion over results of the experiment and pretheoretic statements about their meaning.

Baseline

The Controlled Scanning Technique of Turner and Rommetveit (1967a) was utilized to provide a baseline for the child's capabilities in passive production. This technique allowed for a gauge of the imitation abilities of the children. A second effect of the technique was that it also allowed for the measurement of immediate learning effects based on exposure to the passive verb form. The children imitated 45.23 percent of the active sentences and 47.61 percent of the passive sentences. The overall percent of imitation of both verb forms was 46.46 percent. The six-year-olds imitated the greatest percentage of sentences (71.42 percent active; 57.14 percent passive). The five-year-olds imitated with the next highest percentage (36.71 percent active; 50 percent passive), with the seven-year-olds

imitating the least (28.57 percent active; 35.71 percent passive). Combining the cells for both active and passive imitation the six-year-olds imitated 64.28 percent of the sentences, the five-year-olds imitated 42.85 percent of the sentences, and the seven-year-olds imitated 32.14 percent.

For the proportion of passive verbs utilized in supplemental analysis, the imitation sentences were excluded. Thus, the baseline data was based on language produced outside the imitation framework. Two five-year-olds, two six-year-olds and one seven-year-old produced passives during the remaining interaction with the interviewer. These passives were not repetitions of the same passive sentences included in the scanning phase, although many of the sentences included some of the same words presented in the imitation sentences. (See Table 1.)

For the interviews with the mothers, the assigned topic was the language activity of the child. During the baseline interview with the mothers, three mothers assigned to the experimental group produced passives and one mother from the control group produced passives.

Hypothesis 1

Hypothesis 1 stated that there would be an increase in the proportion of passive verbs produced by the experimental group as compared to the control group. To test this hypothesis, five-minute segments of the weekly interviews were transcribed and analyzed. The total number of passive verbs

Table 1
Baseline--Children

	Proportion of Correct Imitation		
	Active	Passive	$\bar{X}$
5 year	.3571	.5000	.4285
6 year	.7142	.5714	.6428
7 year	.2857	.3571	.3214
$\bar{X}$	.4523	.4761	.4646

divided by the total number of verbs yielded the proportion of passive verbs produced.

Children exposed to the passive verb form in their reading material demonstrated a marked increase in their production of the passive voice. During the baseline the overall proportion was .0148. The succeeding weeks produced the following proportions: Week 1 = .0134; Week 2 = .0171; Week 3 = .0231; Week 4 = .0218; Week 5 = .0173 and Week 6 = .0031. Thus, the children in the experimental group increased their passive production through the first three weeks, then began a gradual decline.

The children in the control group remained relatively stable in their production of passive verbs. The proportion of passive verbs produced during the baseline was .0058. The succeeding weeks produced the following proportions: Week 1 = .0000; Week 2 = .0031; Week 3 = .0000; Week 4 = .0015; Week 5 = .0058 and Week 6 = .0014.

The average proportion of passive constructions for the experimental group throughout the weekly interviews was .0170 (range = 0 to .1136) and the control group produced an average proportion of .0024 (range = 0 to .0435).

A Runs test on the proportion of passive constructions comparing the experimental group against the control group resulted in $Runs = 6$ ($p < .05$). A second Runs test was calculated, with the deletion of the baseline score. This test was conducted to reduce any error resulting from the ambiguity

concerning the direct learning effects that may have occurred in the baseline interview. The result of the test was Runs = 4 ($p < .05$). Therefore, Hypothesis 1 was supported. (See Table 2 and Figure 1.)

The mean frequency of passive verbs also demonstrated the gradual increase followed by a gradual decrease for the experimental children. Analysis of this data lends further support to Hypothesis 1. The average frequency during the baseline was 0.3. The succeeding weeks produced the following averages: Week 1 = 0.8; Week 2 = 0.8; Week 3 = 1.1; Week 4 = 1.2; Week 5 = 0.8 and Week 6 = 0.2.

The control group produced an average frequency of 0.18 during the baseline period. The succeeding weeks produced the following averages: Week 1 = 0.0; Week 2 = 0.18; Week 3 = 0.0; Week 4 = 0.091; Week 5 = 0.333 and Week 6 = 0.111. The overall frequency of passive verbs for the experimental group throughout the weekly interviews was 0.75 (range = 0 to 5) and the control group produced an average frequency of 0.1221 (range = 0 to 2). (See Table III and Figure 2.)

The Runs test calculated on the average frequency of the experimental group as compared to the control group was Runs = 6 ($p < .05$). Again, with the deletion of the baseline scores, the result was Runs = 4 ($p < .05$) adding further support for the hypothesis.

Thus, in the proportion of passive verbs and average frequency of passive verbs, the experimental group

Table 2
Passive Verb Production--Children

Time	Number of Passive Verbs/Total Number of Verbs			
	Experimental		Control	
	Average	High-Low Score	Average	High-Low Score
Baseline	.0148	0-.0588	.0058	0-.0435
Week 1	.0134	0-.0533	.0000	0-0
Week 2	.0171	0-.0392	.0031	0-.0345
Week 3	.0231	0-.0588	.0000	0-0
Week 4	.0218	0-.0597	.0015	0-.0167
Week 5	.0173	0-.1136	.0058	0-.0333
Week 6	.0031	0-.0149	.0014	0-.0130
$\bar{X}$	.0170		.0024	

Figure 5. Average proportion of passive verbs produced by children in experimental and control groups.

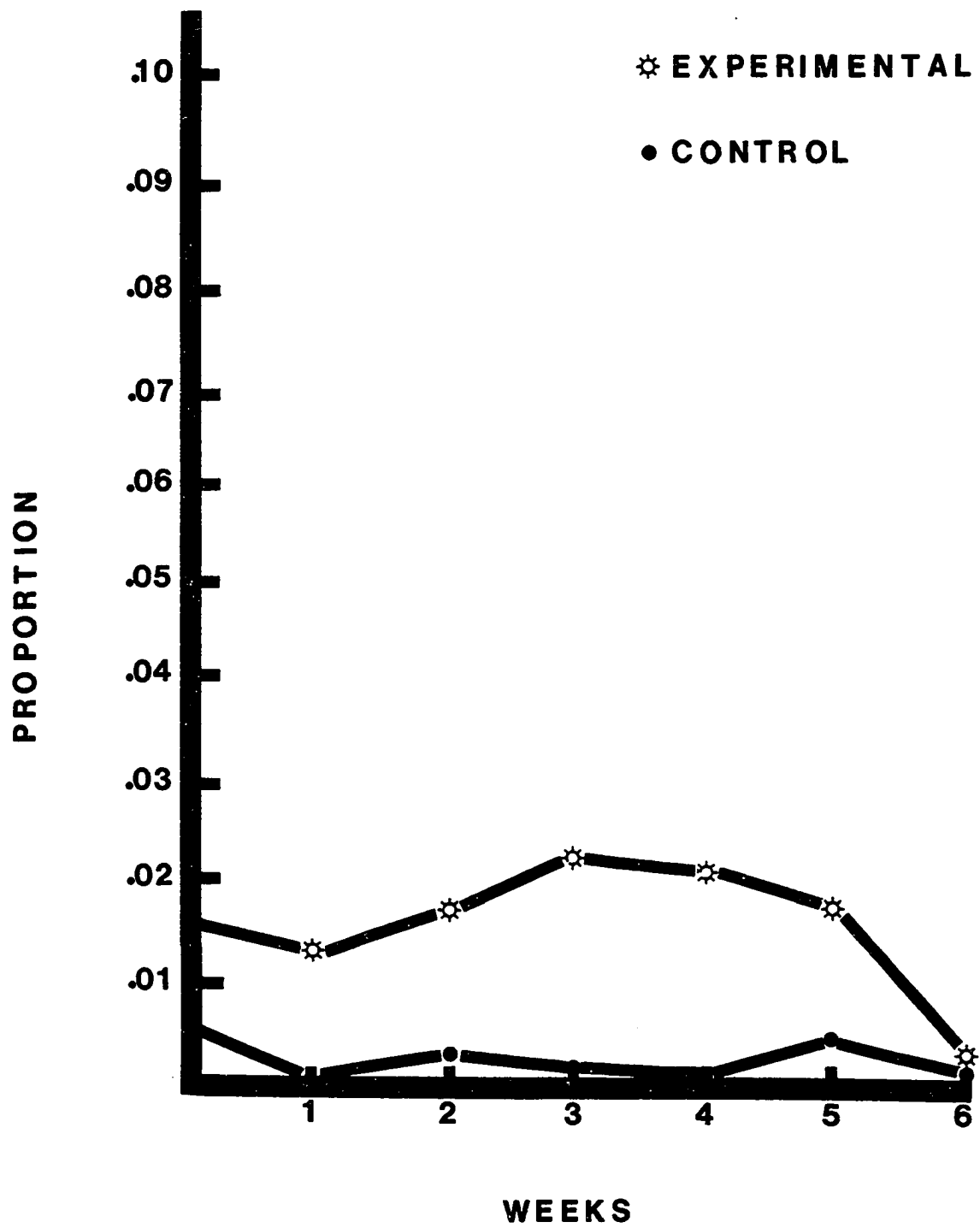
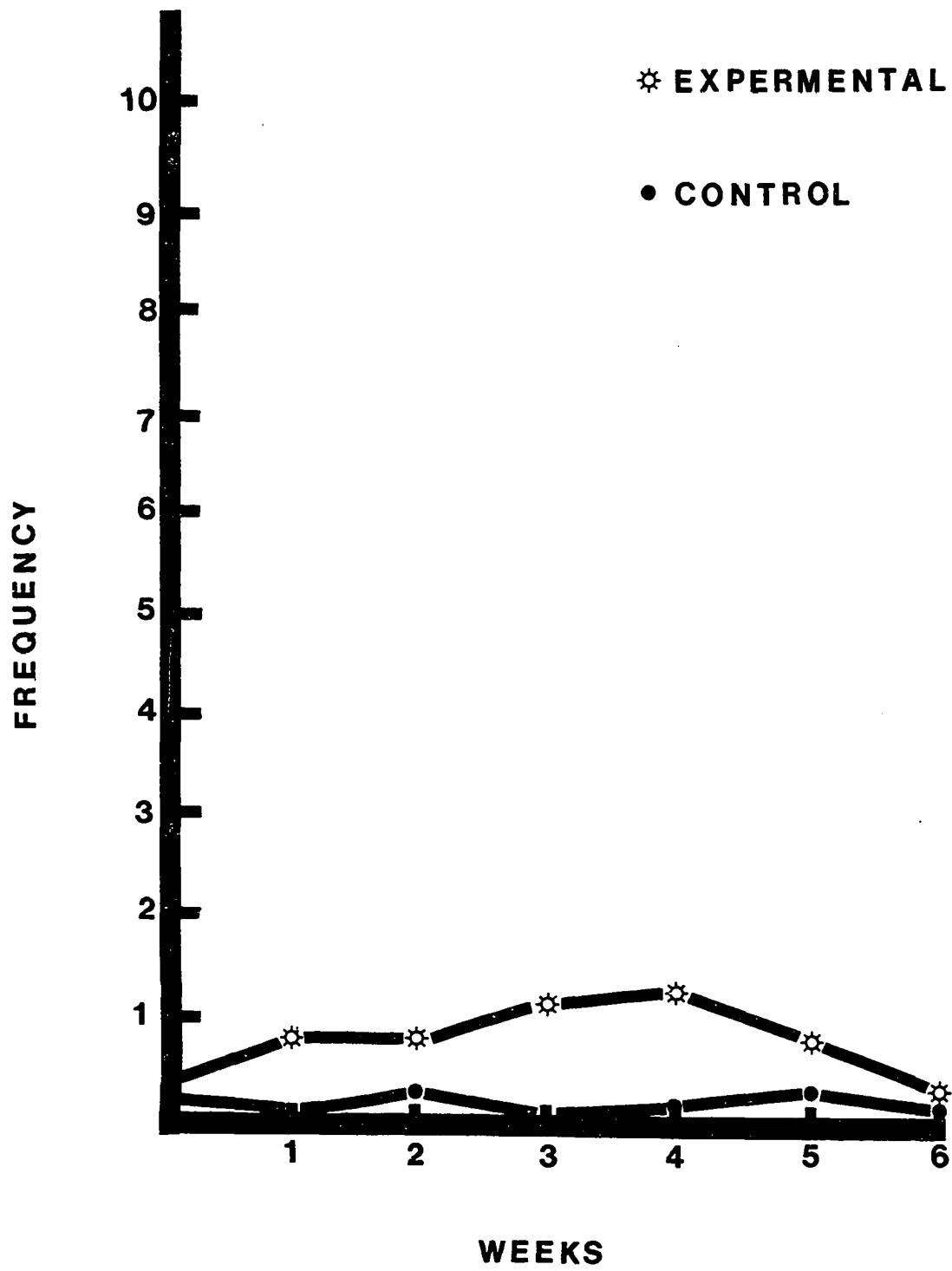


Table 3
Passive Verb Production--Children

Time	Average Frequency of Passives			
	Experimental		Control	
	Average	High-Low Score	Average	High-Low Score
Baseline	0.3	0 - 1	0.18	0 - 1
Week 1	0.8	0 - 4	0.0	0 - 0
Week 2	0.8	0 - 2	0.18	0 - 2
Week 3	1.1	0 - 3	0.0	0 - 0
Week 4	1.2	0 - 4	0.09	0 - 1
Week 5	0.8	0 - 5	0.33	0 - 2
Week 6	0.2	0 - 1	0.11	0 - 1
$\bar{X}$	0.75		0.12	

Figure 6. Average frequency of passives produced by children in experimental and control groups.



demonstrated a marked increase over the control group for the children.

Mothers

Although Hypothesis 1 did not specifically include the reaction of the mothers to the increased passives, analysis of their language behavior provides further support for acceptance of the hypothesis. The mothers in the experimental group demonstrated a similar increase in their production of the passive verb form. However, the mothers did not demonstrate the decrease during Weeks 4 through 6. In fact, the mothers only began to decrease in production of passive verbs during the Week 6 interviews. The proportion of passive verbs produced during the baseline interviews was .0073. The succeeding weeks produced the following proportions: Week 1 = .0126; Week 2 = .0216; Week 3 = .0214; Week 4 = .0262; Week 5 = .0297 and Week 6 = .0247.

As opposed to the children in the control group, the mothers in the control group exhibited a slight increase in passive production during the six weekly interviews. The proportion of passive verbs for the baseline interview was .0025. The succeeding weeks produced the following proportions: Week 1 = .0046; Week 2 = .0060; Week 3 = .0000; Week 4 = .0025; Week 5 = .0041 and Week 6 = .0088.

The average proportion of passive constructions for the experimental group was .0214 (range = 0 to .0763) and the average proportion for the control group was .0030 (range =

0 to .0357). (See Table 4 and Figure 7.)

A Runs test on the proportion of passive verbs comparing the experimental and control groups resulted in $\text{Runs} = 2$ ($p < .05$). Because some of the mothers may have been effected by the passives presented during the baseline interview with the children, a second Runs test was calculated deleting the baseline scores. The result was $\text{Runs} = 4$ ($p < .05$).

The average frequency of passives for the experimental group of mothers was also significantly greater than for the mothers in the control group. The average frequency of passives for the experimental group during the baseline was 0.3. The succeeding weeks produced the following averages: Week 1 = 0.6; Week 2 = 2.2; Week 3 = 2.3; Week 4 = 2.1; Week 5 = 3.0 and Week 6 = 2.55.

The average frequency of passive verbs for the experimental group was 1.8334 (range = 0 to 9) and the control group produced an average frequency of .2935 (range = 0 to 3) (Table 5 and Figure 8).

A Runs test calculated on the average frequencies resulted in $\text{Runs} = 4$ ($p < .05$). Deletion of the baseline score resulted in $\text{Runs} = 6$ ($p < .05$).

Thus, from the data obtained from the children and the supplemental analysis of the mothers, Hypothesis 1 was supported.

Table 4
Passive Verb Production--Mothers

Time	Number of Passive Verbs/Total Number of Verbs				
	Experimental			Control	
	Average	High-Low Score		Average	High-Low Score
Baseline	.0073	0	-.0588	.0025	0-.0278
Week 1	.0126	0	-.0571	.0046	0-.0253
Week 2	.0216	0	-.0533	.0060	0-.0238
Week 3	.0214	0	-.0555	.0000	0- 0
Week 4	.0262	0	-.0513	.0025	0-.0093
Week 5	.0297	0	-.0698	.0041	0-.0357
Week 6	.0247	.0089-.0763		.0088	0-.0267
$\bar{X}$	.0204			.0030	

Figure 7. Average proportion of passives produced by mothers in the experimental and control groups.

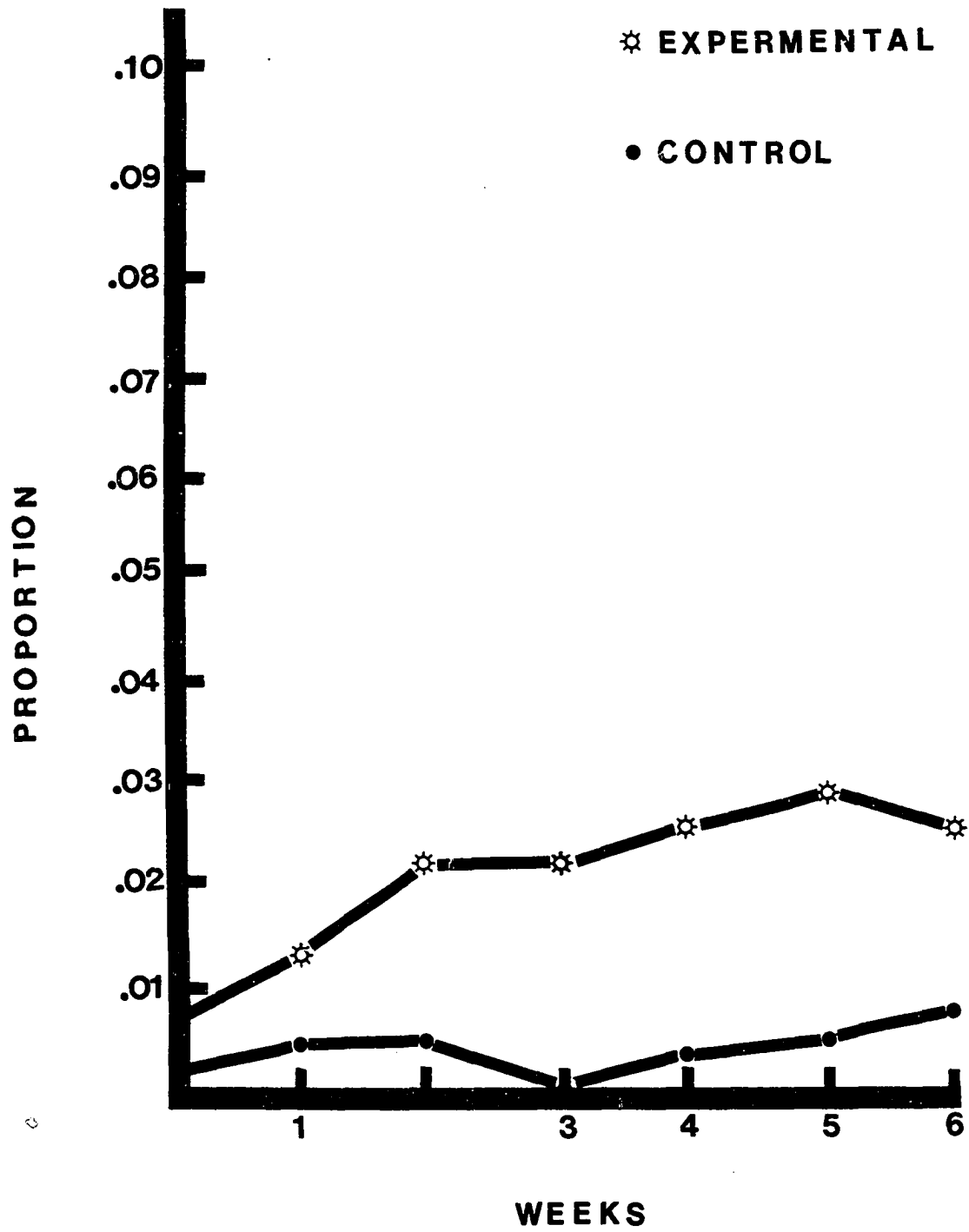
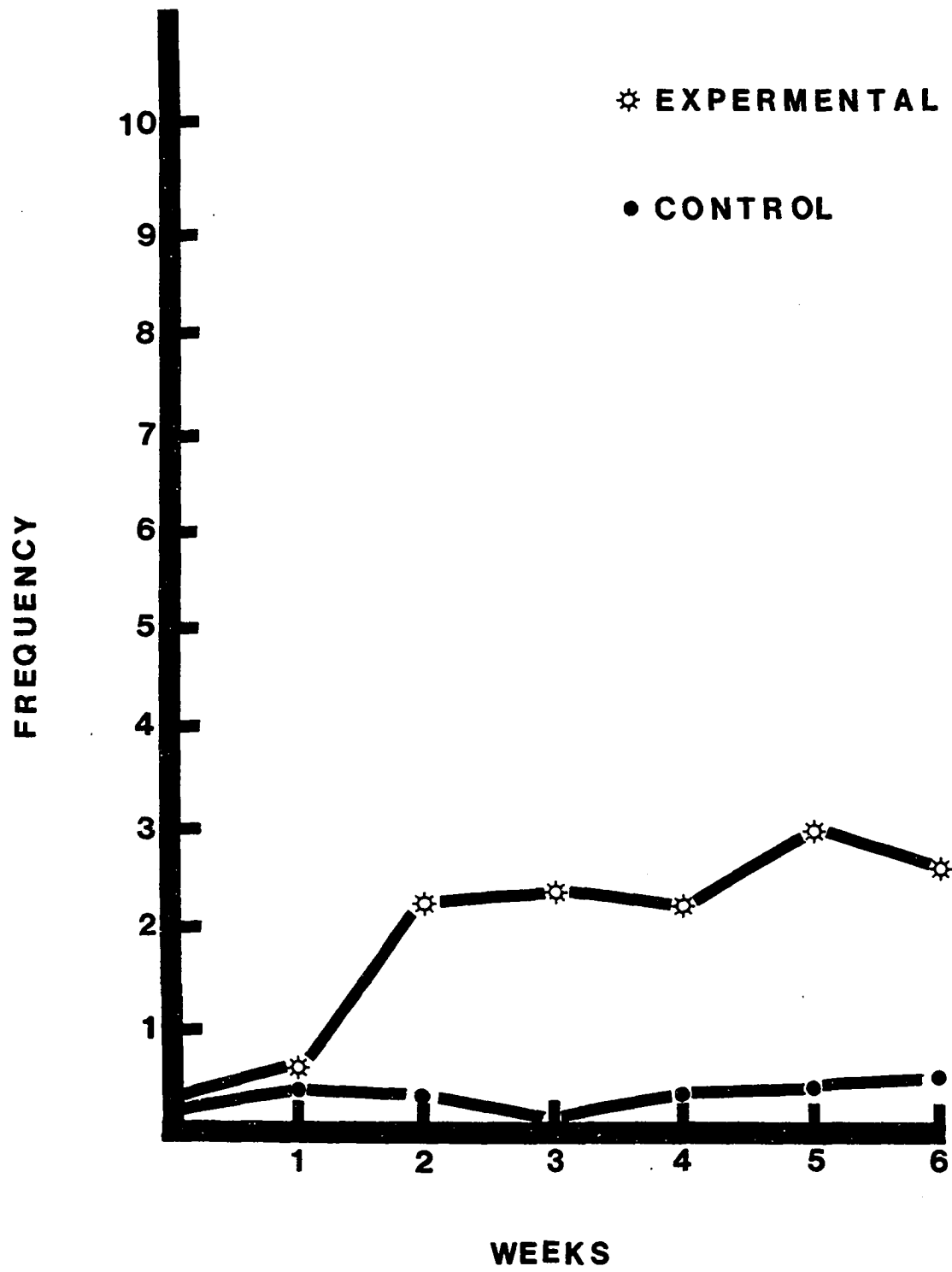


Table 5
Passive Verb Production--Mothers

Time	Average Frequency of Passives			
	Experimental		Control	
	Average	High-Low Score	Average	High-Low Score
Baseline	0.3	0 - 1	0.09	0 - 1
Week 1	0.6	0 - 2	0.36	0 - 2
Week 2	2.2	0 - 4	0.27	0 - 1
Week 3	2.3	0 - 6	0.0	0 - 0
Week 4	2.1	0 - 6	0.27	0 - 1
Week 5	3.0	0 - 6	0.44	0 - 3
Week 6	2.55	1 - 9	0.67	0 - 2
$\bar{X}$	1.8334		0.2935	

Figure 8. Average frequency of passives produced by mothers in experimental and control groups.



Hypothesis 1a

Hypothesis 1a predicted that there would be a significant shaping relation between the proportion of passive verbs in the stories and the proportion of passive verbs produced by the children and the mothers based on the computer simulation technique developed by Renshaw (1975). This hypothesis was not supported.

It was expected that the stories would shape the language behavior of the children and also that the stories would shape the language behavior of the mothers. Week 1 and Week 2 proportion scores were entered for analysis.

In order to determine the degree of fit of the simulation model, a Kendall Tau correlation was calculated, utilizing the sum of the difference scores for both the observed and expected scores. The coefficient of correlation between the difference scores for the relation between the story and child was $\tau = .5796$ ($p < .05$). The product moment coefficient was $r = .7542$ ($p < .05$).

It was expected that the computer simulation would yield the model of the story shaping the child's language behavior. However, only five of the ten sets yielded this model. A chi square (Siegel, 1956) comparing the experimental and control group based on the predicted model was nonsignificant ($\chi^2 = 2.3856$; $df = 1$).

Additionally, product moment coefficients were calculated between the observed difference scores (Week 1 through Week 6)

of each subject and the expected difference scores for each subject. These coefficients are listed in Table 6, along with the predicted model.

The Kendall Tau coefficient of the difference scores between the stories and the mothers resulted in $\tau = .1654$. The product moment coefficient was $r = .2251$. Neither of these coefficients were significant.

It was expected that the simulation would yield a model predicting the stories would shape the language behavior of the mothers. However, only five of the ten sets yielded this model. A chi square comparing the experimental and control group based on the predicted model was nonsignificant ($\chi^2 = 2.3856$; $df = 1$).

Again, product moment coefficients were calculated for the observed and expected difference scores for each subject. These coefficients are listed in Table 7, along with the predicted model.

The results of the simulation based on the relationship between mother and child were ambiguous. No one model seemed to dominate the predictions. The Kendall Tau coefficient between the difference scores of the observed and expected values resulted in $\tau = .4955$ ($p < .05$). The product moment coefficient resulted in $r = .7273$ ($p < .05$).

Four of the ten sets yielded the model of the child shaping the mother, three sets yielded a model of the child countershaping the mother and two sets resulted in the mother

Table 6
Coefficients between Observed and
Expected Difference Scores*

Story--Child	
Model	<u>r</u>
Story shapes child	-.9129
	-.0508
	-.0724
	-.1124
	.0095
Story countershapes child	.4345
	.1391

*Coefficients could not be computed on the remaining scores.

Table 7
Coefficients between Observed and
Expected Difference Scores*

Story--Mother	
Model	<u>r</u>
Story shapes mother	-.8180
	.8789
	.1876
	.9633
	.1424
Story countershapes mother	.9007
	-.0075
	.8603

*Coefficients could not be computed on the remaining scores.

countershaping the child. A final set resulted in a mutual effect model.

The product moment coefficients between the observed and expected difference scores for each mother-child set are listed in Table 8, along with the predicted model. A chi square was not calculated because it was not predicted which model should result from the mother-child relationship.

Hypothesis 2

Hypothesis 2 predicted there would be significant differences in the increase in passive proportions between the five, six and seven-year-olds. The five-year-olds produced an average proportion of 0.0116 passive verbs; the six-year-olds produced an average of 0.0152 passive verbs and the seven-year-olds produced an average of 0.0213 passive verbs. A Kruskal-Wallis one-way-analysis-of-variance (Siegel, 1956) showed these results were nonsignificant ($H = 2.600$).³

The proportion of passives produced by the control group violated most expectations based on previous research of the passive voice. The average proportion for the five-year-olds was .0031; the six-year-olds produced an average of 0.0075 and the seven-year-olds produced an average of 0.0009. Again these differences were not significant utilizing the Kruskal-Wallis one-way-analysis-of-variance

³Due to the small n per cell, the Runs test for k samples could not be calculated without violation of several assumptions. Therefore, insufficient evidence exists to accept or reject the null hypothesis.

Table 8
Coefficients between Observed and
Expected Difference Scores*

Mother--Child	
Model	<u>r</u>
Child shapes mother	.8030
	.0653
	-.6373
	-.4912
Mother countershapes child	-.1253
	-.0608
Child countershapes mother	.5857
	.4759
	.1499
Mutual effect	.1149

($H = .7363$; Corrected $H = .8755$).⁴

The average frequency of passive verbs followed the same pattern as the proportions and again were nonsignificant. For the experimental group the five-year-olds produced an average of 0.3810 passives; the six-year-olds produced an average of 0.7679 passives and the seven-year-olds produced an average of 1.0951 passives. The Kruskal-Wallis test resulted in $H = 1.7132$ (Corrected $H = 1.7343$).

For the control group the five-year-olds produced an average of 0.1786 passives; the six-year-olds produced an average of 0.1129 passives and the seven-year-olds produced an average of 0.05 passives. Again, utilizing the Kruskal-Wallis test, the results were nonsignificant ($H = .7363$; Corrected $H = .8755$). (See Table 9.)

Based on these results for both the experimental and control groups, Hypothesis 2 could not be accepted.

Summary

Hypothesis 1 was supported. Both children and mothers exposed to the increased percentage of passive verbs increased their production of this form as compared to the control group. This result held for analysis computed on both proportions and average frequencies. Hypothesis 1a was not supported. The resulting curve of the observed data was in quadratic form, not the tanh shape as predicted by the

⁴The Corrected H is calculated in the case of tied ranks.

Table 9
Average Proportion of Three Age Groups

Age	Number of Passive Verbs/Total Number of Verbs			
	Experimental		Control	
	Average	High-Low Score	Average	High-Low Score
5 years	.0112	0-.0588	.0027	0-.0192
	.0138	0-.0500	.0097	0-.0345
	.0097	0-.0270	.0000	0-0
			.0000	0-0
6 years	.0090	0-.0400		
	.0212	0-.0555	.0000	0-0
	.0178	0-.0588	.0018	0-.0130
	.0128	0-.0435	.0086	0-.0435
7 years	.0241	0-.0597	.0000	0-0
	.0047	0-.0176	.0000	0-0
	.0352	0-.0556	.0030	0-.0152
			.0000	0-0

simulation. Hypothesis 2 was not supported. There was no significant difference between the proportion of passive verbs produced by five, six and seven-year-olds in either the experimental or control group.

CHAPTER IV

DISCUSSION AND RESEARCH IMPLICATIONS

This chapter includes potential interpretations of the results obtained by the present investigation. The baseline procedure will be discussed, followed by a discussion of each hypothesis. Then the study is critically evaluated and future research implications are discussed.

Baseline

The frequency of occurrence of imitation of the passive voice in the present experiment was somewhat lower than the percentages obtained by Turner and Rommetveit (1967a). Less than 50 percent of either type of sentence (active or passive) was correctly imitated by children in any of the three age groupings. One explanation may be that this experimental condition was not as rigid as that conducted by Turner and Rommetveit. The present interviewers did not demand a repetition of the sentence by the children. However, there were many interesting findings which did result from this phase.

First, the six-year-olds imitated more sentences than either the five or seven-year-olds, and the seven-year-olds imitated the lowest percentage of sentences. However, these

differences were quite small. It may be that older children are less dependent on verbalized cues in order to construct a story concerning a picture. The five-year-olds may not have gained the proficiency in correct imitation and the six-year-olds may be at the optimal age for imitation of language behavior.

There were also several interesting transformations of the sentences presented during the Controlled Scanning phase. Three of the passive sentences were transformed to the got passive. This transformation was performed by a six-year-old (both sentences changed to got form) and by a five-year-old (one passive sentence changed to got form). The transformation to the got passive may indicate its acceptability as discussed by Roberts (1954). It may be that children at an early age (five through seven) use the got passive more than a passive which employs the auxiliary be.

Also, one seven-year-old changed an active sentence to a passive form, following the imitation of the two passive sentences. This transformation is a rare occurrence among reported research on the passive voice. This occurrence demonstrated the immediate effect of the linguistic environment on a child's language behavior.

The baseline data may provide some evidence for a view of language production influenced by exposure. Due to this immediate effect the baseline phase may have produced some artificial results in the analysis of passive production.

For example, the children's production of passives decreased from the baseline to Week 1. An immediate learning effect may have occurred after the presentation of the stimulus passive sentences during the Controlled Scanning phase. This learning may have been greater than the reaction to the continual exposure that occurred during Week 1. Similarly, a number of mothers were present during this first interview with the child. This exposure to the passives may also have affected their language production during the baseline interview. In future research using this technique spontaneous language behavior should be sampled before the presentation of the stimulus sentences during the Controlled Scanning procedure, in order to control for the immediate reaction to the language environment.

Hypothesis 1

The results of this study lend credibility to the assertion that the language environment effects the language produced by those within that environment. Both mothers and children who were exposed to the controlled percentage of the passive verb form produced more passive verbs than did the control group which was not exposed to the passive form. It may be that this language production by the experimental group was a reaction to their language environment--a reaction that exceeded an imitation stage. For both the mothers and children, the reaction was one of producing language which was congruent with their linguistic environment.

The mothers, who likely produced the passive verb form before the initiation of the manipulation, increased their production to a much greater extent. For the children the reaction may have been one of abstracting from the environment in order to produce language in line with this environment.

There is justification for the statement that members of the experimental group produced language in reaction to their environment. If the children had produced only passives which were present in the stories, then the production of passives would have to be labeled a rote memory function: they would have been merely repeating or recalling the passives already heard in the stories. However, no child produced a passive which was a direct imitation of passives appearing in the stories. This creation of new passive sentences provides support for the assertion that the children's language involved in an application of the rules for passive production.

Similarly, the mothers did not repeat or recall any of the sentences appearing in the stories. This is doubtless because the mothers were not asked to recall any of the stories--instead they were asked to produce language behavior on a variety of topics. The increased production of passives by mothers in the experimental group as compared to the control group does indicate that the mothers were increasing their passive production in line with the environment.

The area of the truncated or full passive provides another justification for the assertion that the participants

were producing the passives in congruence with their environment. All of the passives appearing in the stories were written in the full passive form (containing the prepositional phrase). However, Beilin (1975, p. 11) states that 70 percent of all passives are in the truncated form. The findings of this study seem to support his contention. For the children in the experimental group, 64 percent of the sentences were truncated passives while 35 percent were full passives. The five-year-olds produced the greatest percentage of truncated passives (83.33 percent) and the lowest percentage of full passives (16.66 percent). The six-year-olds and the seven-year-olds produced approximately the same percentages (full = 36.84 percent; truncated = 63.16 percent for the six-year-olds and full = 34.78 percent; truncated = 62.22 percent for the seven-year-olds).

The mothers in both groups also produced similar percentages of full and truncated passives. The mothers in the experimental group produced 30.47 percent full passives and 69.53 percent truncated passives. The mothers in the control group produced 33.73 percent full passives and 66.66 percent truncated passives. The average percentages for full and truncated passives were 31.90 percent full passives and 68.08 percent truncated passives.

The issue of truncated versus full passives is instrumental to the assertion that both mothers and children reacted to the linguistic environment in their language

behavior. Changing a full passive to a truncated form may require some comprehension of the sentence itself and also of the rules involved in the production of the passive. Thus, when the children produced a truncated passive, they may have been reacting to their environment by increasing the percentage employed, but they were utilizing the form of passive construction which they already knew. For the mothers, since they likely produced the truncated version of the passive in normal language behavior (without manipulation), production of the truncated passive was congruous with their language behavior before exposure, while the extent of usage displayed the reaction to the linguistic environment.

The context of the production of the passive verb forms provides a final justification for the assertion that the participants were producing language in congruence with their environment. First, the mothers, by not retelling the stories had to construct the passives in a completely different context. If the mothers had been required to retell the stories, there may have been an even greater increase in their production of the passive verb form. For the children in the experimental group, there was a shift in the context of the passive production with time. In the first week (Week 1) all of the passives produced by the children were in the context of retelling the story. During Week 2, 50 percent of the passives were produced in the context of describing a picture. By Week 3, 63 percent of the passives

were present in the picture description phase, with only 37 percent in the retelling of the story. Week 4 reversed the trend, with only 11 percent of the passives present in the picture description phase while 89 percent were produced in retelling the story. Week 5 resulted in 57 percent of the passives produced in the picture phase and 43 percent produced in the story phase. Finally, in Week 6 all of the passives were produced in the story phase of the interview. Thus, the children were able to generalize the context in which the production of passive verb forms occurred. If the children had produced passives only in the context of retelling the story, it could be argued that the change in language behavior was dependent upon a particular language context. However, since the children were able to generalize to a different context, it is reasonable to assume they were reacting to the language environment via their language behavior.

These three areas provide a basis for the statement that the children and mothers produced language in congruence with their environment. The fact that the passives produced by the children and mothers were new passives, that they utilized the truncated version instead of the full version to which they were exposed and that they applied this production in different contexts indicate that learning, not rote memorization, was taking place.

A second interesting finding was the gradual increase

followed by a gradual decrease in the production of the passive verb form by the children and a steady increase in the production of the passive by the mothers. There are several possible explanations for this occurrence. First, the children may have reached a saturation level where language present in the environment no longer effects a change in their language behavior. For the first four weeks, the passive may have been such a new occurrence that the children were keenly aware of this construction when they heard the passive produced during the reading of the stories. After the first four weeks, the increase in passive verbs was now a stable occurrence in their language environment, and thus it was not as salient to the children, causing a decrease in the production of the passive verb form.

Another explanation of this decrease is the repetition of the stories. Although the mothers insisted that the repetition did not cause a lack of or a decrease in attention on the part of the children (100 percent affirmative response in the diaries), the children may not have had to listen as closely or carefully to the stories. This decrease in attention may have led to a decrease in the attention paid to the language present in the stories. Thus, the diminished attention to the language could have resulted in the decrease in production of the passive verb form.

On the other hand, the mothers continued with an increase in the production of passive verb forms, even during

the repetition of the stories. Likely this was due to the fact that in reading the stories the mothers were still very conscious of the language present in the stories. In listening to the stories, the children were able to listen for the main idea, but in reading the stories the mothers were still having to read each word, and thus may have been quite conscious of the passives. In fact, more mothers began to note the awkwardness of the stories during the second three weeks than during the first three weeks of the stories.

Also, the presence of the pictures could have contributed to the decreased salience of the language present in the stories for the children. Most mothers commented that their children would continually look at the pictures during the reading of the story. Thus, the children may have concentrated on the pictures and relating these to the stories, instead of concentrating on understanding and comprehending the language in the stories.

The majority of the children in the experimental group developed a gradual increase in the production of the passive followed by a slight decrease. There were several children that did not increase their production of passives in line with the majority. Again, several possible explanations are available for this occurrence. Two mothers expressed discontent with the stories: they thought them dull and uninteresting. One of these mothers changed her perception of the stories during Week 3 and her child began an increase

during that week. The other child demonstrated only a minor increase during two of the weekly interviews (the same result applied to the mother).

Another child was extremely uncooperative during the interviews. During the reading of the stories he may have been attentive, but the interview situations were usually stressful, with the interviewer attempting to prompt the child to produce more than one-word utterances.

In a supplemental interview with the mother of the fourth child who did not demonstrate an increase, the mother indicated that the family possessed copies of many of the stories. This child was already aware of these stories without the change in sentence types. This previous contact with the stories could have had the same effect as the repetition during the second three weeks. Her previous knowledge may have resulted in a reduced necessity of concentration upon the language in order to comprehend the stories.

Overall, it seems that the linguistic environment may effect the production of language, but there are several variables that may effect the extent of any change. Lack of salience of stimulus on the part of the hearer, or on the part of the producer may result in an interaction between both hearer and producer and lead to a lack of effect of both parts of the system.

Some support for this argument may be found in the passive production exhibited by the control group. During

the six-week period five children produced passives. Mothers of each of these children also produced the passive during the weekly interviews. This may indicate a shaping relation between these mothers and children, however the data present is too sketchy to make valid assertions concerning this process. This finding does lend support for the preceding argument that production of both mother and child does depend, in part, on the production of each individual. Since the mothers used the passive in casual conversation with the interviewer, it may be that they also use the passive in casual conversation with the child. Thus, the child is exposed to the passive and may produce the passive in order to maintain congruence with his/her language environment.

In conclusion, the results of this investigation do support the assertion that the language present in the environment effects language behavior. There are many variables in the environment that contribute to determine the extent of the reaction. These factors, including level of intrusion, length of exposure and salience level are areas which demand consideration in future research on the impact of the environment on language behavior.

Hypothesis 1a

The observed scores of the experimental group, when plotted, form a quadratic curve (refer to Figures 1 and 2). For this reason, utilization of the tanh equation as specified in the ICOMB simulation (Renshaw, 1975) produced models

that did not fit the observed data well. The tanh equation assumes that usage of a variable will increase then gradually stabilize. In the observed data, this stabilization did not occur, in fact it was replaced with a gradual decrease. There are several possible explanations for this lack of fit between the observed and predicted models.

First, the tanh equation may have succeeded if the repetition of the stories had not occurred. For example, utilizing the average scores of the experimental group, the correlation of Weeks 1 to 6 observed and expected difference scores resulted in $r = .15$. However, a coefficient calculated on scores of Weeks 1 to 4 (before the decrease occurred) resulted in $r = .9195$. Thus, future investigations with a continuation of exposure to new language materials might result in data which is appropriate to a tanh equation.

Secondly, there were a number of subjects who decreased their production of passives in Week 2. When these scores were entered for analysis, the simulation predicted a counter-shaping model. In actuality the subjects began an increase again in Week 3. This raises an issue concerning the intervality of the time units employed by the program. In constructing this system Renshaw commented that the appropriate units of time to be entered for analysis are not yet discerned. Thus, it may be that the proportions of Week 1 and Week 2 which were entered for analysis, may not be the appropriate time segments. Future research in this area

could determine which time intervals are most appropriate for analysis with this system.

Finally, some question existed regarding the tested linear relationship between the difference estimates and the observed difference scores. A quadratic equation was applied for each set of relationships using the expected difference scores and observed difference scores squared as the predictor variables. Results of the application of a quadratic equation between the stories and children over time produced a Pearson r of .33125 as compared to a linear relation of .15. The quadratic relation between the stories and the mothers was $r = .42805$ as compared to a linear relation of .9061. The quadratic relation between the mothers and children was .15899 as compared to a linear relation of .4767. Limited improvement in the relationship between the stories and the children did occur by applying the quadratic equation. All other applications showed the simple linear equation was best. Therefore, standard methods in applying the quadratic equation are less useful than might be apparent from visual inspection of the data. Alternative equations need exploration, but are beyond the focus of this study.¹

¹Research being conducted at Louisiana State University and the University of Oklahoma by S. L. Renshaw and H. W. Cummings is exploring potential adaptation of the tanh equation which may account for the change in direction of the curve. Results of this research are expected to be reported in the near future.

Hypothesis 2

The most surprising result of this study was the lack of significant differences between the three age groups of children. The findings of the control group would seem to contradict the results of many of the previous investigations. One possible explanation may rest in the length of time between the previous research and the present investigation. It may be that children are undergoing certain structural changes in their language behavior. Therefore, five-year-olds who produce passives (as two of the four in the control group) may or may not possess the cognitive capabilities that Sinclair-de-Zwart (1969) asserts are necessary for its production. There is no way to ascertain the capabilities of these children in relation to their concept of stages, although using their criteria it would be feasible to suggest that these children may be at an advanced stage. A suggestion of this sort seems inappropriate. Therefore a discussion of language based on the stages as proposed by Piaget (discussed by Sinclari-de-Zwart, 1969) may need reformulation before their applicability can be viewed as a valid criteria.

The experimental group also did not produce significant differences between the three age groups. The linguistic environment may have similar degrees of impact on five, six and seven-year-olds. It is this finding that seriously questions the assumptions of passive development based on a

cognitive capabilities notion. Exposure to a certain grammatical form may be the determining factor in its development, not the logical structures which a child possesses.

Critical Evaluation

Manipulation

The main confounding problem in the present study was the repetition of the stories. This decision resulted from a lack of uniformity in story length among the stories available. It was decided that all the stories should be similar in length. Any increased length could have resulted in fatigue for either mother or child. Therefore, only fifteen stories, which meet the criteria for length, were utilized.

The proportion of passives produced by the children peaked at Week 4 then decreased through Week 5 and Week 6. This decrease likely resulted from the repetition of the stories--the children did not need to listen as carefully to the story to grasp the general ideas. Thus, the language in the stories may not have been as salient to the child during the repetition.

Without the repetition, the children may have continued the gradual increase (as evidenced in the mothers' production of passives) instead of the ultimate decrease. The mothers likely continued with the increase because in reading the stories they still were very aware of the language contained in the reading material.

A second criticism that is related to the repetition was a lack of quality control on the stories. Various mothers expressed dissatisfaction with several of the stories. They thought that the story in question was dull or boring. A pre-testing of the stories should have been conducted to determine the interest level for both mother and child before the initiation of the experiment. For replication of this study, two stories of the original fifteen would be excluded from the reading list.

Additionally, in order to increase the attention span of the child, the pictures should have been used throughout the entire six weeks of reading. Most of the mothers commented that the pictures helped in attracting and sustaining the attention of the children during reading time. Moreover, the use of the pictures resulted in increased favorable attitudes of the mothers toward the reading of the stories. Many felt the children were bored with hearing the stories unaccompanied by pictures and that the addition of the pictures resulted in an increased willingness to listen on the part of the children.

Several other aspects of the study may have confounded the results. First, in the preliminary interviews with each mother, the vast majority of them indicated that the parents normally read to the child at night. However, in many instances, the father read to the children--reading time was considered to be his time with the children. In asking the

mothers to read the stories, the normal routine of the household was disrupted. Future studies of this format should make provisions to include the entire family or at least both parents as part of the design.

A final criticism was suggested by many of the participants during the weekly interviews. During the first weeks of the study (Week 0 through Week 4) the weather was still quite chilly. However as the weather grew warm, the mothers commented upon the increasing difficulty of securing their child's attention during the reading of the story. Thus, many suggested that similar investigations of this sort should be conducted in the winter months when the children are more confined to the house.

Subject Population

The choice of subject population was made with full knowledge of the limitations placed on generalizability of the results. Utilization of a religious population places constraints on the applicability of these results to families that do not place such a high value on family interaction. However, the decision to use this religious group was a pragmatic decision made for several reasons. First, the members of this church were homogeneous in educational, moral and ethical values. All but two of the mothers had college coursework and most of the families would be classified as middle income families with a few leaning toward upper middle class. Finally, the mothers continually indicated

that reading stories was a normal activity in the home. Therefore it was thought that the children would not be effected by a tremendous change in normal routine.

These similarities were viewed as an advantage in controlling for the numerous variables that can effect research conducted in the home environment. The limitations for generalizability are most evident concerning the time spent with the child. It is likely that working parents do not spend six to ten hours a day interacting with their children. It may be that this close relationship between mother and child promulgated the production of language in congruence with the linguistic environment. Mothers and children who are not as closely related may produce different reactions to the language of the environment.

A second major limitation of the subject population is their frequent exposure to the writings of the Bible. A number of the mothers, when discussing the Bible, would produce exceptionally large proportions of passive verbs. It may be that the Bible, written in its formal style, contains a higher proportion of passive verb forms than other written materials. Thus, this population may produce more passives in causal conversation than other populations who do not hold the same religious views.

However, it was these religious views and ethics that contributed to the required cooperation of the mothers in the experiment. Only two mothers chose to terminate before the

end of the six-week period (one after Week 4 and one after Week 5). Of the remaining families, all of the stories were read and all weekly interviews took place without complications.

Future Research Implications

These results suggest several interesting investigations to aid in the further understanding of the passive voice and the relationship of the environment to language behavior. Studies need to be conducted that measure the use of the passive form in relation to different communication settings (such as written language, the home atmosphere, the school atmosphere) with various age groups. Also, the present investigation should be replicated utilizing a different subject population to test the relationship of various types of home situations to a child's language behavior. A second replication should also be conducted utilizing different stories throughout the entire time period.

Another area of research that is suggested by this research is a pragmatic investigation into the utilization of the passive voice. In supplemental interviews many mothers posed the question concerning why the passive voice is used. In Chapter I the theoretic issues for use of the passive included focus of attention and sentence diversity. It would be theoretically valuable to discern the rationale of language users in selecting the passive form over another verb form. Investigations of this sort would lead to a

grammar of functions--functions based on actual language behavior. Also, the actual percentage of passives present in both the mother's and children's language surprised a majority of the mothers. They had previously expressed doubt that there was any reaction to the language in the stories. Thus, it may be that the utilization of certain language constructions is based on an attempt to achieve congruence with the environment, more than a desire to achieve some purpose through one's language.

While the results of this study lend credibility to the assumption that the linguistic environment effects language production, it is also important to note the limited nature of the manipulation present in this investigation. The average story took only five to ten minutes to read. Thus, extremely limited manipulation of the language environment (compared to six to ten hours a day mother-child interaction) resulted in an alteration of language behavior.

The decision for a six-week investigation was essentially a pragmatic decision, based upon the expected cooperation within the home. The supplemental interviews with the mothers and children, where no passives were produced, indicate that a six week term is sufficient for learning effects to occur. However, these effects did not stabilize following termination of manipulation. Would any changes stabilize if the manipulation continued for ten weeks or longer? This is an important research question that should be answered before

there can be definitive support for the effect of the environment on language production.

Along with expansion in terms of time of manipulation, another important variable would be the extent of manipulation within the language environment necessary to produce a change. What would be the effect if the percentages were graduated--for example, Week 1 = 2 percent; Week 2 = 4 percent; Week 3 = 6 percent and so on. Would this gradual increase in the environment correspond with a gradual increase on the part of the language producer? Research in this line could also determine what is the minimum percentage necessary for learning to occur. It would also determine if there was a maximum percentage, after which any increases would result in a countershaping of the language producer.

A final area that is of theoretical concern is the effect of variation of several categories as opposed to only one as utilized in this investigation. Can there be simultaneous shaping of more than one language characteristic, and what would be the shape of the reaction if more than one variable were utilized? It may be that manipulation of two or more variables might result in a slight decrease of the effect of any one variable. For example, if both passive verbs and future tense verbs were manipulated, the language producer might increase his production of both verb forms, but the effect would not equal the increase obtained in this present study.

Summary

An explanation of the effect of the linguistic environment on language behavior cannot rest upon any single variable. A number of variables, including amount and extent of exposure, age of respondent and salience of the stimulus in the environment, provide information regarding this effect. In the present study, the experimental group who were exposed to an increased percentage of passive verbs produced an increasing percentage of passives during the six week period while the control group remained relatively stable in their production of passives. The experimental group may have been producing these passive verb forms in order to achieve congruence with their language environment. Although there was no difference between the five, six and seven-year-olds with respect to their production of passives, the mothers did increase beyond the level of the children. It may be that certain age groupings, not different ages, react in a similar manner. Finally, the obtained data resulted in a quadratic equation, indicating that the effect of the environment may not reach a level of stability as predicted by a tanh equation.

In conclusion, this present investigation highlights several areas concerning the effect of the linguistic environment. In reviewing studies of environmental impact upon language development, Landes (1975) noted that researchers have typically neglected these factors in favor of

research into the issue of innateness. This study demonstrated that indeed the environment can determine language behavior, in part. But extended research must be conducted before the actual extent of this determination can be asserted.

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APPENDIX A

SUBJECT DESCRIPTION

CHILDREN

<u>Age</u>	<u>Group</u>	<u>Sex</u>	<u>Grade</u>	<u>Sibling Position</u>
5	E	M	K	1st of 2
5	E	F	K	1st of 2
5	E	M	K	2nd of 2
5	C	F	K	1st of 2
5	C	F	K	1st of 2
5	C	F	K	2nd of 3
5	C	F	K	2nd of 3
6	E	F	1	1st of 2
6	E	M	1	1st of 3
6	E	M	1	3rd of 3
6	E	M	1	1st of 2
6	C	M	1	1st of 2
6	C	F	1	2nd of 2
6	C	M	1	2nd of 2
7	E	F	2	1st of 2
7	E	M	2	2nd of 2
7	E	F	2	1st of 2
7	C	M	2	1st of 2
7	C	F	2	1st of 3
7*	C	M	2	4th of 4
7	C	F	2	1st of 3

*40% hearing loss.

SUBJECT DESCRIPTION

MOTHERS

<u>Age</u>	<u>Group</u>	<u>Educational Level</u>	<u>Working</u>	<u>Husband Present</u>
26	E	B.A.	no	yes
30	E	High School	in home	yes
28	E	2 yrs. coll.	3 days/week	yes
28	C	3 yrs. coll.	no	yes
32	C	3½ yrs. coll.	no	yes
29	C	B.A.	no	yes
28	C	2 yrs. coll.	no	no
26	E	1 yr. coll.	no	yes
26	E	2 yrs. coll.	no	yes
35	E	2 yrs. coll.	no	yes
27	E	B.A.	no	yes
36	C	M.L.S.	no	yes
30	C	B.S.	yes	no
29	C	3 yrs. coll.	no	yes
27	E	2 yrs. coll.	no	yes
28	E	B.A.	no	yes
28	E	2 yrs. coll.	no	yes
28	C	High School	no	yes
29	C	B.A.	no	yes
32	C	2 yrs. coll.	yes	yes
28	C	2 yrs. coll.	no	yes

APPENDIX B

GRANDPA BUNNY

Deep in the woods where the brier bushes grow, lies Bunnyville, a busy little bunny rabbit town.

And in the very center of that busy little town stands a cottage, a neat twig cottage, with a neat brown roof, which is known to all as the very own home of Great Grandpa Bunny Bunny.

Great Grandpa Bunny Bunny, as every bunny knows, was the ancestral founder of the town, which is a very fine thing to be.

He liked to tell the young bunnies who always gathered around how he and Mrs. Bunny Bunny, when they were very young, had found that very brier patch and built themselves that very same little twig house.

It was a happy life they lived there, deep in the woods, bringing up their bunny family in that little house of twigs.

And of course Daddy Bunny Bunny, as he was called then, was busy at his job, decorating Easter eggs.

As the children grew up, they helped paint Easter eggs. And soon the children were all grown up, with families of their own. And they built a ring of houses all around their parents' home.

By and by they had a town there, and they called it Bunnyville.

Now Grandpa Bunny Bunny had lots of help painting Easter eggs--so much that he began to look for other jobs to do.

He taught some of the young folks to paint flowers in the woods.

They tried out some new shades of green on mosses and on ferns.

They made those woods so beautiful that people who went walking there marveled at the wonderful colors as they talked among themselves.

"The soil must be especially rich," they said, "or the rainfall especially wet."

And the bunnies would hear them and silently laugh. For they knew it was all their Grandpa Bunny Bunny's doing.

Years went by. Now there were still more families in Bunnyville. And Grandpa Bunny Bunny had grown to be Great Grandpa Bunny Bunny. For that is how things go. He still supervised all the Easter egg painting, and the work on the flowers every spring.

But he had so much help that between times he looked around for other jobs to do.

He taught some of the bunnies to paint the autumn leaves--purple for the gum trees, yellow for the elms, patterns in scarlet for the sugar maple trees. Through the woods they scampered with their brushes and their pails.

And the people who went walking there would say among themselves, "Never has there been such color in these woods. The nights in these woods must have been especially frosty."

And the bunnies would hear them and silently laugh. For they knew that it was all their Great Grandpa's plan.

And so it went, as the seasons rolled around. There were constantly more bunnies in that busy Bunnyville.

And Great Grandpa was busy finding jobs for them to do.

He taught them in winter to paint shadows on the snow and pictures in frost on wintry window panes and to polish up the diamond lights on glittering icicles.

And between times he told stories to each crop of bunny young, around the cozy fire in his neat little twig home. The bunny children loved him and his funny bunny tales. And he loved the new and different things he found for them to do.

But at last it did seem as if he'd thought of everything. He had crews of bunnies trained to paint the first tiny buds of spring.

He had teams who waited beside cocoons to touch up the wings of new butterflies.

Some specialized in beetles, some in creeping, crawling things.

They had painted up that whole wild wood till it sparkled and it gleamed.

And now, the bunnies wondered, what would he think of next? Well, Great Grandpa stayed at home a lot those days, and thought and thought and thought.

And at last he told a secret to that season's bunny boys and girls.

"Children," Great Grandpa Bunny Bunny said, "I'm going to go away. And I'll tell you what my next job will be, if

you'll promise not to say."

So the bunny children promised. And Great Grandpa went away. The older bunnies missed him, and often they looked sad. But the bunny children only smiled and looked extremely wise. For they knew a secret they had promised not to tell.

Then one day a windy rainstorm pelted down on Bunnyville. Everyone scampered speedily home and stayed cozy and dry in their cottages.

After a while the rain slowed down to single dripping drops.

Then every front door opened, and out the bunny children ran.

"Oh, it's true!" those bunnies shouted. And they did a bunny dance. "Great Grandpa Bunny Bunny has been at work again. Come see what he has done!"

And the people walking out that day looked up in pleased surprise.

"Have you ever," they cried, "simply ever seen a sunset so gorgeously bright?"

The little bunnies heard them and they chuckled silently. For they knew that it was the secret. It was all Great Grandpa Bunny Bunny's plan.

APPENDIX C

GRANDPA BUNNY

Deep in the woods where the brier bushes grow, lies Bunnyville, a busy little bunny rabbit town.

And in the very center of that busy little town stands a cottage, a neat twig cottage with a neat brown roof, which is known to all as the very own home of Great Grandpa Bunny Bunny.

Great Grandpa Bunny Bunny, as every bunny knows, was the ancestral founder of the town, which is a very fine thing to be.

He liked to tell the young bunnies who always gathered around how he and Mrs. Bunny Bunny, when they were very young, had found that very brier patch and built themselves that very same little twig house.

It was a happy life they lived there, deep in the woods, bringing up their bunny family in that little house of twigs.

And of course Daddy Bunny Bunny, as he was called by the people of the village, was busy at his job, decorating Easter eggs.

As the children grew up, they helped paint Easter eggs. And soon the children were all grown up with families of their own. And a ring of houses were built by the children all around their parents' home.

By and by they had a town there, and they called it Bunnyville.

Now Grandpa Bunny Bunny had lots of help painting Easter

eggs--so much that he began to look for other jobs to do.

Some of the young folks were taught by Grandpa Bunny Bunny to paint flowers in the woods.

They tried out new shades of green on mosses and on ferns.

They made those woods so beautiful that people who went walking there marveled at the wonderful colors as they talked among themselves.

"The soil must be especially rich," they said, "or the rainfall especially wet."

And the bunnies would hear them and silently laugh. For they knew it was all their Grandpa Bunny Bunny's doing.

Years went by. Now there were still more families in Bunnyville. And Grandpa Bunny Bunny had grown to be Great Grandpa Bunny Bunny. For that is how things go. The Easter egg painting was still supervised by him, and also the work on the flowers every spring.

But he had so much help that between times he looked around for other jobs to do.

Some of the bunnies were taught to paint the autumn leaves by Great Grandpa Bunny Bunny--purple for the gum trees, yellow for the elms, patterns in scarlet for the sugar maple trees. Through the woods they scampered with their brushes and their pails.

And the people who went walking there would say among themselves, "Never has there been such color in these woods. The nights in these woods must have been especially frosty."

And the bunnies would hear them and silently laugh.
For they knew that it was all their Great Grandpa's plan.

And so it went, as the seasons rolled around. There
were constantly more bunnies in that busy Bunnyville.

And Great Grandpa was busy finding jobs for them to do.

They were taught by Grandpa Bunny to paint shadows on
the snow and pictures in frost on wintry window panes and to
polish up the diamond lights on glittering icicles during
the winter.

Each crop of bunny young were told stories by Great
Grandpa around the cozy fire in his neat little twig home.
The bunny children loved him and his funny bunny tales. And
they loved the new and different things he found for them to
do.

But at last it did seem as if he'd thought of everything!
He had crews of bunnies trained to paint the first tiny buds
of spring.

He had teams who waited beside cocoons to touch up the
wings of new butterflies.

Some specialized in beetles, some in creeping, crawling
things.

They had painted up that whole wild wood till it sparkled
and it gleamed.

And now, the bunnies wondered, what would he think of
next? Well, Great Grandpa stayed at home a lot those days,
and thought and thought and thought.

And at last the bunny boys and girls were told a secret by Great Grandpa.

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And the people walking out that day looked up in pleased surprise.

"Have you ever," they cried, "Simply ever seen a sunset so gorgeously bright?"

The little bunnies heard them and they chuckled silently. For they knew that it was the secret. It was all Great Grandpa Bunny Bunny's plan.

APPENDIX D

Week _____ Day _____

1. Did your child ask any questions concerning the story you read tonight (last night)?
_____yes_____no
2. When did the child ask these questions?
 - a. Immediately after the story? _____
 - b. A few hours later? _____
 - c. Other? (specify) _____
3. What did the questions relate to?
 - a. Lack of attention? _____
 - b. Lack of understanding? _____
 - c. Language in the story? _____
 - d. Characters in the story? _____
 - e. Other? (specify) _____
4. Did the children use vocabulary present in the story when they asked questions?
_____yes_____no
5. Did the child use the passive voice when asking questions?
_____yes_____no
6. Did the child use specific names of characters in the story when asking questions?
_____yes_____no

APPENDIX E

Week _____ Story _____

1. Did your child ask any questions concerning the story you read tonight (last night)?
Yes _____ No _____
2. When did your child ask these questions?
 - a. Immediately after the story? _____
 - b. A few hours later? _____
 - c. Other (please specify) _____
3. What did the questions relate to?
 - a. Lack of attention? _____
 - b. Lack of understanding? _____
 - c. Language in the story? _____
 - d. Characters in the story? _____
 - e. Other (specify) _____
4. Did the children use vocabulary present in the story when they asked these questions?
Yes _____ No _____
5. Did the child use the passive voice when asking questions?
Yes _____ No _____
6. Did the child use complex sentences?
Yes _____ No _____
7. Did the child use specific names of characters in the story when asking questions?
Yes _____ No _____
8. Did the use of the pictures increase the attention and interest of the child?
Yes _____ No _____
9. Did the repetition of the story cause a decrease in attention?
Yes _____ No _____
10. Who read the story with the child?
Mother _____ Father _____

NAME _____