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STAGE I LANGUAGE DEVELOPMENT OF DOWN'S  
SYNDROME CHILDREN.

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STAGE I LANGUAGE DEVELOPMENT OF  
DOWN'S SYNDROME CHILDREN

by

Pamela Russell McGuire

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Abstract

STAGE I LANGUAGE DEVELOPMENT OF  
DOWN'S SYNDROME CHILDREN

by

Pamela Russell McGuire

Advisor: Professor Bernard B. Schlanger

Semantic, syntactic, and morphological characteristics of the spontaneous speech of three noninstitutionalized Down's Syndrome children at Stage I were investigated in order to determine if qualitative differences could be found between these children's language and previous descriptions of the language of normal children at the same stage of development. Stage I was defined, following Brown (1973), as beginning when Mean Length of Utterance (MLU) exceeded 1.0 morpheme and ending when MLU reached 2.0 morphemes.

The subjects of the study had all been medically diagnosed as Trisomy 21, and had been raised in homes where the only language spoken was English. At the beginning of the study, the subjects ranged in age from 3 years, 7 months to 4 years, 9 months.

Hour-long language samples were collected from each child at six- to eight-week intervals throughout the period of Stage I. Transcripts of each sample included all of the child's utterances, plus all relevant verbal and nonverbal contextual information, which was used to determine the

semantic intent of the utterances.

The semantic, syntactic, and morphological characteristics of the utterances were examined according to the framework proposed by Brown (1973), and the findings were compared with Brown's description of the utterances of normal Stage I children. In addition, the order in which the various semantic notions emerged in the speech of the present subjects at Stage I was determined using procedures developed by Leonard (1976), and the results compared with Leonard's description of the order of acquisition of semantic notions by normal children.

The results revealed that, although most of the semantic relations which the Down's Syndrome children expressed at Stage I were also expressed by the normal Stage I children, there were differences between the two groups in the types of semantic relations which were expressed most frequently, and in the order in which various semantic notions emerged. In addition, the Down's Syndrome subjects used a number of syntactic constructions which had not yet developed in the normal Stage I children, and demonstrated a much higher level of development of several of the 14 grammatical morphemes than did the normal children at Stage I.

These findings indicated that the normal symmetry which has been found in nonretarded children between semantic and grammatical development was disturbed in the present subjects, who demonstrated considerably more advanced acquisition of syntactic constructions and morphological forms than of

semantic notions and relations. This disturbance in symmetry supported the position that semantic development and the development of formal expressive means are to some degree independent. Furthermore, these findings indicated that the areas most severely affected by these children's retardation, the acquisition of semantic notions and relations, were those areas which have been shown by previous research to be most directly and demonstrably linked to sensorimotor intelligence, and least sensitive to environmental influences.

It was concluded, therefore, that there were qualitative differences between these Down's Syndrome children's language and the language of normal Stage I children; and that these differences were more closely related to general developmental cognitive processes than to specific linguistic abilities.

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## TABLE OF CONTENTS

Chapter	Page
I. THE PROBLEM . . . . .	1
Statement of the Problem . . . . .	1
Background of Study . . . . .	2
Approaches to the Study of Children's Linguistic Expression . . . . .	7
Need for the Study . . . . .	14
Purpose of the Study . . . . .	15
Questions to be Investigated . . . . .	15
Definition of Terms . . . . .	17
II. REVIEW OF THE LITERATURE . . . . .	20
Universals in Language and Language Acquisition . . . . .	20
Cognitive Basis of Early Language Acquisition . . . . .	35
Language in the Retarded and Its Relationship to Cognitive Functioning . . . . .	38
III. DESCRIPTION OF THE STUDY . . . . .	42
Selection of Subjects.. . . .	42
Description of Subjects . . . . .	43
Procedures for Data Collection . . . . .	45
Data Recording . . . . .	46
Data Analysis . . . . .	53
Limitations of the Study . . . . .	59

Chapter	Page
IV. RESULTS . . . . .	61
Quantitative Characteristics of The Data . . . . .	61
Semantic Characteristics . . . . .	68
Syntactic Characteristics . . . . .	89
Grammatical Morphemes . . . . .	98
Summary of Findings . . . . .	106
V. DISCUSSION AND INTERPRETATION . . . . .	109
Order of Emergence and Frequency of Expression of Semantic Notions . . . . .	112
Relationship between Semantic and Grammatical Development . . . . .	114
Implications for Therapy . . . . .	118
Appendix A. PRELIMINARY TRANSCRIPTION FORM . . . . .	121
Appendix B. TABLES 22, 23, and 24 REPRINTED FROM BROWN (1973) . . . . .	122
References . . . . .	125

LIST OF TABLES

Table	Page
1. Comparison of judges' descriptions of contextual information with and without videotape . . . . .	49
2. Inter-judge agreement with regard to utterance transcription . . . . .	52
3. Number of utterances in each sample classified as unintelligible, intelligible/not acceptable, and acceptable . . . . .	62
4. Percentage of unintelligible utterances in each sample; Early Stage I . . . . .	63
4a. Percentage of unintelligible utterances in each sample; Late Stage I . . . . .	63
5. Number of morphemes, MLU, and upper bound for each sample . . . . .	65
6. Percentage of acceptable utterances in each sample which consisted of a single morpheme; Early Stage I . . . . .	66
6a. Percentage of acceptable utterances in each sample which consisted of a single morpheme; Late Stage I . . . . .	66
7. Acceptable utterances classified according to length . . . . .	69
8. Percentages of multi-morpheme types which express the Prevalent Relations; Early Stage I . . . . .	70
8a. Percentages of multi-morpheme types which express the Prevalent Relations; Late Stage I . . . . .	70
9. Percentages of multi-morpheme types expressing each of the Prevalent Relations . . . . .	72
10. Percentages of multi-morpheme types in each of Brown's (1973) Other Constructions . . . . .	77

Table	Page
11. Total percentages of multi-morpheme types which express Brown's (1973) Other Constructions; Early Stage I . . . . .	78
11a. Total percentages of multi-morpheme types which express Brown's (1973) Other Constructions; Late Stage I . . . . .	78
12. Percentages of multi-morpheme types which are not in Brown's (1973) classification; Early Stage I . . . . .	79
12a. Percentages of multi-morpheme types which are not in Brown's (1973) classification; Late Stage I . . . . .	79
13. Classification of multi-morpheme types not in Brown's (1973) categories expressed in percentages . . . . .	81
14. Percentages of multi-morpheme types expressing higher level constructions; Early Stage I . . . . .	86
14a. Percentages of multi-morpheme types expressing higher level constructions; Late Stage I . . . . .	86
15. Semantic notions expressed according to their groups as defined by Leonard (1976) and their average order of emergence for three Down's Syndrome children . . . . .	90
16. Pronoun use by present subjects and Brown's (1973) subjects . . . . .	96
17. Percentages of 14 grammatical morphemes present for Brown's (1973) subjects . . . . .	100
18. Percentages of 14 grammatical morphemes present for Down's Syndrome subjects in various samples . . . . .	101

## CHAPTER I

### THE PROBLEM

#### STATEMENT OF THE PROBLEM

Clinicians in the field of speech and language pathology have frequently observed in mentally retarded children what appeared clinically to be qualitative differences between these children's language and the language of normal children. One frequent goal of investigations of the language of retarded children has been to determine whether or not this common clinical impression of qualitative differences can be objectified. In an effort to investigate this question, studies have focused on many different aspects of linguistic function in the retarded, from simple articulation (Blanchard, 1964; Schlanger and Gottsleben, 1957) through organized syntactic patterning (Graham and Graham, 1971; Lackner, 1968; Lyle, 1961); from single word vocabulary (Irwin, 1966; Papania, 1954) through highly complex linguistic structures (Cromer, 1972).

Overall, the majority of the studies done to date have not supported the position that the language of the retarded child differs in a qualitative way from that of normal children. In fact, the general consensus has been that, although language develops more slowly and may be

arrested at a primitive stage in the retarded, the developmental sequence is the same as for normal children.

#### BACKGROUND OF STUDY

There are at least two possible explanations which might account for the fact that significant qualitative differences in retarded children's language have not been identified. One notable difficulty with much of the research has stemmed from the broad definition of the term "retardation," and the tendency to generalize across subjects whose retardation has resulted from vastly differing etiologies. In a study by Schlanger and Gottsleben (1957), the authors classified their retarded subjects according to 16 different etiologic categories, 10 of which indicated central nervous system impairment and were therefore subsumed under the category of Organic. Other categories included Familial, Mongolism, Mixed, Undifferentiated (consisting of subjects who could be classified according to the specified categories), Other Forms (which included psychosis, psychoneurosis, and psychopathic personality), and Not Mentally Retarded, which Schlanger and Gottsleben described as "subjects admitted as mental retardates who upon later examination were found not to be retarded even though functioning on a subnormal level" (p. 100). Admittedly, this study by Schlanger and Gottsleben was designed specifically to examine the speech of these various etiologic groups differentially. The fact, however, that such a wide variety

of etiological types are subsumed under the heading of "retardation" indicates the difficulty which might be encountered in trying to identify specific patterns of behavior, linguistic or otherwise, which characterize retardates as a group. In searching for qualitative linguistic differences, studies which select subjects of various etiologies run the risk that their overall results will mask differences which characterize one of the above groups but not the others.

An obvious method of minimizing this difficulty is to select for study a single subgroup of the retarded population and limit the conclusions drawn from the study to that specific population. One group which appears to be the most appropriate for study of speech and language is the group whose retardation is associated with Mongolism, or Down's Syndrome.

One practical advantage to studying this particular group, specifically the standard Trisomy 21 type, is that the fact of retardation in this population, unlike most other etiologic groups, has been thoroughly demonstrated and is universally acknowledged, regardless of variations in the definition of the term retardation. Furthermore, a considerable amount of literature exists documenting the presence of speech and language disturbances in Down's Syndrome children. Schlanger and Gottsleben (1957) indicated that among all etiologic groups studied, the Mongoloids and Organics demonstrated the severest speech handicaps.

Schlanger (1957) found the Mongoloids to be the least developed in oral language of all etiologic groups. A review of the literature on speech and language problems in Mongolism by Zisk and Bialer (1967) discussed a wide variety of studies demonstrating disturbances in language reception, language expression, articulation, rhythm, and phonation.

Most of the speech and language disturbances which have been described in the literature, however, appear to be quantitative differences which may be accounted for on the basis of normal but delayed development which is arrested at a primitive stage. Little evidence exists to support the position that there are differences in the process or the order of language acquisition. The existing literature, therefore, does not account for the fact that Down's Syndrome children constitute a large proportion of that population of retarded children on whom the clinical impression of qualitative differences is based.

A second explanation for the lack of evidence of qualitative differences in the language of retarded children is that the majority of investigations have been very narrow in scope and/or have not dealt in depth with the very aspect of language from which the impression of qualitative differences is derived, the child's spontaneous expression.

One methodological limitation has been the dearth of developmental studies. The acquisition of language is a dynamic process which is most effectively studied in terms

of its changes over time. Most of the important recent literature on normal language acquisition has focused not merely on the utterances produced at a single point in time, but on the changes that occur as a child's linguistic expression matures.

The lack of such an approach in the field of retardation, and one consequence of this deficiency, was remarked upon by Miller and Yoder (1974). Reiterating the conclusion of a previously published review of the literature (Yoder and Miller, 1972), the authors suggested that:

. . . retarded children develop language in a manner similar to children without intellectual deficits, but at a slower rate. The most recent literature does not alter this general conclusion. However, the conclusion is equivocal in that there are few developmental studies and no longitudinal studies of language development in retarded children at this time. At the present time, then, we will assume that retarded children acquire language in a manner similar to nonretardates except for a rate difference.  
(p. 510)

Lenneberg, Nichols, and Rosenberger (1964) attempted to compare the developmental sequence of Mongoloid children's language with that of normals and concluded that the Mongoloids followed the normal stages of development. The "stages" which these investigators used for comparison were defined in terms of the onset of babbling, the use of words, use of phrases, and use of sentences. Such definitions are so broad as to be rendered nearly meaningless by the subsequent detailed analyses of the developmental changes which take place within these various "stages."

Two studies which have attempted to examine in greater depth specific aspects of language development are those by Newfield and Schlanger (1968) and by Lackner (1968). Newfield and Schlanger compared the morphological development of retarded and normal children using an adaptation of a test devised by Berko (1958), employing both lexical and nonsense words to determine whether or not children had learned the rules for producing morphological forms. Newfield and Schlanger concluded that ". . . the retarded children appear to learn morphology in a manner comparable to normal children. The learning pace is slower, but differences are quantitative rather than qualitative" (p. 705). The use of Berko's technique has been criticized by Dever (1972) on the basis of his findings that performance on this type of test does not "predict the occurrence or non-occurrence of errors in the free speech of mentally retarded children" (p. 173).

Lackner (1968) used a transformational grammar approach to study the syntactic performance of five mentally retarded children. His findings indicated that as mental age increases there is a concomitant increase in sentence length, sentence complexity defined in terms of "the amount of structural change involved in the transformational histories of the sentence types" (p. 306), differentiation and specificity of phrase structure rules, and the number of transformations used and understood. While these findings clearly indicated that these retarded children used rules,

and that the children with higher mental ages had more syntactically complex rules than those with lower mental ages, Lackner's study was limited in that it dealt with purely structural complexity, that is, the form of the utterances, without regard for their meaning. Some of the problems inherent in such an approach have been discussed in detail by several researchers (Bloom, 1970; Bowerman, 1973; Brown, 1973).

Bloom (1970) pointed out that in order to identify the grammatical structure of a child's utterance, it is necessary to understand the semantic intent of that utterance. Using her now classic example, "mommy sock," Bloom demonstrated that without knowledge of the context in which such an utterance occurs, it is often impossible to determine the grammatical structure of that utterance. When the context of the utterance is taken into account, however, it is generally possible to determine both the semantic intent and the grammatical structure.

#### APPROACHES TO THE STUDY OF CHILDREN'S LINGUISTIC EXPRESSION

Bloom's criticism of the purely formal approach to the study of children's utterances, and the methods which she and others such as Bowerman (1973) and Brown (1973) developed in order to overcome such criticisms, have provided means of analyzing in depth the development of linguistic expression. These approaches grew out of dissatisfaction with the traditional methods of analyzing the grammatical

and structural aspects of children's language. Prior to the linguistic revolution set in motion by the transformational-generative approach to grammar, linguistic expression was generally analyzed by such static measures as length of response, parts of speech, types of clauses and phrases, incidence of compound and complex sentences, and grammatical errors, all based on traditional adult grammar (McCarthy, 1954). With the advent of the transformational-generative approach to grammar came the realization that children's utterances, though incomplete in terms of the adult grammar, are a reflection of the rules which the child has learned and must be analyzed in terms of the child's grammar, rather than the adult's.

The earliest efforts at analyzing utterances in terms of their own grammar characterized these utterances as telegraphic; that is, consisting of contentive words such as nouns, verbs, and adjectives, usually with adult word order preserved but with the omission of function words, such as prepositions, conjunctions, articles, and auxiliary verbs (Brown and Bellugi, 1964; Brown and Fraser, 1963). However, as Brown (1973) later pointed out, ". . . the characterization of speech as telegraphic. . . does not in its own right provide for productivity, for the construction of new sentences; it is a purely descriptive characterization" (p. 90).

Attempts by Braine (1963) and Miller and Ervin (1964) to characterize the productive rules operating in children's

earliest syntactic utterances resulted in what has come to be called "Pivot Grammar." Despite differences in terminology, the findings of these investigators were closely parallel and indicated that at the time children began combining words, they had two word classes, a small closed class of high frequency words which has come to be called "pivots," and a larger, less restricted class which has come to be called "open." Children's two-word utterances, rather than being random, were formed by specific rules operating on these two word classes. Slobin (1971b) summarized these rules as follows:

The pivot class can be subdivided into two subclasses: first- and second-position pivots; and . . .there are three sentence types: pivot-open, open-pivot, and open-open. (p. 5)

McNeill (1966) further characterized pivots as not occurring as single-word utterances and not combining with each other in two-word constructions.

Bowerman (1973) discussed some of the formal inadequacies of the pivot grammar as a representation of children's linguistic knowledge. She pointed out that many words in children's two-word constructions do not conform to all of the specified characteristics of either the open or the pivot classes, and furthermore, that those words which clearly belong to the open class do not have identical distributional properties.

The most significant inadequacy of the pivot grammar approach, however, is its purely distributional nature;

that is, that it does not take into consideration the linguistic functions of the utterances it describes. Brown (1973) has discussed in detail the limitations of such purely distributional grammars, which he terms "lean" grammars, and contrasts them with what he terms "rich" grammars, those which take into account the functional aspects of the utterance. According to Brown, only the "rich" grammars such as those devised by Bloom (1970), Fillmore (1968), and Schlesinger (1971) ". . .are able to expose what appear to be the major uniformities characterizing Stage I speech both in its total course and with respect to the developments occurring in that course" (p. 242).

The development of these rich grammar approaches to the analysis of children's utterances has provided the means of examining in greater depth the early linguistic development of retarded as well as normal children. Two recent studies have attempted to apply the type of "rich" analysis described by Brown to the language of Down's Syndrome children, and to compare their findings with those which Brown found in normal children. Coggins (1976) investigated the spontaneous two-word utterances of four Down's Syndrome children in terms of the semantic relations which these utterances expressed, and comparing his data with those reported by Brown, found that ". . .initial two-word utterances expressed by Down's Syndrome children do indeed concentrate on the same, rather small set of relational meanings as do nonretarded children's first two-word utterances" (p. 44).

Coggins's study, although informative, was limited in that it dealt not only with a very small proportion of the utterances produced, but also with only the lowest level syntactic utterances produced at Stage I. Despite the fact that Stage I is frequently referred to as the two-word utterance stage, this stage is actually defined in terms of the average length of utterance produced in a given sample. Utterances of more than two words are a frequent occurrence at Stage I, and any analysis which omits them is limited to studying only those utterances of lowest syntactic complexity. Coggins pointed out, validly, that in Brown's data, longer utterances were composed of combinations of the same relations which had been expressed in the two-word utterances. However, to make the assumption that this would also be the case for the Down's Syndrome children is, in effect, to deny the possibility of qualitative differences in advance. If qualitative differences in linguistic acquisition do exist between Down's Syndrome retarded children and nonretarded children such as those described by Brown, it is very possible that these differences increase with the level of linguistic complexity and are not readily apparent at the lowest levels. Indeed, just such a pattern was apparent in a study by Hubschman (1977) of six institutionalized Down's Syndrome children.

In addition to investigating the children's performance on formal tests, Hubschman also examined spontaneous speech samples using the type of analysis described by Brown.

She found that of the children she studied, who had mean length of utterances (MLU's) ranging from 1.4 to 3.3, ". . . even the youngest subject used the eight basic semantic relationships" (p. 127). Hubschman also found, however, that:

The subjects used some semantic relationships and structures such as embedded, complex and coordinated sentences which are not characteristic of the normal child at Stage I and Stage II. In some respects, therefore, the language development of these early institutionalized Down's Syndrome subjects differed from that of the normal child contrary to the conclusions of some previous research. (Abstract, p. iv)

Despite the fact that Hubschman's study appeared to support the notion of qualitative linguistic differences, several limitations in her study make further investigation necessary. First, the choice of early institutionalized children as subjects reawakens the controversy regarding the effects of institutionalization on language development. As Hubschman herself noted, studies relating to this issue have varied considerably in their conclusions. In fact, while a number of studies have suggested that early institutionalization inhibits linguistic growth (Lyle, 1960; Shotwell and Shipe, 1964), in at least one study reported by Hubschman (Mueller and Weaver, 1964), institutionalized subjects performed better than a similar group of non-institutionalized retardates. In view of the unresolved controversy, when comparing institutionalized children to subjects such as those described by Brown, it is difficult to determine whether observed differences are related to the

fact of the Down's Syndrome or are the direct result of the institutional environment in which the children have been raised.

The other, and perhaps more serious, limitations of Hubschman's study result from the fact that her findings were based on only one sample from each of her subjects. For each sample, Hubschman collected two subsamples, one with the teacher in the classroom, and the other in the child's cottage with a member of the cottage personnel. Hubschman did not indicate the length of time which elapsed between the two subsamples except to note that the two were collected "within a relatively short period of time" (p. 47). Presumably, if each sample were to be considered a reliable indicator of the child's stage of linguistic development, the two subsamples should be close to one another in terms of MLU. For two of the children, however, there were striking differences in MLU for the two conditions. For one child the MLU for the Teacher condition placed her in Early Stage I, whereas the MLU in the Cottage condition placed her at the end of Late Stage I. For another child the subsamples varied between the very beginning of Late Stage I and the beginning of Stage II.

These discrepancies demonstrate the problem involved in drawing conclusions based on any single language sample. In contrast, most of the descriptive studies which have been done on nonretarded children have followed the subjects for a sufficient period of time so that developmental

patterns could be observed. For example, all except one of the children described by Brown (1973) were followed for periods of no less than one month. In fact, when Brown plotted MLU against chronological age for the three subjects he himself followed, the resulting figure (p. 55), while unquestionably showing a general upward trend, also revealed frequent "downward jogs," indicating decreases in MLU. Brown pointed out that one of these "jogs" occurred for Eve at a time when she had a cold. For any single sample, therefore, or even two subsamples one or two days apart, the MLU may be determined not only by the child's linguistic abilities but also by illness or other such extralinguistic factors. For this reason, any study which purports to study developmental aspects of language with respect to MLU needs to follow the individual subjects developmentally for at least a sufficient period to insure that the child's performance is not being significantly affected by temporary extralinguistic factors.

#### NEED FOR THE STUDY

The importance of identifying existing qualitative differences in the language of retarded children was made evident by Miller and Yoder (1974), who proposed a strategy for teaching language to retarded children which was based on their assumption that the manner of language acquisition of retarded and nonretarded children is similar except for a rate difference. Both the content of their program and the sequence in which that content was presented was

consequently based on what is known regarding the content and sequence of acquisition in normal children. Miller and Yoder, however, admit that their basic assumption was unsubstantiated, and was accepted only because the existing literature has not contradicted it. As the authors stated, "It is clear that we need more direct information about the retarded child as a language learner in his community" (p. 525).

#### PURPOSE OF THE STUDY

The purpose of the present study is to investigate developmental aspects of the semantic, syntactic, and morphological characteristics of Stage I utterances in non-institutionalized Down's Syndrome retarded children in order to determine if qualitative differences between these children and normal children can be identified, using methods derived from current "rich" grammar approaches.

#### QUESTIONS TO BE INVESTIGATED

There are several areas in which qualitative linguistic differences may be revealed using the methodology of the present study. Recent literature on normal children (Bloom, 1970; Blount, 1969; Bowerman, 1973; Kernan, 1969) has amply supported the contention of Brown (1973) that "The order of progression in knowledge of the first language, both semantic and grammatical, will prove to be approximately invariant across children learning the same language and, at a higher level of abstraction, across children learning any language" (pp. 403-404).

Implicit in the findings of Brown and others dealing with syntactic constructions, semantic relations, and the morphological forms which Brown terms "modulations of meaning" is the indication that the universal order of development applies not only to those areas individually but also to the relationships among them. The numerous studies of normal children have demonstrated that, despite variations in individual style, similar syntactic structures are used to express the same semantic relations during the earliest stages of development.

The primary question which the present study attempts to investigate is whether or not the same regularity which exists in the language development of nonretarded children also exists in the language development of three Down's Syndrome children. In the course of investigating this question, the study addressed the following secondary questions:

1. Are the semantic relations expressed at Stage I by these Down's Syndrome children the same as the semantic relations expressed by nonretarded children?
2. Do these Down's Syndrome children use the same syntactic constructions to express the semantic relations at Stage I as do normal children?
3. Is the level of development, or lack of development, of the 14 grammatical morphemes which Brown discussed the same for the Down's Syndrome children as for nonretarded children at Stage I?

## DEFINITION OF TERMS

Acceptable Utterance (AU). AU is defined as any utterance included for analysis and consists of any utterance which is completely intelligible with the following exceptions: (a) the child's exact repetition of his own previous utterance at the investigator's request is not included; (b) the child's third or more uninterrupted repetition of the same utterance is not included.

Utterance Types. Utterance Types refer to distinct utterances which occur in any single sample, as differentiated from Utterance Tokens, which may include any number of repetitions of the same utterance within the sample. In determining the number of Utterance Types occurring in a given sample, each distinct utterance was counted only once, regardless of the number of times that utterance occurred.

Multi-morpheme Types. Multi-morpheme types are utterance types which consist of more than a single morpheme.

Mean Utterance Length (MLU). MLU is defined as the average number of morphemes per utterance in any language sample. MLU is calculated according to the rules outlined by Brown (1973, p. 54) with the following exceptions: (a) calculations are based on all AU's instead of a subsample of 100 utterances as used by Brown; (b) all utterances consisting solely of two or more repetitions of the same morpheme, such as "no no," are counted as single morpheme utterances.

Stage I. Stage I is defined, following Brown (1973), as beginning when MLU exceeds 1.0 and ending when MLU reaches 2.0. For the purposes of this study, subjects are not considered as having reached Stage I until they have achieved a minimum MLU of 1.05.

Early Stage I. Early Stage I includes all Stage I samples which have been obtained prior to the first sample with an MLU of 1.5 or more.

Late Stage I. Late Stage I is considered to begin with the first sample which achieves an MLU of 1.5 or more. All language samples obtained after that time, regardless of MLU, are considered Late Stage I, until the first sample which achieves an MLU of 2.0. Samples with MLU of 2.0 or more are no longer considered part of Stage I, and are not included in the analysis of the present study.

Semantic Intent. The semantic intent of an utterance is the overall meaning of that utterance when examined in relation to the context in which the utterance occurs. Bloom (1970) has noted, with regard to the problem of determining semantic intent, that:

It has often been observed that what young children say is usually related directly to what they do and see. . . .Although some utterances may be equivocal or otherwise not interpretable, it is generally not difficult to judge the relationship between what a child says and what he is talking about. (p. 9)

Each utterance is examined in relation to three types of contextual information: (a) preceding adult utterance, (b) child's utterance immediately following the utterance under consideration, (c) nonlinguistic context. For the

purposes of this study, all utterances for which the semantic intent is ambiguous, or otherwise not obviously interpretable, have been separated from those utterances with unequivocal semantic intent and do not enter into classification with those unequivocal utterances.

Semantic Description. The semantic characteristics with which this study is concerned do not refer to the meanings of the individual words in the lexicon, but to the relational meanings between the various words and morphemes within an utterance.

Syntactic Description. The syntactic characteristics discussed in this study refer to the formal and structural properties of an utterance which have been determined on the basis of specification of the semantic intent of that utterance.

Language Sample. Each language sample consists of all utterances produced during any single one-hour session. The samples are numbered chronologically, using Roman numerals. For example, Amy I refers to Amy's first sample, and Patricia VI refers to the sixth sample produced by Patricia.

## CHAPTER II

### REVIEW OF THE LITERATURE

Investigations of language acquisition have frequently addressed themselves to two issues which are central to psycholinguistic study. The first of these issues involves the specification of universals; that is, delineation of those features of language acquisition which characterize all normal children learning a first language. This issue is particularly relevant to the present study, since the attempt to compare the language development of Down's Syndrome retarded children with that of normal children presupposes that there are universal aspects of linguistic development that characterize normal children and that these characteristics can be specified. The second issue involves the nature of the relationship between linguistic development and the development of other cognitive skills.

#### UNIVERSALS IN LANGUAGE AND LANGUAGE ACQUISITION

Historically, the issue of universality has dealt both with identifying those features which are common to all languages, and with identifying those aspects of development which are common to all first language learners. According to Chomsky (1965), describing linguistic universals is the main task of linguistic theory. Chomsky discussed two types of linguistic universals: substantive universals, which

include the specific attributes which are shared by all languages, and formal universals, which may be defined as constraints on the form that the rules of a universal grammar may have. Bach (1974), while questioning the adequacy of Chomsky's particular theory of transformational grammar, agreed with Chomsky that a universal grammar must deal both with formal and substantive universals, and that the specification of these universals is central to general linguistic theory. Some of the substantive universals which Bach discussed included: phonetic universals, such as phonetic distinctive features; semantic universals, such as the presence in every language of a category for names of individuals; and syntactic universals, such as the similarities across languages in the means of expressing various speech acts (i.e., expressing commands, asking and answering questions, and making statements). An even wider variety of linguistic universals has been discussed by Greenberg (1966), who, with Osgood and Jenkins (1966), further pointed out that linguistic universals "provide. . .the major point of contact with underlying psychological principles" (p. xv).

The attempt to relate linguistic universals and psychological processing has been a major focus of the field of psycholinguistics. Although early efforts to demonstrate a one-to-one correspondence between linguistic complexity as defined by transformational grammar and ease of psychological processing have been less than conclusive (Fodor, Bever, and Garrett, 1974, pp. 320-328), the search for

universal aspects of language acquisition has appeared more promising.

It has been recognized for decades that children pass through universal stages in the development of speech, from random vocalization to babbling, single words, and phrases (Berry and Eisenson, 1956). Furthermore, the importance of universal distinctive features to the acquisition of phonology has also been noted (Jakobson, 1968; Jakobson and Halle, 1956). Much of the recent emphasis, however, has been on isolating similarities in the acquisition of syntactic, semantic, and morphological structures, not only across children developing the same language, but across languages as well. A great deal of this literature has focused on the earliest stage of syntactic development, the two-word utterance stage.

#### Characteristics of Stage I

Description of the telegraphic nature of children's earliest syntactic utterances (see Chapter I) represented one of the first attempts to characterize universal features of these utterances, and was supported by evidence from a variety of languages, including French (Gregoire, 1937), Russian (Slobin, 1966), Swedish (Rydin, 1971), Hebrew (Bar-Adon, 1971), and Finnish (Bowerman, 1973). Probably the greatest impetus to the search for universals in the acquisition of language structure, however, resulted from the fact that two independent studies of children's two-word utterances,

published almost simultaneously, revealed remarkable similarities in their descriptions of these utterances (Braine, 1963; Miller and Ervin, 1964). Braine (1963), studying the spontaneous utterances of three English-speaking children, was the first to apply the term "pivot" to refer to what he observed to be a small class of frequently occurring words which were associated with a particular utterance position. Braine hypothesized a parallel between the pivot and open classes in children's grammar and the distinction between open classes such as nouns, verbs, and adjectives and closed classes such as pronouns, prepositions, and auxiliary verbs in the adult grammar.

Miller and Ervin (1964), in describing the utterances of 24 English-speaking children who were at the two-word stage, drew a similar conclusion regarding the relationship between the two classes of words which they found in the children's speech and adult word classes. Miller and Ervin used the term "Operators" to refer to the children's small class of high frequency words, and noted the similarity between this class and function words in adult speech.

Despite the subsequent criticisms of the adequacy of the pivot grammar (see Chapter I), these studies provided initial evidence that children's earliest syntactic utterances are not random combinations of words but are governed by rules; and that there is a close resemblance among children in the types of rules they use at the same stage of development.

Bloom (1970), on the basis of her analysis of the spontaneous utterances of three children, not only questioned the adequacy of the pivot grammar as a representation of these utterances, but also concluded that no single grammar could account for the utterances of all three children, therefore casting doubt on the universal nature of children's grammars. Bloom wrote grammars for each corpus using a transformational approach. Despite the fact that her method of inducing the grammar for each corpus differed from previous attempts at grammar writing in that the semantic intent of each utterance was used to determine its syntactic structure, the grammars themselves were purely syntactic descriptions, omitting in their final form the semantic properties of the utterances.

The importance of including the semantic element in any description of children's utterances has been discussed by such theorists as Chafe (1970), Fillmore (1968), and Schlesinger (1971), who have all proposed ways in which to represent semantic information. When Bloom's data are re-examined specifically in terms of the semantic relationships which were expressed in each of the samples, many similarities become apparent. In fact, in a subsequent discussion of this study, the author pointed out that the relations which appeared in the data, although not all represented to the same extent in each of the children, comprised only a small proportion of the relations which can be expressed in the adult language (Bloom, 1972, p. 25). Furthermore, there

was considerable overlap in the semantic relations which were expressed and in the syntactic means of expressing them.

Since Bloom's results were based on only three children, all of whom were English speaking, the possibility remained that even if the semantic relations most prevalent in her data were found to be the same in the utterances of other English-speaking children, the results might be due to some property of English, rather than to universal properties of language or language acquisition. The need for studying languages which are structurally different from English led to the cooperative effort of a group of psychologists, linguists, and anthropologists in writing a field manual which outlined goals and procedures for such study (Slobin, 1967). This field manual served as the basis for three cross-linguistic studies which included the two-word stage in three different languages: Samoan (Kernan, 1969), Luo (Blount, 1969), and Finnish (Bowerman, 1973).

Kernan (1969) studied 12 Samoan children between the ages of two and five years, and reported in detail on two of the youngest children, Sipili and Tofi, both of whom were at Stage I. The grammars which Kernan wrote for Sipili and Tofi were based in part on Fillmore's (1968) Case Grammar, in that they included the semantic relationships as part of the grammar itself, rather than merely as an aid to determining syntactic structure. Kernan pointed out, however, that the case relationships described by Fillmore, which are based on the relationships between verbs and

nouns, are not adequate as a description of children's utterances in that not all of these utterances contain, or even imply, a verb. The semantic relationships which Kernan found in the utterances of Sipili and Tofi differed primarily in the fact that Sipili used more simple nominatives, whereas Tofi used fewer nominatives and a wider variety of case relations and modalities. Kernan noted that the corpus obtained for Sipili was less spontaneous than that from Tofi as a result of the fact that Sipili's mother made continual efforts to elicit speech from him by asking questions. Nonetheless, the grammars of the two children were very similar, in that Tofi, whose MLU was slightly higher than that of Sipili, expressed all of the semantic relations expressed by Sipili as well as a number of other relations which were not present in Sipili's speech.

Blount (1969) studied eight Luo children from Nyanza Province in southwestern Kenya. The children ranged in age from nine to 35 months, and, except for the two youngest, were all using utterances of at least two words. Two problems with Blount's study limit its usefulness for cross-linguistic comparison. Due to a strong prohibition against conversing with strangers or visitors, a prohibition which is inculcated beginning at a very young age, it was impossible to obtain representative language samples from any of the children. Since none of the samples contained 100 utterances, which is considered the minimum number of utterances necessary to determine MLU (Brown, 1973, p. 73), no direct

comparison is possible between Blount's subjects and the subjects from other studies.

A second limitation of Blount's study resulted from the fact that he made minimal use of semantic information in his analysis of the children's utterances, and did not include semantic relationships in his description of the children's grammars.

Nonetheless, a few of Blount's findings may be compared with some of the general observations reported for English-speaking children. Blount found an obvious distinction between one-word and two-word stages, as has been reported for English (Bloom, 1973). His data, however, did not support the notion of pivot grammar, even though his analysis was primarily distributional in nature. Blount indicated that, although on the basis of his limited data he could not conclusively rule out the possibility that some of the children had used a pivot grammar, ". . .it may be concluded that pivot constructions do not occupy as important a position in the syntactic development of Luo children as in their American counterparts" (pp. 94-95).

Blount also found that syntactic development preceded morphological development in the Luo children just as in English (Brown, 1973), even though Luo is a much more highly inflected language than English. Furthermore, the earliest inflections to develop in Luo were verb inflections for pronoun subjects and objects, both of which are expressed syntactically in English at Stage I.

Bowerman (1973) examined the spontaneous utterances of one English-speaking and two Finnish-speaking children within the framework of pivot grammar, transformational grammar, and case grammar, and compared her findings with those of Bloom (1970), Blount (1969), and Kernan (1969), as well as with findings reported by Brown (1970, 1973), on three English-speaking children. Bowerman's primary goal was to determine which of the three grammatical approaches was best able to represent children's linguistic knowledge at Stage I. Like Bloom and Blount, Bowerman found the pivot grammar to be neither accurate nor adequate as a description of the linguistic knowledge of the children she studied (see Chapter I). The transformational approach served as the basis for Bowerman's most detailed analyses, and revealed important similarities between her subjects and those in the other studies. Bowerman stated that:

The analysis within this framework of the speech of two Finnish children and the comparison of their speech with that of American, Samoan and Luo children. . .revealed that the children's utterances were semantically and syntactically very similar at two stages of development with regard to the kinds of constructions produced, the length and internal complexity of the utterances, the omission of obligatory elements, and the absence of certain construction patterns and operations. (p. 220)

The two stages which were mentioned referred to what Bowerman termed Early Stage I, consisting of Stage I samples with MLU of 1.5 or less, and Late Stage I, composed of Stage I samples with MLU above 1.5. Bowerman analyzed Early Stage I and Late Stage I separately in order to observe

developmental patterns within Stage I. The predominant patterns which were found in all of the children at Early Stage I included subject-verb-object relationships, as well as noun-locative, genitive-noun, adjective-noun, and demonstrative-noun constructions, all of which were generally expressed according to predominant adult word order. Embeddings, conjunctions, and inflections were largely absent, and personal pronouns were infrequent. By Late Stage I, the children's utterances included clear differentiation between copular and main verb sentences; incorporation of modified nouns, usually direct object phrases, as constituents of longer utterances; and greater use of pronouns. Word order still reflected the dominant word order in the adult language, and obligatory functors were usually absent.

Despite the fact that the transformational grammar approach isolated numerous similarities among the children, Bowerman criticized the theoretical basis of that approach on the grounds that there is not sufficient evidence to support the requirement of such a grammar that children be credited with understanding the abstract notions of grammatical categories such as subject and predicate. Rather, Bowerman preferred the approaches of Schlesinger and Fillmore which credit children with knowledge of semantic concepts such as agent, action, object, and location. Nonetheless, Bowerman, like Kernan (1969), indicated that the semantically based grammar as proposed by Fillmore was not adequate to describe the linguistic knowledge of Stage I children.

The need for a semantically based description of Stage I speech which would not be limited by the inadequacies of the existing grammatical models led Brown (1973) to re-examine the data obtained in a number of investigations of Stage I speech in terms of the semantic relations expressed in these samples. For this purpose, Brown examined not only the studies described above by Bloom (1970), Blount (1969), Bowerman (1973), Braine (1963), Kernan (1969), and Miller and Ervin (1964), but also several other cross-linguistic studies such as those by Rydin (1971) of a Swedish child and Tolbert (1971) of a Mexican child, in addition to data collected by himself and his colleagues from three English-speaking children. With regard to ten of the children for whom sufficient information was available to classify the utterances according to the semantic relations expressed and to determine MLU, Brown found that a group of eight minimal relations and their combinations accounted for approximately 70% of all the utterances expressed by these children and that these eight relations were the most prevalent in each of the language samples, regardless of the language spoken by the child. Furthermore, Brown noted that ". . .the development that occurs in the course of Stage I is always the same. Two things happen: 1. concatenating serially more relations with redundant terms omitted; 2. unfolding of simple relations such that one term becomes itself a relation, always either possession, attribution or recurrence" (p. 244).

With regard to the syntactic structures used to express the semantic relations at Stage I, Brown's findings indicated that all major constituents seemed to be regarded as optional, and that constituents which are obligatory in the adult language were often omitted. Furthermore, the functors which Brown termed the Grammatical Morphemes are almost always omitted at Stage I, and appear to be regarded as optional at Stage II and beyond.

Brown's findings were further confirmed by Lindhagen (1976), who applied Brown's method of analysis to two Swedish children. Lindhagen noted that the Prevalent Relations described by Brown accounted for between 70% and 80% of her subject's utterances.

In summary, the literature on Stage I spontaneous utterances indicates that, although all children do not use exactly the same semantic relations, those relations which are expressed are selected from within a limited set of the relations which are possible in the adult language, and that this limited set is the same not only across children but across languages. Furthermore, the syntactic constructions used to express these relations also show similarities both across children and across languages.

#### Order of Acquisition of Semantic Relations

A number of recent studies have investigated the expression of semantic relations to determine if there is universality in the order in which they are acquired.

Both Wells (1974) and Bloom, Lightbown, and Hood (1975) set up systems for classifying utterances on the basis of the semantic relations which they expressed, and categorized children's utterances on the basis of their respective systems of classification. Wells' study included samples from eight children and covered the period from single-word to three-word utterances. Bloom et al. studied only multi-word utterances of four children who were followed developmentally until they were well past Stage I.

Both studies described the order in which the various categories emerged in their data, and indicated that the order of emergence was apparently consistent across children. Differences in order of emergence, however, were evident between the two studies. For example, Wells found that sentences with the verbs want and see were among the first to develop, whereas Bloom et al. classified these verbs with other state verbs, which were found to emerge much later. Most of the differences between the studies may be the result of differences in the classification systems rather than in the utterances themselves.

Further question regarding the universality of order of acquisition was raised by the results of a study by Braine (1976). Braine studied 11 children, all within Stage I. His method differed from that of Wells and Bloom et al. in that he did not impose a previously determined classification system upon the utterances he studied, but examined each utterance individually and derived the

semantic relations from the utterances themselves.

Unlike Wells and Bloom et al., Braine did not find that the semantic notions were acquired in a consistent order across children. Several factors, however, may account for his findings. First, for many of the children in his study, Braine had only one language corpus. Order of emergence, therefore, could not be viewed developmentally, but had to be inferred from a single sample. Second, Braine determined the presence of a particular semantic relation on the basis of its productive occurrence in syntactic constructions. Leonard (1976) reexamined the data of those of Braine's subjects for whom more than one sample was available and found that:

. . .when the longitudinal data used by Braine are examined for the first evidence of a semantic notion. . .the order in which these notions emerge is consistent with that of other studies. Out of the 14 instances in which a notion that was not noted in the first sample was evidenced in the second sample, 12 or possibly 13. . . represented notions which, according to other investigations, were later to emerge than those of the first sample. (pp. 34-35)

In addition to reanalyzing Braine's data, Leonard (1976) also did his own longitudinal study of eight children in terms of the order of emergence of semantic notions, and found that this order was generally consistent with that of previous studies. Leonard suggested that the combined results from previous studies on order of acquisition, including the studies of Bloom et al. (1975), Braine (1976), Wells (1974), Greenfield, Smith, and Laufer (1972), and

Ingram (1971), indicated that the semantic notions could be grouped according to their order of emergence, with Group A including the notions which emerge earliest, such as nomination, notice, negation, and recurrence. Group B notions, which emerge developmentally later than those in Group A, include action, object, and agent. The next group to emerge, Group C, includes the notions of attribution, place, and possessor. Group D notions, which are marginal at Stage I, include instrument, experience, and experiencer.

Leonard's findings on the eight children that he studied were fairly consistent with this order. Some differences did occur, however. The notions of negation and recurrence emerged much later than expected, and the notion of place emerged before that of agent. Leonard accounted for the late evidence of recurrence and negation on the basis that these notions occurred infrequently in all of the children, and that frequency of occurrence and variability in time of acquisition appear to be related. With regard to the notion of agent, Leonard noted that several studies, including Bloom (1970) and Ramer (1974), have found agent to emerge later than action in some children.

In summary, there is some inconsistency in the current literature regarding the order of acquisition of semantic notions. Although the evidence is far from conclusive, it appears that many of the differences between studies may be the result of differences in the methods of classifying the various notions. When a uniform classification is used,

the results seem to indicate that while individual variation exists in the order in which specific notions emerge, there may be greater consistency in the order of emergence of groups of notions, such as those described by Leonard (1976).

#### COGNITIVE BASIS OF EARLY LANGUAGE ACQUISITION

Much of the language acquisition literature of the past decade has viewed the acquisition process and its relationship to general cognitive functioning from within the general framework discussed by Slobin (1971a, 1973). According to Slobin's position, language develops as a means of expressing previously learned cognitive concepts. The child's task in acquiring language is to discover the linguistic means by which his conceptual notions may be expressed. Order of acquisition, therefore, depends both on the complexity of the conceptual notions themselves and on the complexity of the linguistic means of expressing these notions.

The specific cognitive framework most often referred to as the basis for language acquisition is the development of sensorimotor intelligence as described by Piaget (1952). A number of language researchers, among them several previously mentioned, have described their findings in relation to the cognitive skills which children develop during the sensorimotor period (Beilin, 1975; Bloom, 1970, 1973; Bowerman, 1973, 1976a, 1976b; Brown, 1973; Ingram, 1976; Kernan, 1969; Leonard, 1976; Wells, 1974). Brown (1973),

for example, stated that "What the Stage I child talks about. . . is the sensorimotor world which he has organized in the first 18 months of his life" (p. 182).

Some investigators have attempted to demonstrate a consistent relationship between linguistic notions and particular stages of cognitive development. Both Ingram (1971) and Greenfield and Smith (1976) indicated that the semantic development of single-word utterances mirrors the order of sensorimotor development. Edwards (1974) presented evidence to support the position that the child's level of cognitive development at the onset of word combination affects the content of early sentences. Tool use, which is a characteristic of the fifth stage of sensorimotor development, has been related to the use of vocal signals to communicate intentions, such as the desire for an object (Bates, Camaioni, and Volterra, 1975), and difficulties in the development of tool use has been related to delays in language acquisition (Snyder, 1975).

The characteristic of sensorimotor intelligence most frequently discussed in terms of its relationship to language acquisition is the capacity for mental representation, which develops during the sixth and final stage of sensorimotor development. Bloom (1973), Ingram (1974), McNeill (1974), Morehead and Morehead (1974), and Sinclair de Zwart (1973) have taken the position that the capacity for mental representation is basic to the transition from single-word use to syntactic constructions. Some question has arisen

regarding this view, however. Studies by Huttenlocher (1974) and Bates (1976) indicated that evidence of mental representation was found in a number of children long before multi-word use began. Corrigan (1976) and Ingram (1975), on the other hand, found that some children did not show evidence of mental representation until after word combination had started.

Some Piagetians, most notably Sinclair (1971; Sinclair-de Zwart, 1973) have taken an even stronger position regarding the relationship of cognitive development to language acquisition, suggesting that sensorimotor development is not only necessary for the acquisition of language, but is sufficient to explain all aspects of language development, including the development of syntax. This position has been challenged by Cromer (1974, 1976), who proposed what he termed the "weak form" of the cognition hypothesis, asserting that

. . . although the study of cognitive structures and operations and the cognitions to which they give rise are of central importance in understanding the language acquisition process, these cognitive entities by themselves are not sufficient to explain that process. Our abilities "make available," so to speak, certain meanings to be encoded, but we must also possess certain specifically linguistic capabilities in order to express these meanings in language. (1974, p. 326)

Furthermore, Slobin's (1971a, 1973) position regarding the necessity for differentiating between conceptual complexity and formal linguistic complexity has been emphasized by a number of writers, including Beilin (1975), Bloom et al.

(1975), Cromer (1976), and Leonard (1976). Brown (1973) stated that "The formal relations which express semantic relations are peculiarly linguistic, and I see nothing like them in sensorimotor intelligence" (p. 201).

Although the question of whether syntactic development reflects innate linguistic abilities which are independent of general cognitive development (Chomsky, 1965; McNeill, 1968) or develop through the application of cognitive and perceptual strategies (Bever, 1970a, 1970b; Slobin, 1971a, 1973) has not been definitively resolved, it has become apparent that semantic relations and their formal means of expression develop to some degree independently, with the former being linked more closely and more demonstrably to the development of sensorimotor intelligence.

#### LANGUAGE IN THE RETARDED AND ITS RELATIONSHIP TO COGNITIVE FUNCTIONING

The literature on language in the mentally retarded has repeatedly shown not only that retardates in general function more poorly in language than do normal children in such areas as word meaning (Bolles, 1937; Irwin, 1966; Papania, 1954), syntax (Carlson and Carlson, 1945; Graham and Graham, 1971; Lackner, 1968; Lyle, 1961), and morphology (Lovell and Bradbury, 1967; Newfield and Schlanger, 1968; Spradlin and McLean, 1967), but also that Down's Syndrome children function more poorly in language than do other retardates (Mein, 1961; Schlanger, 1957; Schlanger and Gottsleben, 1957). Furthermore, a number of studies of

Down's Syndrome children have indicated that language is the most severely impaired area of development (Lyle, 1961; Melyn and White, 1973; Schlanger, 1957; Share, 1975). Fishler, Share, and Koch (1964), for example, comparing a group of Down's Syndrome children on measures of motor ability, adaptive behavior, language, and personal-social behavior, found that language progressed more slowly than any of the other areas.

Milgrim (1971) has indicated that language lags behind cognitive development in the mentally retarded and has suggested that language disability is specifically responsible for the fact that retarded children frequently perform less well on a variety of tasks than normal children matched for mental age.

Zisk and Bialer (1967), who used the term "speech problems" to refer to the entire range of language disabilities, noted that it is commonly believed that the condition of mongolism itself is the cause of speech impairment in this population. One proponent of this position was Blanchard (1964), who concluded from her observations of the linguistic performance of 350 retarded children that the condition of mongolism was the most significant etiological factor causing disturbances in verbal communication.

If, as this literature suggests, Down's Syndrome causes a specific language disability over and above the general cognitive impairment, one would expect that the development of syntax which, as was discussed previously, is linked

less closely with the development of sensorimotor intelligence, might be more seriously delayed than the development of those areas of language which relate more directly to sensorimotor development. Three studies, by Bilovsky and Share (1965), Hubschman, Polizzotto, and Kalisli (1970), and McCarthy (1965), provide preliminary evidence to support this position. In all three studies, Down's Syndrome children performed least well on those items of the Illinois Test of Psycholinguistic Abilities which were assumed to be related to the development of grammatical structure. However, none of these studies tested the children's development and use of syntax directly.

To date, only one study (Hubschman, 1977) has looked at syntactic performance in Down's Syndrome children in such a way that the grammatical aspects of their language can be compared with other aspects of linguistic development. Some of the limitations of Hubschman's study have been discussed previously (see Chapter I). Nonetheless, some of her findings suggested that for these children grammatical development, rather than being more delayed, was actually more advanced than would be expected on the basis of their stage of language development. Hubschman noted that, although the MLU for her subjects was no greater than 2.0 morphemes, the children as a group used a number of grammatical morphemes which are not generally expressed by Stage I children. Furthermore, Hubschman stated that, "The most notable way in which these subjects differ from the

normal Stage I child is in the use of complex embedded and coordinate sentences" (p. 142). These findings appear to contradict the position that Down's Syndrome children are particularly delayed in the areas of language which are least closely related to sensorimotor functioning. This conclusion is far from definitive, however, since the only two children who used a significant number of these constructions had MLU's of 2.0 or more, indicating that they were no longer at Stage I.

It is hoped that the present study will shed more light on the issue of whether Down's Syndrome children, by the very nature of their genetic disorder, necessarily demonstrate greater impairment in the acquisition of grammatical structures than in areas of language such as semantic relations which are more closely related to sensorimotor development.

### CHAPTER III

#### DESCRIPTION OF THE STUDY

##### SELECTION OF SUBJECTS

The subjects for this study were selected from the students attending a private day school for retarded children. The only children who were eligible for the study were those who had been medically diagnosed as Trisomy 21, were under eight years of age, had been raised at home rather than in an institution, and came from homes where the only language spoken was English.

Those children who met the above criteria were screened for participation in the study. An initial one-hour language corpus was collected using the procedures described below in Procedures for Data Collection. The number of acceptable utterances, the percentage of intelligible utterances, and the MLU were determined for each corpus. In addition, teachers and parents were interviewed to determine if the child's spontaneous speech in the classroom and at home was consistent with the MLU obtained in the language corpus.

Of the children who were screened, only those who met the following criteria were eligible for participation in the study:

1. The rate of verbalization for the language corpus had to be a minimum of 100 AU's per hour. Brown (1973) has noted that an accurate MLU cannot be calculated on less than 100 utterances.

2. The number of intelligible utterances had to equal at least 75% of the total number of utterances in the corpus, in order to insure that the utterances available for analysis were representative of the characteristics of the total sample.

3. MLU for the initial corpus had to fall within the range of 1.05 - 1.20. The lower limit of 1.05 was selected to insure that the children had reached Stage I. The upper limit of 1.20 was sufficiently early in Stage I to allow for observing developmental changes.

4. Reports from parents and teachers had to confirm that the child's spontaneous speech at home and in the classroom was consistent with the early two-word utterance stage.

#### DESCRIPTION OF SUBJECTS

Three subjects were selected who met all of the above criteria. For these children the level of their language was accurately predicted both by parents and by teachers, who indicated that the children spoke mostly in single words but were just beginning to put two words together into phrases. All the subjects were female because there were no males who met all the specified criteria. Since the screening corpus for these children was utilized as their

first sample in the final study, findings regarding the rate of verbalization, percent of intelligible utterances, and MLU may be found in Tables 3, 4, 4a, and 5.

Amy was 3 years, 7 months at the time her first language corpus was collected and 4 years, 7 months at the time of her last Stage I corpus. She is the youngest of nine children, and both of her parents are college graduates. Examination of the school records revealed no significant medical, social, or environmental problems. The most recent intelligence testing, done when she was 4 years, 3 months, yielded a Stanford-Binet IQ of 69.

Laurie was 3 years, 11 months at the time of her first language corpus and 4 years, 9 months at the time of her last Stage I corpus. She is an only child. Her parents, both high school graduates, were separated when she was fifteen months old, and Laurie was raised by her mother. There were no reported medical or social problems. Psychological testing at the age of 44 months revealed a Cattell IQ of 52.

Patricia was first seen at the age of 4 years, 9 months and was 5 years, 10 months at the time of her last Stage I corpus. She has one older brother. Both parents are high school graduates. School records indicated a good family situation with no environmental or social problems. Patricia suffers from frequent upper respiratory infections, but has no other medical problems. Psychological testing at the age of 35 months revealed a Cattell IQ of 45.

#### PROCEDURES FOR DATA COLLECTION

Language samples from each child were collected at six- to eight-week intervals, except during the summer when the children were not available. To maintain continuity, samples were collected as late as possible in the spring and as early as possible in the fall. Each child was followed until a language sample was produced for which the MLU was 2.0 or better. For both Amy and Laurie, seven samples, collected over a period of ten months, were required. Patricia was followed for a period of 13 months, until a sample with MLU of 2.0 or better was obtained in the ninth session.

All language samples were obtained in the school. The children were seen individually for one-hour sessions. The room in which the sessions took place contained a table and chairs, with a tape recorder placed at the far end of the table, away from the child. A directional microphone was attached to the wall in front of the table, facing the child. During the initial sessions, a videotape recorder and camera were placed to the side of the child opposite to the investigator in order to provide as little distraction as possible.

Except for the presence of the videotape operator during the initial sessions, only the child and the investigator were present. Each recording session lasted one hour. For each session the child was brought to the observation room by the investigator and seated at the table facing the microphone. The child was then presented with an assortment

of toys, books, and other objects which were easily adapted for use at a table. The investigator interacted with the child by playing and talking with her in such a way as to encourage spontaneous verbalization. However, the child was allowed to select the toys she wished to use and to structure the manner of playing with them.

#### DATA RECORDING

##### Preliminary transcript

During each observation session, the investigator used a preliminary transcription form (see Appendix A) to record the child's utterances as well as the verbal and nonverbal context. Although it was not possible to transcribe all of the child's utterances during the session, special care was taken to transcribe utterances which were said softly or in such a way as to be unintelligible on the audiotape, and to note nonverbal contexts which were important to the interpretation of the semantic intent of an utterance.

##### Audiotape

All utterances of both the child and the investigator were recorded on audiotape. In cases when an utterance occurred which the investigator believed might be subsequently misinterpreted on the tape, the investigator repeated the utterance or commented on the context in such a way that her remark would be available to assist in the final transcription.

### Videotape

The use of videotape recordings was originally included because it was assumed that a recording of the visual context occurring during each utterance would assist in determining the semantic intent of the utterances. However, after the first two sessions for each child had been transcribed, it became apparent that the videotape contributed very little information which was not already available from the written preliminary transcript and from the comments which the investigator made onto the audiotape during the session. Therefore, in view of the expense and inconvenience of the videotaping, the following procedures were used to determine if the videotapes contributed sufficient information to merit their continued use.

A 15-minute sample was selected from the third session of each subject. These samples had been previously taped, but had not yet been transcribed. The investigator then transcribed each 15-minute sample using only the preliminary written transcript, the audiotape, and the investigator's memory of the session.

An independent transcriber was selected to assist with this portion of the study. The transcriber was a student in the doctoral program in Speech and Hearing Sciences at the City University of New York, and was experienced in working with retarded children. She was not previously acquainted with the investigator and was not told the specific purpose of the study nor her role in it.

The transcriber was presented with the following information:

1. A copy of the preliminary transcript from each of the 15-minute samples with all nonverbal contextual information omitted;
2. The audiotapes of the samples;
3. The videotapes of the samples.

She was then asked to transcribe each 15-minute sample using all of the above information and to include in her transcriptions all of the child's utterances and all verbal and nonverbal contextual information which she found to be related to each utterance.

A comparison was then made between the transcripts prepared by the experimenter without videotape and by the independent transcriber with videotape to determine the amount of contextual information which was changed or improved by the use of the videotape. The calculations were based only on the responses which were intelligible to both judges. A comparison was made of the contextual information associated with each intelligible utterance. The results may be seen in Table 1.

For the three children combined, there was a total of 251 utterances which were intelligible to both the experimenter and the independent transcriber. Of these 251 utterances, the percentage for which the videotape did not improve or change the contextual description was 96. This figure represents the percentage of intelligible utterances

TABLE 1. Comparison of judges' descriptions of contextual information with and without video-tape.

<u>Utterance conditions</u>	<u>Subjects</u>			<u>Total</u>
	<u>Amy</u>	<u>Laurie</u>	<u>Patricia</u>	
Utterances intelligible to both judges	146	43	62	251
Utterances unintelligible to one or both judges	57	9	14	80
% Intelligible utterances for which video-tape did not improve or change the contextual description	97	98	95	96
% Intelligible utterances for which the video-tape did improve the contextual description	2	2	0	2
% Intelligible utterances for which the video-tape did change the contextual description	1	0	5	2
% Intelligible utterances for which the video-tape did improve or change the contextual description	3	2	5	4

for which the context described by the experimenter was the same as or more detailed than the context described by the independent transcriber using the videotape. For only 2% of the total utterances, the videotape improved the contextual description. For these utterances, the context was more detailed in the description indicated by the independent transcriber. For an additional 2% of the total utterances, the videotape changed the contextual description; that is, the two transcriptions indicated descriptions of the context which were essentially different.

For the three children combined, therefore, the non-verbal contextual information of only 4% of the intelligible utterances was either changed or improved by the use of the videotape. It was determined, therefore, that the use of the videotape did not contribute sufficient information to merit its continued use.

#### Final transcript

The final transcript for each one-hour session included all of the child's utterances plus all relevant verbal and nonverbal contextual information. Relevant contextual information was considered to be anything which would aid in determining the semantic intent of the utterance, and was included in the transcript next to the appropriate utterance. Any utterance which was not totally intelligible was entered as a question mark. All intelligible utterances were transcribed in English orthography.

### Utterance Reliability

In order to determine the degree of accuracy of the investigator's transcription of the children's utterances, a comparison was made between the investigator's transcripts and those prepared by the independent transcriber for the same 15-minute samples which were used to examine the efficacy of the videotape. As previously noted, the independent transcriber based her transcriptions on information from the audiotapes, videotapes, and preliminary transcripts with all nonverbal context omitted. The investigator's transcripts were based on the preliminary transcripts and audiotapes only.

Following generally accepted standards, it was determined that agreement of 80% or better would be accepted as evidence of sufficient utterance reliability for the purposes of this study.

The results of the comparison between the two sets of transcripts may be seen in Table 2. For the three children combined, there was a total of 331 utterances, including both intelligible and unintelligible utterances. Of those 331 utterances, there was complete agreement between the two transcribers on 85%. The utterances on which there was not complete agreement fell into four categories. For nine utterances, which were marked as unintelligible by one of the judges, the other judge had not indicated that an utterance had occurred. In addition, there were four utterances which were considered by one judge to be single

TABLE 2. Inter-judge agreement with regard to utterance transcription.

<u>Utterance conditions</u>	<u>Amy</u>		<u>Laurie</u>		<u>Patricia</u>		<u>Total</u>	
	<u>N</u>	<u>%</u>	<u>N</u>	<u>%</u>	<u>N</u>	<u>%</u>	<u>N</u>	<u>%</u>
Total utterances	203	100	52	100	76	100	331	100
Agreed utterances	168	83	44	85	70	92	282	85
Disagreed utterances	35	17	8	15	6	8	49	15
Disagreed utterances:								
A. Utterances unintelligible for one judge and no utterance for other	6	3	2	4	1	1	9	3
B. Utterances for which sole basis of disagreement was division of words into 1, 2, or 3 utterances	4	2	0	0	0	0	4	1
C. Utterances intelligible for only one judge	20	10	4	8	5	7	29	9
D. Intelligible/not agreed except for those in C	5	2	2	4	0	0	7	2
Agreed utterances including A and B	178	88	46	88	71	93	295	89
Disagreed utterances including <u>only</u> C and D	25	12	6	12	5	7	36	11

utterances containing more than one word, but were considered by the other judge to be a series of single-word utterances. In each of these utterances there was complete agreement on the words themselves.

When the utterances in the above two categories were included with the utterances on which there was complete agreement, the percentage of agreed utterances rose to 89%.

There were an additional 36 utterances for which there was a basic disagreement between the two transcribers. For 29 of those utterances, only one judge had noted an intelligible response, whereas the other judge had indicated an unintelligible response or had not noted any response at all. For only seven utterances, or 2% of the total, both judges had noted responses which they believed to be intelligible but had disagreed on what the child had said. Of those seven disagreed utterances, four were single words and, therefore, would not have entered into the analyses of the present study.

The degree of agreement between the two transcribers indicated that the investigator's transcription of the children's utterances was sufficiently reliable to be used for the purposes of this study.

#### DATA ANALYSIS

All Stage I samples, which included the first six samples from both Amy and Laurie and the first eight samples from Patricia, were analyzed both quantitatively and qualitatively.

### Quantitative characteristics

All utterances in each sample were first classified into one of three categories:

1. Unintelligible utterances--The number and percentage of unintelligible utterances in each sample were determined. These utterances did not enter into any of the subsequent analyses.

2. Intelligible/Not Acceptable utterances--The utterances in this category were counted, but did not enter into any of the subsequent analyses.

3. Acceptable utterances (AU's)--The AU's were then separated into single morpheme and multi-morpheme AU's. The number and percentage of single morpheme AU's were determined, but these utterances did not enter into any subsequent analysis except for the determination of MLU, which was calculated as defined in Chapter I. The multi-morpheme AU's were examined quantitatively in terms of the number of tokens, the number of types, and the upper bound.

### Qualitative analysis of multi-morpheme AU's

Semantic intent. Each utterance was examined in relation to the context in which it occurred in order to determine the semantic intent. The semantic intent of each utterance was determined following the guidelines outlined by Ramer (1974, pp. 313-331). In cases where a semantically equivocal utterance could not be clearly disambiguated by the context, that utterance was classified as Semantically Uninterpretable.

Semantic relations. The semantic relations expressed by each unambiguous multi-morpheme AU were determined on the basis of the semantic intent of that utterance, and were categorized according to the classification adopted by Brown (1973). The results were then compared with the characteristics Brown observed in the utterances of normal children.

According to Brown, a set of eight minimal two-term relations and their combinations accounted for approximately 70% of the multi-morpheme types expressed by the normal children in most of the Stage I samples he studied. This basic set of eight was termed the Prevalent Relations, and included the following:

1. Agent and action
2. Action and object
3. Agent and object
4. Action and locative (or location)
5. Entity and locative (or location)
6. Possessor and possession
7. Entity and attributive
8. Demonstrative and entity

The combinations which occurred were of two kinds:

1. Two or more of the Prevalent Relations were strung together with redundant terms deleted;
2. One of the nominative, attributive, or possessive noun phrases was expanded.

The remaining utterances, approximately 30% of most

samples, which did not express the Prevalent Relations, Brown categorized as Other Constructions. These categories included:

1. Semantically uninterpretable utterances
2. Nominatives
3. Semantic relations of low frequency, which included:
  - a. instrumental
  - b. benefactive
  - c. indirect object dative
  - d. experiencer or person affected dative
  - e. comitative
  - f. conjunction
  - g. classificatory
4. Infrequent and apparently uncomprehending use of forms which will reach a criterion of control in Stages II and III. In Brown's data these included:
  - a. inflections -s, -ing
  - b. prepositions in and on
  - c. semi-auxiliary wanna
  - d. copula is
5. Idiosyncratic and inflexible forms
6. Vocatives and greetings
7. WH questions
8. Negatives

All multi-morpheme AU's in each sample in the present data were categorized according to the semantic relations which were expressed. The resulting classification was then

examined with respect to the following questions:

1. What proportion of the multi-morpheme types occurring in each sample expressed the Prevalent Relations, as described by Brown?

2. Were the Prevalent Relations which were most frequently expressed by these Down's Syndrome children the same as those most frequently expressed by the normal children Brown described?

3. Of the utterance types which did not represent the Prevalent Relations, what proportion fell into the categories described by Brown under Other Constructions?

4. What proportion of utterance types had no representation in Brown's classification, and what were their semantic characteristics?

5. What was the order of acquisition of the semantic notions expressed in these utterances, and how did this order compare with the findings of Leonard (1976) on the order of acquisition of semantic notions in normal children?

To answer the fifth question, order of emergence of the semantic notions was calculated according to the method described by Leonard (1976). For the eight children Leonard studied, each semantic notion was ranked according to the order in which the first evidence of that notion emerged. The resulting ranks for each notion were then averaged across the eight subjects. The same ranking procedure was used in the present study, with the ranks averaged across the three Down's Syndrome children. For example, Patricia

expressed the notions of nomination, action, attribution, and location in her first sample. Each of these notions, therefore, received a rank of 2.5, which was calculated by adding the ranks one through four, and dividing by four. The next group to emerge also contained four notions, each of which received a rank of 6.5, the average of ranks five through eight. When each notion had been ranked according to its order of emergence for each child individually, the average rank for the three children combined was determined for each notion.

Syntactic structure. Although Brown was primarily concerned with the semantic rather than the syntactic aspects of the children's utterances, his descriptions of the semantic categories frequently included information about the kinds of syntactic structures which were used to express them. The syntactic characteristics of the utterances used by the Down's Syndrome children in this study to express various semantic relations were examined and compared with the structures described by Brown.

Morphological structures. Brown described the development of 14 grammatical morphemes in terms of their presence or absence in obligatory contexts. These grammatical morphemes included:

1. Present progressive -ing
2. in
3. on
4. Plural -s

5. Past irregular
6. Possessive -'s
7. Uncontractible copula
8. Articles
9. Past regular
10. Third person irregular
11. Third person regular
12. Uncontractible auxiliary
13. Contractible copula
14. Contractible auxiliary

The presence or absence in obligatory contexts of these grammatical morphemes in the utterances of the Down's Syndrome children was determined, and the results compared with Brown's findings.

#### LIMITATIONS OF THE STUDY

1. Because of the small number of Down's Syndrome children involved, the findings of this study cannot be thought to apply to all retarded children or even to all noninstitutionalized Down's Syndrome children. This study, in describing what occurred in the Stage I utterances of three Down's Syndrome children, indicated what may occur in some retarded children, but not what must universally occur.

2. This particular study is restricted to dealing with the semantic, syntactic, and morphological structures of utterances, and does not attempt to examine the communicative function of these utterances.

3. The study focuses only on the spontaneous expressive aspects of linguistic performance, and does not pretend to deal with all aspects of these children's competence.

## CHAPTER IV

### RESULTS

#### QUANTITATIVE CHARACTERISTICS OF THE DATA

Each of the samples obtained at Stage I was analyzed quantitatively, and the results are presented in Tables 3-7.

The total number of utterances for each sample shown in Table 3 combined Acceptable Utterances, as defined in Chapter I, the number of unintelligible utterances, which included any utterance which was wholly or partially unintelligible, and the number of intelligible/not acceptable utterances, which included the child's exact repetition of his own utterance at the investigator's request, or the third or more uninterrupted repetition of the same utterance. Considerable variability can be seen both between subjects and between individual samples for the same subject in the total number of utterances as well as the number of AU's. The total number of utterances ranged from a minimum of 135 in Patricia I to a maximum of 682 in Amy I. The AU's ranged from 101 for Patricia I to 493 for Amy I.

The percentage of unintelligible utterances shown in Tables 4 and 4a was determined on the basis of the total number of utterances. This percentage varied from a high of 31% for Laurie II to a low of 8% for Patricia V. Since the subjects were selected partially on the basis of

TABLE 3. Number of utterances in each sample classified as unintelligible, intelligible/not acceptable, and acceptable.

<u>Samples</u>	<u>Unintelligible</u>	<u>Intelligible/ Not Acceptable</u>	<u>Acceptable</u>	<u>Total</u>
Amy I	142	47	493	682
Amy II	131	27	469	627
Amy III	119	22	408	549
Amy IV	87	24	394	505
Amy Early Stage I	479	120	1764	2363
Amy V	75	28	373	476
Amy VI	46	21	312	379
Amy Late Stage I	121	49	685	855
Amy Total	600	169	2449	3218
Laurie I	62	21	194	277
Laurie II	103	24	208	335
Laurie III	33	10	149	192
Laurie IV	74	19	377	470
Laurie Early Stage I	272	74	928	1274
Laurie V	76	17	301	394
Laurie VI	97	21	426	544
Laurie Late Stage I	173	38	727	938
Laurie Total	445	112	1655	2212
Patricia I	25	9	101	135
Patricia II	79	20	346	445
Patricia III	31	17	203	251
Patricia IV	50	14	217	281
Patricia V	12	8	125	145
Patricia Early Stage I	197	68	992	1257
Patricia VI	46	5	203	254
Patricia VII	33	8	169	210
Patricia VIII	57	2	371	430
Patricia Late Stage I	136	15	743	894
Patricia Total	333	83	1735	2151

TABLE 4. Percentage of unintelligible utterances in each sample; Early Stage I.

<u>Subjects</u>	<u>Samples</u>					<u>Total</u>
	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>V</u>	
Amy	21	21	22	17	-	20
Laurie	22	31	17	16	-	21
Patricia	19	18	12	18	8	16

TABLE 4a. Percentage of unintelligible utterances in each sample; Late Stage I.

<u>Subjects</u>	<u>Samples</u>				<u>Total</u>	<u>Combined Stage I Total</u>
	<u>V</u>	<u>VI</u>	<u>VII</u>	<u>VIII</u>		
Amy	16	12	-	-	14	19
Laurie	19	18	-	-	18	20
Patricia	-	18	16	13	15	15

intelligibility, it is not surprising to find such high percentages of intelligible utterances. The only child who demonstrated a clear pattern of change in intelligibility was Amy. After practically no change in the first two sessions, the proportion of unintelligible utterances decreased consistently for subsequent samples, reaching a low of 12% in the final Stage I sample. Both Laurie and Patricia demonstrated variability in intelligibility between samples, but no consistent pattern of change between early samples and later samples.

In Table 5 the number of morphemes was determined for the AU's only, and MLU was determined by dividing the number of morphemes by the number of AU's. In general, a fairly steady increase in MLU can be seen for each child across Stage I. However, at least one sample for each child had an MLU which was lower than that of the preceding sample. In addition, Patricia showed considerable inconsistency in MLU growth in Early Stage I. It must be noted that Patricia V, which showed the most significant drop in MLU, was obtained at a time when Patricia was recovering from a severe upper respiratory infection. As can be seen in Table 3, Patricia's total verbal output also showed a considerable decrease for that session; and the proportion of AU's which consisted of a single morpheme, shown in Tables 6 and 6a, was 88%, the highest percentage for any of her samples.

These temporary decreases in MLU were similar to the

TABLE 5. Number of morphemes, MLU, and upper bound for each sample.

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<u>Samples</u>	<u>Morpheme</u>	<u>MLU</u>	<u>Upper Bound</u>
Amy I	541	1.10	3
Amy II	563	1.20	4
Amy III	514	1.26	4
Amy IV	525	1.33	4
Amy Early Stage I	2143	1.21	4
Amy V	593	1.59	4
Amy VI	465	1.49	5
Amy Late Stage I	1058	1.54	5
Laurie I	231	1.19	2
Laurie II	243	1.17	3
Laurie III	183	1.23	3
Laurie IV	556	1.47	4
Laurie Early Stage I	1213	1.30	4
Laurie V	543	1.80	5
Laurie VI	831	1.95	5
Laurie Late Stage I	1374	1.89	5
Patricia I	120	1.19	3
Patricia II	406	1.17	3
Patricia III	258	1.27	2
Patricia IV	275	1.27	3
Patricia V	141	1.13	3
Patricia Early Stage I	1200	1.21	3
Patricia VI	305	1.50	3
Patricia VII	259	1.53	4
Patricia VIII	676	1.82	5
Patricia Late Stage I	1240	1.67	5

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TABLE 6. Percentage of acceptable utterances in each sample which consisted of a single morpheme; Early Stage I.

<u>Subjects</u>	<u>Samples</u>					<u>Total</u>
	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>V</u>	
Amy	91	81	76	72	-	81
Laurie	81	84	81	65	-	75
Patricia	85	85	73	76	88	81

TABLE 6a. Percentage of acceptable utterances in each sample which consisted of a single morpheme; Late Stage I.

<u>Subjects</u>	<u>Samples</u>				<u>Total</u>	<u>Combined Stage I Total</u>
	<u>V</u>	<u>VI</u>	<u>VII</u>	<u>VIII</u>		
Amy	57	62	-	-	60	75
Laurie	43	37	-	-	40	59
Patricia	-	57	59	47	52	79

"downward jogs" reported by Brown (1973, p. 55) for normal children, and suggest that although the pattern of MLU growth over time is indicative of children's linguistic development, the MLU for any individual sample, from Down's Syndrome as from normal children, may be affected by factors other than the stage of linguistic acquisition. These findings indicate the inadvisability of drawing conclusions based on the MLU of a single language corpus from any individual subject.

Further examination of Table 5 reveals that all of the children required more sessions to complete Early Stage I than Late Stage I. For both Amy and Laurie, the first sample to achieve an MLU of 1.5 or more was produced in session V, and the last Stage I corpus occurred in session VI. Patricia did not begin Late Stage I until session VI, and her last Stage I corpus was produced in session VIII. No conclusions can be drawn regarding the relationship of these findings to normal children, since comparable developmental data on normals is not available.

The Upper Bound was determined by the number of morphemes in the longest AU for each sample. In the first sessions, the children's longest utterances were only two or three morphemes in length. By the end of Stage I, all of the children were producing utterances of five morphemes, and there were no utterances of more than five morphemes in any of the samples. These findings regarding Upper Bound are consistent with the findings reported for normal children at Stage I.

The percentage of single morpheme utterances shown in Tables 6 and 6a and the number of single morpheme utterances, multi-morpheme utterances, and multi-morpheme types shown in Table 7 were determined on the basis of AU's only. As would be expected, the percentages of single morpheme utterances decreased from Early Stage I to Late Stage I for all children. With regard to the number of multi-morpheme types, only Laurie showed a consistent increase for each sample. All of the children, however, produced considerable overall increases across Stage I. For example, Amy's multi-morpheme types increased from 43 in Amy I to 88 in Amy VI; Laurie showed an increase in multi-morpheme types from 20 in Laurie I to 183 in Laurie VI; and Patricia's multi-morpheme types increased from 15 in Patricia I to 142 in Patricia VIII.

#### SEMANTIC CHARACTERISTICS

##### Prevalent Relations

The percentages of multi-morpheme types in each sample which expressed the Prevalent Relations are presented in Tables 8 and 8a. With the exception of the first two samples for Amy and Laurie, these percentages were all considerably lower than the 70% which would be expected on the basis of Brown's findings. Over all of the samples, 42% of the multi-morpheme types expressed the Prevalent Relations. With the exception of Patricia IV, the initial samples for each child showed the highest proportion of the Prevalent Relations. In fact, aside from these first

TABLE 7. Acceptable utterances classified according to length.

<u>Samples</u>	<u>Single- Morpheme Tokens</u>	<u>Multi- Morpheme Tokens</u>	<u>Multi- Morpheme Types</u>
Amy I	447	46	43
Amy II	380	89	60
Amy III	310	98	69
Amy IV	284	110	69
Amy Early Stage I	1421	343	241
Amy V	213	160	121
Amy VI	195	117	88
Amy Late Stage I	408	277	209
Amy Total	1829	620	450
Laurie I	157	37	20
Laurie II	174	34	21
Laurie III	120	29	23
Laurie IV	245	132	96
Laurie Early Stage I	696	232	160
Laurie V	130	171	127
Laurie VI	158	268	184
Laurie Late Stage I	288	439	311
Laurie Total	984	671	471
Patricia I	86	15	15
Patricia II	293	53	38
Patricia III	148	55	15
Patricia IV	166	51	29
Patricia V	110	15	12
Patricia Early Stage I	803	189	109
Patricia VI	115	88	49
Patricia VII	99	70	48
Patricia VIII	176	195	142
Patricia Late Stage I	387	356	239
Patricia Total	1379	545	348

TABLE 8. Percentages of multi-morpheme types which express the Prevalent Relations; Early Stage I.

<u>Subjects</u>	<u>Samples</u>					<u>Total</u>
	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>V</u>	
Amy	65	23	36	49	-	42
Laurie	65	33	30	45	-	44
Patricia	53	48	27	59	25	46
Combined Early Stage I Total						43

TABLE 8a. Percentages of multi-morpheme types which express the Prevalent Relations; Late Stage I.

<u>Subjects</u>	<u>Samples</u>				<u>Total</u>
	<u>V</u>	<u>VI</u>	<u>VII</u>	<u>VIII</u>	
Amy	41	40	-	-	41
Laurie	35	45	-	-	41
Patricia	-	41	46	44	44
Combined Late Stage I total					42
Combined Early and Late Stage I Total					42

samples and Patricia IV, the Prevalent Relations accounted for less than 50% of the multi-morpheme types in all other samples.

The higher proportions of Prevalent Relations in the earliest samples suggest that these Down's Syndrome children may initially have developed the Prevalent Relations much as do normal children, but that the Down's Syndrome children may have begun using other relations earlier in Stage I than normal children do. With the first sample for each child omitted, the total percentage of multi-morpheme types expressing the Prevalent Relations fell to 41%. Stated conversely, with the exception of the initial sample for each child, 59% of the multi-morpheme types did not express the Prevalent Relations. This figure is almost double the 30% which Brown found in the utterance types of normal children.

When the frequencies of the individual Prevalent Relations were examined, it was observed that the Prevalent Relations most frequently expressed by the Down's Syndrome children were not the same as those expressed by the subjects described by Brown. Table 9 shows each of the Prevalent Relations expressed as percentages of acceptable multi-morpheme types for each child both at Early Stage I and at Late Stage I. The relations listed include all of the combinations of Prevalent Relations observed by Brown. The category listed as "Other" includes a small number of utterance types which were a logical extension of Brown's categories, but which were not found in the data he studied.

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TABLE 9. Percentage of multi-morpheme types expressing each of the Prevalent Relations.

<u>Prevalent Relations</u>	<u>Amy</u>		<u>Laurie</u>		<u>Patricia</u>	
	<u>Early I</u>	<u>Late I</u>	<u>Early I</u>	<u>Late I</u>	<u>Early I</u>	<u>Late I</u>
Two terms:						
Agent & Action	4.6	3.3	6.9	3.2	.9	3.3
Action & Object	7.1	6.2	3.8	6.1	2.8	4.2
Agent & Object	.8	0	0	0	0	0
Action & Locative	2.1	5.7	5.0	2.9	11.0	3.3
Entity & Locative	12.9	5.7	15.0	11.6	12.8	5.4
Possessor & Possession	5.0	1.0	4.4	2.6	3.7	5.0
Entity & Attribute	4.1	10.0	5.6	5.5	10.1	8.4
Demonstrative & Entity	3.7	2.4	0	2.3	0	.8
Three terms:						
Agent + Action + Object	.8	1.0	0	1.3	0	2.9
Agent + Action + Locative	0	1.4	0	.3	1.8	2.9
Agent + Object + Locative	0	0	0	0	0	0
Action + Object + Locative	0	.5	.6	1.3	0	2.5
Four terms:						
Agent + Action + Object + Locative	0	0	0	0	0	0
Two terms with NP expanded:						
Agent + Action	0	0	0	0	0	0
Action + Object	0	0	0	.6	0	1.3
Agent + Object	0	0	.6	0	0	0
Action + Locative	0	0	0	0	0	0
Entity + Locative	0	.5	.6	.6	1.8	1.7
Possessor + Possession	0	0	0	.3	0	0
Entity + Attribute	0	0	0	0	0	0
Demonstrative + Entity	0	.5	1.3	.3	.9	0
Three terms with NP expanded:						
Agent + Action + Object	0	0	0	.3	0	0
Agent + Action + Locative	0	0	0	0	0	0
Other	.8	2.4	0	1.9	0	1.7

Examples were such utterance types as Demonstrative + Action + Locative, Demonstrative + Entity + Locative, and Action + Object + Expanded Locative NP. Since these utterances were clearly combinations of two-term Prevalent Relations and were constructed in precisely the same way as the combinations which Brown observed, and in view of their infrequent occurrence in the present data, it may be assumed that their absence in Brown's data was merely the result of sampling limitations. These utterances, therefore, were categorized along with other utterances expressing the Prevalent Relations.

The percentages shown in Table 9 were compared with similar percentages computed by Brown (1973, Tables 22, 23; pp. 174-175) in order to determine which semantic relations were expressed most frequently by each child. Reproductions of Brown's Tables 22 and 23 may be found in Appendix B. When the three most frequently expressed relations were examined for each child, the following was observed:

1. For the subjects described by Brown, the Agent + Action relation appeared in the top three for 10 of the 12 samples, and was the most frequently expressed relation for five of the samples.

2. The Action + Object and the Possessor + Possession relations both appeared in the top three for seven of Brown's 12 samples.

3. For the subjects in the present study, the Agent + Action, Action + Object, and Possessor + Possession relations were never the most frequently expressed relations,

and none appeared in the top three in more than half of the samples. In fact, of the six samples, the Agent + Action relation appeared in the top three only once, the Possessor + Possession relation twice, and the Action + Object relation only three times.

4. The most frequently expressed relation for the Down's Syndrome subjects was the Entity + Locative relation, which ranked first for four of the samples, and in the top three for all six samples.

5. The Entity + Attribute relation appeared in the top three for five of the six samples.

6. The Entity + Locative and Entity + Attribute relations never appeared as the most frequently expressed relations for the children described by Brown, and appeared in the top three for less than half the samples.

To summarize, the children described by Brown tended to express Agent + Action, Action + Object, and Possessor + Possession relations most frequently, whereas the Down's Syndrome children in the present study most frequently expressed the Entity + Locative and Entity + Attribute relations.

#### Brown's Other Constructions

In order to determine the characteristics of the utterance types which were not classifiable as Prevalent Relations, the remaining utterances were categorized where appropriate according to Brown's list of Other Constructions. In view of certain difficulties which arose in the application of

Brown's categories, some modifications of his classification were necessary. For example, Brown included the plural and progressive inflections, the prepositions in and on, the semi-auxiliary wanna, and the copula is in a single category which was defined as ". . .very infrequent and apparently uncomprehending use of forms which will become fully productive in Stages II and III" (pp. 178-179). In the present data these forms did not fit Brown's description and, in fact, did not yield to any common classification. The semi-auxiliary wanna did not occur in any of the samples. The plural and progressive inflections, the copula is, and the prepositions in and on appeared frequently and were used appropriately and with apparent comprehension in many cases. These forms, therefore, were not classified with Brown's Other Constructions, but were categorized and will be discussed separately.

In the present classification, three of Brown's categories were combined under the heading of Miscellaneous and Uninterpretable Constructions. These include the constructions Brown defined as Semantically Uninterpretable, Idiosyncratic and Inflexible, and Vocatives and Greetings. Since no further analysis of the semantic or syntactic structures of these constructions was indicated, it seemed appropriate merely to classify them together.

According to Brown (1973), the Operations of Reference included utterances expressing Recurrence and Nonexistence, as well as simple Nomination. Utterances expressing

Recurrence, however, were also classified with other Attribute + Entity constructions as one of the Prevalent Relations. In addition, Nonexistence was classified with the negatives. Only the category of Nominatives, therefore, included utterances which could not be categorized elsewhere.

Following this system, the category of Operations of Reference in the present study included only those simple nominatives which could not be classified elsewhere.

Of the constructions which Brown included under the heading of Semantic Relations of Low Frequency, only the comitative did not appear in the present data. All of the others were classified and their frequencies noted separately.

All utterances expressing Negation and WH Questions were classified according to those features.

The resulting classification of these Other Constructions is presented in Table 10, which shows each of the categories in terms of its percentage of acceptable multi-morpheme types, and Tables 11 and 11a, which present the percentages for each sample and the total percentages for Early Stage I, Late Stage I, and Combined Early and Late Stage I.

If the present data were totally accounted for by Brown's classification, the percentage of Other Constructions for each sample, when added to the percentage of Prevalent Relations, as shown in Tables 8 and 8a, should equal 100%. As can be seen in Tables 12 and 12a, however, that is true for only one of the 20 samples, Patricia I. Tables 12 and

TABLE 10. Percentages of multi-morpheme types in each of Brown's (1973) Other Constructions.

<u>Samples</u>	<u>Misc. &amp; Uninterp.</u>	<u>Oper. of Reference</u>	<u>Negs.</u>	<u>Conjs.</u>	<u>Wh Q's.</u>	<u>Exper. or Person Affected</u>	<u>Benef.</u>	<u>Ind. Obj.</u>	<u>Class.</u>	<u>Instr.</u>
Amy I	19	2				2				
Amy II	7	3								
Amy III	12	3	1		6					
Amy IV	3	4	3	3						1
Amy V	3	3		2		2		1		
Amy VI	12	3	3	8						1
Laurie I	5	0								
Laurie II	19	4	29							
Laurie III	9	35	4		4					
Laurie IV	23	10	4		10			1		
Laurie V	15	6	2	3	5	13				
Laurie VI	18	4	6	7	2	2		1		1
Patricia I	7	33			7					
Patricia II	13	8	11							
Patricia III	7	13	7							
Patricia IV	4	17								
Patricia V	9	25		8		8				
Patricia VI	6	11	2	6	2		2	4		
Patricia VII	13	8		11		4	2			
Patricia VIII	13	11	4	4	2	2	5		3	

TABLE 11. Total percentages of multi-morpheme types which express Brown's (1973) Other Constructions; Early Stage I.

<u>Subjects</u>	<u>Samples</u>					<u>Total</u>
	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>V</u>	
Amy	23	10	22	14	-	17
Laurie	15	52	52	48	-	45
Patricia	47	32	27	21	50	32
	Combined Early Stage I Total					29

TABLE 11a. Total percentages of multi-morpheme types which express Brown's (1973) Other Constructions; Late Stage I.

<u>Subjects</u>	<u>Samples</u>				<u>Total</u>
	<u>V</u>	<u>VI</u>	<u>VII</u>	<u>VIII</u>	
Amy	11	27	-	-	18
Laurie	46	39	-	-	41
Patricia	-	33	38	44	40
	Combined Early Stage I Total				35
	Combined Early and Late Stage I Total				32

TABLE 12. Percentages of multi-morpheme types which are not in Brown's classification; Early Stage I.

<u>Subjects</u>	<u>Samples</u>					<u>Total</u>
	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>V</u>	
Amy	12	67	42	36	-	41
Laurie	20	15	18	7	-	11
Patricia	0	20	46	20	25	22
Combined Early Stage I Total						28

TABLE 12a. Percentages of multi-morpheme types which are not in Brown's classification; Late Stage I.

<u>Subjects</u>	<u>Samples</u>				<u>Total</u>
	<u>V</u>	<u>VI</u>	<u>VII</u>	<u>VIII</u>	
Amy	48	33	-	-	41
Laurie	19	16	-	-	18
Patricia	-	26	16	12	16
Combined Late Stage I Total					23
Combined Early and Late Stage I Total					26

12a present the percentages of multi-morpheme types which cannot be accounted for by any of Brown's categories. Over all of the samples, 26% of the utterance types expressed by these Down's Syndrome children did not fit Brown's descriptions of the utterances of normal children.

#### Characteristics of Utterances Not In Brown's Classification

The utterances which did not fit any of Brown's descriptions of his data on normal children fell into several categories, which are presented in Table 13. One of the two largest categories consisted of single words which were combined with either an inflected ending or a copula. The utterances in this category included only those multi-morpheme types which could not be classified in any of the previously mentioned categories. For example, if an utterance which expressed one of the Prevalent Relations contained a plural inflection, that utterance was classified with the appropriate relation, and the inflection did not enter into the classification. Only those utterances which could not be classified elsewhere, because the inflection or copula occurred only with another single word, entered into the present category. The inflections and copulas in this category, as well as those included in utterances classified elsewhere, will be discussed in the section on morphological structures.

The percentage of multi-morpheme types not found in Brown's classification which consisted of expanded locative

TABLE 13. Classification of multi-morpheme types not in Brown's (1973) categories expressed in percentages.

<u>Samples</u>	<u>Single Word</u> + <u>Inflection</u> <u>or Copula</u>	<u>Expanded</u> <u>Locative</u>	<u>Stative Verb</u>	<u>Temporal</u>	<u>Misc.</u>
Amy					
Early I	72	23	0	1	4
Late I	51	31	1	2	15
Total	61	27	1	2	9
Laurie					
Early I	39	28	5.5	5.5	22
Late I	24	28	28	13	7
Total	28	28	22	11	11
Patricia					
Early I	29	46	17	0	8
Late I	10	49	15	0	26
Total	17	48	16	0	19

phrases is the second category in Table 13 and is of particular interest because it is in direct contradiction to one of Brown's findings. Brown noted that in the data he examined all of the expansions which occurred were noun phrase expansions. Brown stated emphatically that, "No other combinations occurred" (p. 177). In the present data the Down's Syndrome children studied used numerous expanded constructions in which the expanded element was not a noun phrase. The most frequent of these constructions were expanded locative phrases, most of which were of two types: Prepositional phrases such as on top, in it, under table, on the table, on the top, in a mouth; and adverbials such as over there, right here, in here, out there, around here, right in there, and back in bag. These constructions were used with sufficient variety and appropriateness as to leave no doubt of their productivity in most of the samples in which they occurred.

The third category in Table 13 is Stative Verbs. Although Brown did not discuss the presence of stative verbs in his data, his description of the category of Experiencer or Person Affected Dative indicated that utterances expressing this relation consisted in most cases of the Experiencer plus a stative verb. For that reason, all statives which occurred with the Experiencer or Person Affected Dative were categorized as such under Brown's Other Constructions. The present category included only those stative verbs which occurred in constructions such as want

that, where the Experiencer was understood but not expressed. For two of the three Down's Syndrome children studied, this category contained a fairly significant proportion of those utterances which did not fit into Brown's classification.

Temporal expressions appeared in the data for two of the children, but only occurred with any frequency in Laurie's Late Stage I.

The remaining category in Table 13 contains miscellaneous constructions of very low frequency, such as the relations of Locative + Attribute (There dirty) and Demonstrative + Locative (That away) and expansions such as expanded action (Make come off) and Expanded Attribute (very good, hot too).

In order to present a clearer picture of the semantic differences between Brown's normal children and the Down's Syndrome children in this study, certain aspects of the utterance types previously described must be examined. A closer look at the utterance types which Brown classified under Other Constructions reveals that these utterances can be broken down into two general categories: Lower Level Constructions and Higher Level Constructions. The Lower Level Constructions are those which have achieved their full development by the time they appear in Stage I. These include the Operations of Reference, idiosyncratic and inflexible constructions, and vocatives and greetings. The Higher Level constructions include those which are just beginning to develop in Stage I and include all of the

constructions which Brown terms Semantic Relations of Low Frequency, as well as the Negatives and WH Questions. The final category, Uninterpretable constructions, cannot, by definition, be analyzed in terms of their complexity. Logically, therefore, they would be most appropriately classified with the Lower Level, rather than Higher Level constructions.

Although Brown did not present individual percentages for all of these Other Constructions, he did, in his discussion, indicate that the Lower Level constructions occurred with considerably greater frequency than did the Higher Level constructions. Brown's discussion, combined with the information provided in his Table 24 (1973, p. 176), which is reproduced in Appendix B, led to the following observations:

1. Brown's statement that approximately 70% of the multi-morpheme types in his data expressed the Prevalent Relations was based on the average percentage in this category for 10 of the 12 children presented in Table 24. Brown indicated (p. 178) that he omitted the samples for Sarah I and Sipili from his calculations because in both cases the children's mothers had "made a continuing determined effort to elicit speech from their children," resulting in the fact that the ". . . protocols for the children were, consequently, overloaded with. . . simple nominatives" (p. 178).

2. When the 10 children on whom Brown based his calculations were examined further, it could be seen that the exact percentage of multi-morpheme types expressing the Prevalent Relations was 68%, and the average percentage expressing Uninterpretable constructions was 11%. The remaining 21%, therefore, was comprised of all Other Constructions, both Higher and Lower Level. In view of Brown's comments indicating that the constructions here termed Lower Level occurred with much greater frequency than those here termed Higher Level, we may assume that the percentage of multi-morpheme types in Brown's data which express Higher Level constructions was considerably lower than 21%. All that we can state for certain, however, is that the percentage could not be higher than 21%.

3. Examination of the multi-morpheme types expressed by the Down's Syndrome children in this study revealed that they produced a much greater proportion of Higher Level constructions than did Brown's subjects. Inspection of those multi-morpheme types which were not in Brown's classification revealed that all were appropriately classified with the Higher Level constructions. These utterances were combined with those categories in Table 10 which represented Higher Level constructions, and the resulting percentages appear in Tables 14 and 14a. Therefore, Tables 14 and 14a represent the percentage of total multi-morpheme types which expressed Higher Level constructions. As can be clearly seen, this percentage rises from Early Stage I to Late Stage I

TABLE 14. Percentages of multi-morpheme types expressing higher level constructions; Early Stage I.

<u>Subjects</u>	<u>Samples</u>					<u>Total</u>
	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>V</u>	
Amy	14	67	49	43	-	46
Laurie	20	43	26	23	-	26
Patricia	7	32	33	21	42	29
	Combined Early Stage I Total					36

TABLE 14a. Percentages of multi-morpheme types expressing higher level constructions; Late Stage I.

<u>Subjects</u>	<u>Samples</u>				<u>Total</u>
	<u>V</u>	<u>VI</u>	<u>VII</u>	<u>VIII</u>	
Amy	52	45	-	-	49
Laurie	43	33	-	-	37
Patricia	-	43	33	32	35
	Combined Late Stage I Total				40
	Combined Early and Late Stage I Total				38

for each of the subjects. The total percentage for all subjects combined in Early Stage I was 36% and in Late Stage I was 40%. Over all samples, the total percentage of Higher Level constructions in the utterances of these Down's Syndrome children was 38%. This figure may be compared with the figure of 21% of the utterance types of Brown's subjects, which represented the maximum percentage of Higher Level constructions. As mentioned previously, the actual percentage of Higher Level constructions in Brown's data was unquestionably far less than 21%.

In summary, comparison between Brown's normal children and the Down's Syndrome children in this study on the types of semantic relations they expressed revealed the following:

1. The Down's Syndrome children expressed the Prevalent Relations in a much lower percentage of multi-morpheme utterance types than did the normal children. The percentages were 42% and 68%, respectively.

2. Of the Prevalent Relations, those most frequently expressed by the Down's Syndrome children were Entity + Locative and Entity + Attribute relations, whereas those most frequently expressed by the normal children were the Agent + Action, Action + Object, and Possessor + Possession relations.

3. A total of 26% of the multi-morpheme types expressed by the Down's Syndrome children did not fit any of the categories into which Brown classified the utterances of the normal children.

4. The multi-morpheme types which did not fit Brown's classification consisted of single words combined with either an inflection or copula, expanded locatives, stative verbs, temporals, and a few miscellaneous low frequency constructions.

5. The percentage of Higher Level constructions produced by the Down's Syndrome children, 38%, was considerably greater than the maximum percentage of 21% which may have been produced by the normal children.

#### Order of Acquisition

In order to compare the order in which semantic notions emerged in the Down's Syndrome children with the order of emergence discussed by Leonard (1976), all of the AU's which had previously been categorized according to the semantic notions expressed were examined to determine the first sample for each child in which each semantic notion occurred. Since the categories of Designated object and Notice, both of which Leonard had found to emerge early in Stage I, were not categorized separately in the present study, these categories were omitted from consideration. With regard to the other notions, Leonard found the following order of emergence:

Group A: Nomination, recurrence, and negation

Group B: Action, object, agent

Group C: Attribution, location, possessor

Group D: Instrument, experience, experiencer

For the Down's Syndrome children, each of these notions was given a numerical rank, based on the order in which it emerged, as described in Chapter III. The resulting average order of acquisition for the three children is represented in Table 15.

As can be seen, except for the early appearance of nomination and the late appearance of instrument, the order of emergence of these notions for the Down's Syndrome children is not generally consistent with Leonard's findings. Although Leonard did note variability in the time of emergence of negatives and recurrence, neither his findings nor the findings of previous studies of normal children were consistent with the emergence of attribution and location before object, and the emergence of both of those notions in addition to possessor and experience before the notion of agent.

It must be noted, furthermore, that these findings were quite consistent across the three Down's Syndrome children. For all three children, the notions of attribution and location appeared in the first sample, along with nomination and action. Possessor and object were present in the first sample for two of the children and emerged in the second sample for the third child.

#### SYNTACTIC CHARACTERISTICS

A number of differences existed between the syntactic structures used by the Down's Syndrome children in this study and those used by the normal children Brown (1973) described.

TABLE 15. Semantic notions expressed according to their groups as defined by Leonard (1976) and their average order of emergence for three Down's Syndrome children.

<u>Semantic notion</u>	<u>Group</u>	<u>Average Rank</u>
Nomination	A	4
Action	B	4
Attribution	C	4
Location	C	4
Object	B	6
Possessor	C	6
Experience	D	6
Agent	B	8
Experiencer	D	8
Negation	A	10
Recurrence	A	10
Conjunction	-	12
Indirect Object	-	13
Temporal	-	14
Instrument	D	14

The most notable of these differences were in the means of expressing the semantic relations of conjunction and location, and the use of pronouns in various semantic roles.

### Conjunctions

The semantic relation of conjunction occurring in Brown's data consisted of "simply naming present objects as when Kendall said: 'Kimmy Phil'" (p. 179). In the present data, Noun + Noun conjunction constructions occurred in only two samples, Laurie V (Boy girl) and Laurie VI (Spoon knife, Milk sugar, and Here's Mickey Mouse Donald Duck). In addition, there were two constructions which appeared to require the conjunction and to connect two actions: Down sleep (Laurie V) and Here eat hurry-up (Laurie VI).

All other conjunction constructions for the subjects in this study included the word and. In most of those utterances, and occurred as the initial word in the utterance. This was true of all conjunction constructions for both Amy and Patricia. Amy's conjunction constructions included And beef, And pink (Amy IV); And shoe, And a eye (Amy V); six And + Noun constructions, and And Mommy home (Amy VI). Patricia used And + Noun constructions in samples V, VII, and VIII. In addition, she produced the following utterances: And yellow, And there, And dolly here (Patricia VI); And mine, And away, And Daddy here (Patricia VII); And nose away, And hat away, And that one (Patricia VIII). Only Laurie used and in other than the initial position, producing such utterances as Sit down and make it, Coffee and coffee, and

Tea and tea.

In view of the fact that the word and occurred in the initial position in most of these utterances, the question arose as to whether it could legitimately be considered a conjunction, or whether it functioned in some other manner. In determining the function of the word and in these constructions, the verbal and nonverbal contexts preceding the utterances were examined. In many of the cases, the context, either verbal or nonverbal, which preceded the utterance contained an element which could have been expressed in coordination with the element following the word and. For example, Amy produced the following sequences.

	Context: ( ) = nonverbal		Child's Utterance
	" "	" "	= verbal
Amy V:	(Picking up one shoe)		Shoe
	(Picking up second shoe)		And shoe
	(Picking up female doll)		Mommy
	(Picking up male doll)		And Daddy
	(Pretending to cook--pours from toy bottle into plate. Then takes toy sugar bowl, puts sugar into plate)		And sugar
	(Tries to fit plate into stove)		In there?
	"Does it fit?"		Yes
	(Takes plate from stove; pours from bottle)		And cream

Patricia and Laurie produced the following sequences:

Context	Child's Utterance
Patricia VI:	
(Placing one doll in bed)	Go right there
(Placing second doll in chair)	And dolly here
Patricia VII:	
(Handing plate to investigator)	For you
"Is this for me?"	Yup
(Taking plate for herself)	And mine
Laurie VIII:	
(Takes teapot. Pours first in one cup, then in another)	Tea and tea.

Although examination of the context did not reveal initial elements for all utterances containing and, these elements were present in a sufficient number of the contexts to suggest that the children were using the word and to connect two elements, but were usually unable to express both elements in the same utterance. It was apparent, therefore, that and was functioning semantically as a conjunction, but that the syntactic means of expression was still at a primitive level.

### Locatives

According to Brown, the locatives which occur in Stage I are "either simply the names of places or one of the pro forms" (p. 194). The pro forms in English consist of the prolocatives here and there. Neither locative adverbs nor prepositions were reported in the data Brown described.

In contrast, both locative adverbs and prepositions were frequent in the locative expressions of the Down's Syndrome children in the present study. Adverbials occurred not only in the expanded locative phrases previously described, but also in the single word locatives occurring in the Action + Locative and Entity + Locative relations. In fact, adverbs were considerably more frequent for all of the children than were locative nouns or noun phrases. For example, of all the Action + Locative and Entity + Locative utterance types produced by Patricia, only two of the locatives were expressed by nouns or noun phrases: Her go Daddy (VI) and Her hand apple (VII). On the other hand, Patricia used all of the following adverbs in these two relations: down, up, out, in, away, on, ahead. Prolocatives were also produced frequently by all of the children.

### Pronouns

Brown stated with regard to the data he studied that "The selection of pronouns to be learned at I is governed by the selection of NP's at that stage rather than by the structure of pronominal paradigms in English grammar" (p. 211).

This conclusion was based on the fact that the few pronouns which were produced by his subjects at Stage I could not be subdivided into any of the subclasses which characterize the adult English pronouns.

The pronouns which occurred in Brown's data included I, you, and occasionally it and my as sentence subjects; it, that, and occasionally you as sentence objects; and my as possessor. In examining these forms in relation to English subclasses, Brown made the following observations:

The full set of English pronouns subdivides on such bases as the following: personal-impersonal (he and it); singular-plural (this and these, he and they); masculine-feminine (he and she); first, second and third person (I, you, and he); nominative-accusative-genitive (I, me, my). If we use just these features to subclassify I, you, it and my, we need the contrasts personal-impersonal; nominative-genitive; first, second, and third person. In short, more features than pronouns. (p. 210)

The pronouns used by Brown's subjects as a group, as well as those used by the individual subjects in the present study, are presented in Table 16. In terms of the pronoun subclasses referred to above, the only contrasts which were present in Brown's data were the first, second, and third person, which occurred only in the nominative singular; the nominative-accusative, which occurred only for the second and third person; and the nominative-genitive, which occurred only for the first person. Since Brown's data were reported for the group as a whole, it was not possible to determine if any of the individual children made even these initial distinctions.

TABLE 16. Pronoun use by present subjects and Brown's (1973) subjects.

<u>Subjects</u>	<u>Person</u>	<u>Pronoun Classification</u>										
		<u>Nominative</u>		<u>Accusative</u>		<u>Genitive</u>		<u>Personal</u>	<u>Impersonal</u>	<u>Masc.</u>	<u>Fem.</u>	
		<u>Sing.</u>	<u>Plur.</u>	<u>Sing.</u>	<u>Plur.</u>	<u>Sing.</u>	<u>Plur.</u>					
Brown's Subjects	1st	I my	-	-	-	-	my	-	-	it that	-	-
	2nd	You	-	You	-	-	-	-	-	-	-	-
	3rd	it	-	it that	-	-	-	-	-	-	-	-
Amy	1st	I	-	-	-	my	-	-	-	-	-	-
	2nd	-	-	-	-	-	-	him	it that	-	-	-
	3rd	him that	-	him it that	-	her	-	-	-	-	-	-
Laurie	1st	me I	we	-	-	me my	-	-	-	-	-	-
	2nd	-	-	-	-	your	-	he her	it that this	he	her	-
	3rd	her he it that this	-	it that this	-	-	-	-	-	-	-	-
Patricia	1st	I me	we	me	-	my mine	-	-	-	-	-	-
	2nd	You	-	you	-	your	-	him her	it that	him	her	-
	3rd	him her it that	they	him it that	-	her he him	-	-	-	-	-	-

The data for Amy indicated that her pronoun acquisition was no further developed than that of Brown's subjects. In fact, even the first, second, and third person distinction was not evident. Only the demonstrative that occurred as both subject and object. The pronoun him, which occurred only once in the data, appeared in the utterance him off, and could not be classified unambiguously as either subject or object. In view of the single occurrence of this form, it appeared unlikely that the personal-impersonal distinction was a functional one for Amy.

Laurie's use of pronouns, on the other hand, showed a somewhat higher level of development. Both the personal-impersonal and masculine-feminine contrasts were evident. In addition, Laurie used it, that, and this as both subject and object. Interestingly, the forms me and her, which are accusative forms in adult English, were used as nominatives, along with such appropriate nominatives as I and he. This appeared to be a type of overgeneralization and may have been an indication that Laurie was beginning to form primitive rules for the use of pronouns.

This same pattern of overgeneralization of the accusative form was evident for Patricia, who used me, her, and him as both subject and object, as well as using the appropriate form I. Patricia's pronoun development was the most advanced of the three Down's Syndrome children and was considerably more advanced than any of Brown's subjects. Patricia had evidence of all the distinctions which Brown

indicated are characteristic of the adult grammar, except for the singular-plural distinction, which was not productive. Patricia had only two plural pronouns, we and they, and each occurred in single utterances which may have been merely learned routines, Here we are and There they are. All other subclass distinctions were productive: first, second, and third person; nominative-accusative-genitive; personal-impersonal; masculine-feminine. In short, Patricia's pronoun development was far more advanced than would be expected on the basis of Brown's findings regarding pronoun use in Stage I normal children.

#### GRAMMATICAL MORPHEMES

According to Brown (1973), the development of grammatical morphemes, which he described as "modulations of meaning," does not begin for normal children until Stage II, which was defined as beginning when MLU reached 2.0 morphemes. In describing the development of the 14 grammatical morphemes on which he focused, Brown noted that ". . . performance does not abruptly pass from total absence to reliable presence. There is always a considerable period, varying in length with the particular morpheme, in which production-where-required is probabilistic" (p. 257). Brown found that the most appropriate method of tracing the development of these morphemes was to examine their presence or absence in contexts where they would be obligatory in the adult language.

Brown followed the development of these 14 grammatical morphemes in terms of their presence or absence in obligatory contexts in three children, Adam, Eve, and Sarah, from Stage I through Stage V. Table 17 presents his findings regarding the total percentage of required forms which were present for each of the children at Stages I, II, and V.

Brown's procedures for determining obligatory contexts for each of the 14 grammatical morphemes (pp. 255, 259 - 269) were applied to the language samples obtained from the Down's Syndrome subjects in the present study, beginning with the last sample in Early Stage I and including all Late I samples. The results are presented in Table 18. It is clear that by the end of Late Stage I, the Down's Syndrome children were producing a far greater percentage of the required forms than the normal children produced even at Stage II. In fact, several of the samples produced by the Down's Syndrome children included a greater percentage of the required forms than one of Brown's subjects, Eve, produced by Stage V.

These findings, however, do not imply that all of the grammatical morphemes were developing at Stage I. In many samples there were no obligatory contexts for a particular morpheme, and in others, a single obligatory context occurred with an appropriately supplied inflection. Since these problems were the same in Brown's study as in the present investigation, they do not affect the overall results. A clearer picture, however, of the grammatical morphemes

TABLE 17. Percentages of 14 grammatical morphemes present for Brown's (1973) subjects<sup>a</sup>.

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<u>Subjects</u>	<u>Stage I</u>	<u>Stage II</u>	<u>Stage V</u>
Adam	6	17	80
Eve	13	19	57
Sarah	16	26	85

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<sup>a</sup>From Roger Brown. A First Language/The Early Stages. Cambridge: Harvard University Press, 1973, 256.

TABLE 18. Percentages of 14 grammatical morphemes present for Down's Syndrome subjects in various samples.

<u>Subjects</u>	<u>Samples</u>				
	<u>IV</u>	<u>V</u>	<u>VI</u>	<u>VII</u>	<u>VIII</u>
Amy	47	63	66	-	-
Laurie	51	26	37	-	-
Patricia	-	75	45	58	39

which began developing at Stage I for these Down's Syndrome children could be presented by examining the morphemes which were present in the greatest frequency for each of the children.

For Amy, in all three samples presented, the grammatical morphemes present most frequently were in, -ing, and plural -s. In addition, articles were frequent in two of the three samples, and the uncontracted form of the copula was frequent in Amy V.

Articles were frequent for Laurie in all three samples, and the copula, both contracted and uncontracted, plural -s, on, and -ing were frequent in two of the three samples.

Articles were also a very frequently appearing form in all four of Patricia's samples. The only other form which occurred frequently in three of Patricia's four samples was in.

In general, the morphological forms which were expressed most frequently by these children were among the earliest developing morphemes for Brown's subjects. Two exceptions were the articles and the copula. Nonetheless, on the basis of Brown's data, none of these morphemes would have been expected to occur with such frequency in Stage I.

One of the grammatical morphemes which required particular mention is the copula. The copula was not among the earliest developing forms for Brown's subjects and was one of the structures which Brown included in Other Constructions in the category defined as ". . .very infrequent

and apparently uncomprehending use. . ." (pp. 178-179). As previously mentioned, however, the subjects in the present study produced this form more often than would be expected on the basis of Brown's description. In fact, for two of the three subjects, the copula was frequently present in a variety of utterance types by Late Stage I.

Patricia was the only one of the three subjects for whom it was not possible to draw any definite conclusion regarding the productivity of the copula. The only copulas which were present in Patricia's samples I-VII occurred in utterances such as There are, Here are, Here you are, and Here we are. In sample VIII utterances of this type continued to occur, along with utterances such as Who's there, What is that one, and This is for you.

For Amy and Laurie, however, the copula appeared more frequently. In Amy V, for example, a construction occurred which may be described as:

( Prolocative )+ is + (NP)  
 Demonstrative

where either or neither of the elements in parentheses may occur, but where the copula always occurs. There were 11 multi-morpheme types in Amy V which fit this description. In addition, one predicate adjective construction, There is blue, also appeared.

It is interesting to note that Amy also seemed to have formed an unusual rule for determining whether to use the contracted or uncontracted form of the copula is. In all

constructions in which the copula was followed by an article, Amy used the contracted form. Utterances included That's a boat, There's a ball, and 's a pinwheel. In all other contexts the copula was expressed in its uncontracted form.

The development of the copula in Laurie's speech showed an unusual pattern in Stage I.

In Laurie III two forms appeared which seemed to be demonstratives. The form s'a occurred before both singular and plural nouns, as in S'a boy and S'a boys. Since the article a was produced in other contexts only twice, and the copula not at all, there was not sufficient data to permit drawing definitive conclusions about the elements in the form s'a.

In addition, in the same sample the form s'at occurred in four contexts, all of which were produced with an interrogative intonation. These utterances were S'at doggie?, S'at ball?, S'at baby hair?, and What s'at? The word that did not occur in this sample.

By Laurie IV, a more definitive pattern was emerging. In that sample the article a appeared productively in a variety of contexts. In addition, the form 's was produced in both predicate nominative constructions, including S'a + N, It's a + N, and That's a + N; and in What questions, including S'at?, What'sat?, What's that?, What is that?, and What'sat on truck? In this sample Laurie appeared to have the rudiments of the copula, article, and demonstrative

separately, but seemed unsure of how to combine them.

In Laurie V no predicate nominatives or predicate adjectives occurred, with or without copulas. The only What question that was expressed took the form Is this? Where questions were produced as Where + N, without the copula.

By Laurie VI the following constructions appeared:

Predicate nominatives:

(This ) + N  
 (That )  
 That = 's + (N  
 (NP)

Locatives:

Prolocative + N  
 Prolocative + 's + N  
 Prolocative + is  
 Prolocative + it + is

WH Questions:

What's that?  
 Where sugar?  
 Where's sugar?

Although the copula was certainly not fully developed by the end of Stage I, both contracted and uncontracted forms occurred, and, unlike the development reported for normal children, the contracted form showed earlier development than the uncontracted form.

When all of the contexts in which the copula would be obligatory in the adult grammar were taken into account,

the copula was present 24% of the time in Patricia Late Stage I, 51% of the time in Amy Late Stage I, and 50% of the time in Laurie Late Stage I.

#### SUMMARY OF FINDINGS

A review of the differences which were found between the utterances expressed by the Down's Syndrome children in this study and those used by the nonretarded children described by Brown revealed that the great majority of these differences were based on syntactic and morphological features rather than semantic features of the utterances. Reexamination of Table 13 reveals that the two largest categories of utterance types which did not fit into Brown's classification of semantic relations differed primarily in structural rather than semantic features. The first category differed only in the presence of morphological inflections and copulas, and it has been shown that the Down's Syndrome children were more advanced than the normal children in morphological development. The second category, expanded locatives, differed primarily in the presence of prepositional and adverbial phrases. Although a few prepositions and adverbs in the data expressed semantic relations other than location, such as the temporal and benefactive relations, these were extremely infrequent. It is obvious, therefore, that while the Down's Syndrome children produced the relatively more advanced syntactic constructions, they used them primarily to express the locative semantic relations which were expressed frequently but in a less advanced syntactic

form by the normal children.

Further evidence of the more mature syntactic development of the Down's Syndrome children was demonstrated in the structure of their conjunction relations and in their use of pronouns.

There were, however, a few differences which can legitimately be considered semantic. The use of stative verbs in relation with structures other than experiencer or person affected, the use of temporals, and the use of a few other miscellaneous semantic relations suggests that these children were slightly more advanced than the normal children in the semantic relations they expressed at Stage I. In addition, there were definite differences in the types of semantic relations which the two groups used most frequently, and in the order in which the semantic notions were acquired.

With regard to the fact that the Down's Syndrome children used a considerably greater percentage of Higher Level constructions than did the normal children, it was difficult to separate the semantic and syntactic factors which combined to produce this result. Since Brown did not differentiate between the percentage of Other Constructions expressing the Lower Level construction of Nomination and the Higher Level constructions, it is not possible to determine the degree of influence of the relatively frequent occurrence in the present data of WH questions, Negatives, Conjunction, and Experiencer-Person Affected relations. The syntactic and morphological features in the first two

categories in Table 13, however, undoubtedly combined to provide an even greater influence.

In summary, the Stage I Down's Syndrome children in the present study demonstrated a higher level of syntactic and morphological development than did Brown's nonretarded children at the same linguistic stage. This advanced development was not uniform across all types of syntactic structures, but was limited primarily to the presence of what have traditionally been termed functors, including such forms as article, copulas, prepositions, adverbs, and inflections. In addition, the Down's Syndrome children differed from normal Stage I children in the kinds of semantic relations which they expressed most frequently and in the order in which various semantic notions emerged.

CHAPTER V  
DISCUSSION AND INTERPRETATION

The results of this study indicated that there were both quantitative and qualitative differences between the language of these Stage I level Down's Syndrome retarded children and normal Stage I children. These differences did not appear as bizarre meanings or constructions which would never be found in the speech of normal children; neither did they appear as lower level constructions which would be accounted for merely by a delay in development or by arrested development, contrary to the position taken by Lenneberg, Nichols, and Rosenberger (1964) and Miller and Yoder (1974).

With respect to the specific questions posed in Chapter I, the language used by these Down's Syndrome children may be described as follows:

1. The semantic relations expressed by the subjects of this study were, with a few exceptions, the same as those expressed by normal Stage I children. The exceptions which were found included stative verbs which were expressed in constructions where the experiencer was understood but not expressed. Although such constructions were not found in Brown's (1973) data, other recent studies of Stage I speech, including Bloom, Lightbrown, and Hood (1975) and Braine (1976)

have found such constructions in the speech of normal children. Two categories of constructions which were not in Brown's classification, single words with inflections or copulas and expanded locatives, differed not in the semantic notions which they expressed but in their syntactic structure. Therefore, the only semantic relations found in the Down's Syndrome children which have not been found in the speech of normal Stage I children were the temporal and a few miscellaneous constructions of very low frequency.

2. The Down's Syndrome children used a number of syntactic constructions which normal Stage I children do not use. The most frequent of these were expanded locative phrases, which included both prepositional and adverbial phrases. In addition, there were differences in the use of the conjunction and and in the use of pronouns in various semantic roles.

3. The Down's Syndrome subjects demonstrated a much higher level of development of several of the 14 grammatical morphemes than did the normal Stage I children. These included the prepositions in and on, the present progressive -ing, plural -s, articles, and copulas.

In addition to the findings which were directly related to the questions posed in Chapter I, the study led to several other findings:

1. Contrary to the position that the language of retarded children is arrested at a primitive stage (Lackner, 1968; Lenneberg et al., 1964), these Down's Syndrome

children demonstrated no areas in which language development had been arrested. Throughout Stage I, these subjects evidenced increases in MLU, in the number and kind of semantic relations expressed, and in the complexity of syntactic and morphological structures. These findings do not rule out the possibility that other Down's Syndrome retarded children may show an arrest in development at Stage I. Nor do these findings rule out the possibility that the subjects of this study may evidence an arrest in development at a later stage of language acquisition. However, on the basis of this study, there is no support for the position that arrested development is a characteristic of the language of Stage I retarded children.

2. The Down's Syndrome subjects differed from normal children both in the order in which semantic notions emerged and in the frequency with which various notions were expressed. Specifically, the notions of location and attribution appeared earlier and more frequently in these subjects. In addition, there was a greater percentage of higher level constructions, representing semantic relations which appear later and less frequently in normal children. These findings indicate that the Down's Syndrome children, while still at Stage I semantically, were functioning at a slightly more advanced level than the normal children at the same stage.

3. While both semantic and grammatical development were more advanced than would be expected for the normal child at Stage I, the development of these two areas was not

symmetrical. Rather, there was considerable difference in the relative development of semantic notions and their formal means of expression.

#### ORDER OF EMERGENCE AND FREQUENCY OF EXPRESSION OF SEMANTIC NOTIONS

In his discussion of the order of emergence of semantic notions in normal children, Leonard (1976) noted that there was a relationship between the order in which notions emerged and the frequency with which they were expressed. Leonard's findings related primarily to notions such as negation and recurrence, which were found to emerge later than expected and which also occurred infrequently in his data (pp. 114; 124-126). In the present study, however, a similar relationship may be seen in the notions of location and attribution, both of which occurred more frequently and emerged much earlier in the utterances of the Down's Syndrome subjects than in the speech of the normal children. Location and attribution were the two most frequent notions expressed by the subjects of the present study. Furthermore, they emerged in the first sample for each of the Down's Syndrome children, before either object or agent, which are expressed both earlier and more frequently by normal children.

As Leonard indicated, however, "The finding that a relationship exists between the order in which a notion emerged and its frequency of occurrence does not constitute a statement of cause and effect" (p. 125). Thus, it is necessary to search further for an explanation for the

relatively early and frequent appearance of the locative and attributive notions in these Down's Syndrome children's speech.

The relationship which has been hypothesized between the order of acquisition of cognitive concepts and the order of emergence of semantic notions, discussed previously in Chapter II, constitutes one possible explanation for these findings. If, as has been postulated, the order in which semantic notions appear directly reflects the order in which the concepts underlying these notions have developed, these results would indicate that the order of acquisition of cognitive concepts may be different for the Down's Syndrome children than for normal children.

A second possible explanation for the present findings is that the Down's Syndrome children may have developed the cognitive concepts in the same order as the normal child, but may differ in the concepts which they choose to express; that is, the focus of their attention may be on attributes and locations of objects rather than on agents or objects of actions. Such a possibility presupposes that the order of acquisition of semantic notions may be influenced by factors other than the order in which the concepts underlying them have developed. Until the order of development of the concepts underlying Stage I semantic notions can be investigated directly, however, this question cannot be resolved definitively.

## RELATIONSHIP BETWEEN SEMANTIC AND GRAMMATICAL DEVELOPMENT

As noted in Chapter II, a number of researchers have emphasized the relative independence of the semantic and grammatical systems, indicating that semantic development is more closely tied to cognitive development than are syntax and morphology (Beilin, 1975; Bloom et al., 1975; Brown, 1973; Cromer, 1976; Leonard, 1976). Nonetheless, investigation of the language development of normal children has indicated that these two systems maintain a certain parallel as they develop. For example, the grammatical structures which the Stage I child uses to express Stage I semantic relations are similar, both across children and across languages. That is not to say that all children use exactly the same structures to express the same relation. On the contrary, Bloom et al. (1975) indicated that children use either of two different grammatical systems at the beginning of Stage I: semantic notions may be expressed either by nominal forms or by constant functional forms. These variations, however, do not mean that the grammatical structures which are used at Stage I may be selected from any of the structures available in the adult grammar. Rather, the kinds of structures which children develop at Stage I represent a limited set of the structures which are available in the adult language, just as Stage I meanings represent a limited set of adult meanings.

For example, Brown (1973) noted that in the Stage I subjects he investigated, the semantic notion of location

was represented in one of two ways. Children used either a nominal form to name a place or they used one of the prolocatives. Other types of locatives which are available in the adult language, such as prepositional and adverbial phrases, were not used by Stage I children.

Furthermore, even the function forms which Bloom et al. described at Stage I were limited to certain constant forms which were used in specific relations. Likewise, the pronouns which Brown (1973) described appear to represent individual lexical items at Stage I, rather than a grammatical system.

Thus, although the semantic and grammatical systems develop to some degree separately, there is sufficient symmetry between them in the normal child that many of the characteristics of the latter may be predicted from the former.

In the present study, the normal balance between the semantic and grammatical systems was disturbed. That is, the two systems did not appear to be developing at the same rate.

The semantic system present in the Down's Syndrome children, although somewhat different from that of normal children, was still primarily a Stage I system. That is, with a few exceptions, even the higher level semantic relationships expressed by these children had all been noted in the speech of normal children at Stage I, although they emerged later and were less frequent in normals. The grammatical system

used by the Down's Syndrome children, on the other hand, had many characteristics which were not present in the normal children until Stage II or beyond. These included frequent use of articles, copulas, prepositions and prepositional phrases, adverbs and adverbial phrases, inflections, and, in one child, a fairly well developed pronominal system.

The reasons for the relatively advanced development of grammar over semantic relations may be related to conclusions drawn by Leonard (1976) from the findings of two experiments in which he attempted to determine the effects of experience on children's use of syntactic forms and semantic notions. Leonard indicated that, although there was evidence that the children's use of syntactic forms could be altered by experience, the evidence did not indicate that the children learned new semantic notions. Leonard stated that ". . . semantic notions seem to represent a component of language that is less sensitive to environmental influences than are components of language such as syntax and the lexicon" (p. 139).

Leonard's findings support the position that the semantic relations which develop at Stage I are closely tied to the acquisition of the cognitive concepts which are acquired developmentally during the sensorimotor period. Grammatical structures, on the other hand, appear, as discussed in Chapter II, to be less related to sensorimotor development. Rather, the acquisition of the formal means of expressing semantic relations appears to be based on

the child's experiences and his ability to make linguistic use of those experiences.

The findings of the present study support this position. The relatively advanced development of the formal means of expressing Stage I semantic relations suggests that the more advanced age of these retarded children at the time they reached Stage I, and their consequent additional experience, had a greater effect on the development of grammatical forms than semantic notions. Their semantic development, on the other hand, appeared to be more closely tied to developmental cognitive processes, and therefore more directly affected by the fact of intellectual retardation.

These findings contradict the position taken by Sinclair (1971; Sinclair de Zwart, 1973) that the development of grammatical forms, as well as semantic notions, is totally explained by the development of sensorimotor intelligence. Nor do these findings support the position of Milgrim (1971) that language lags behind cognitive development in the retarded, or the position of Blanchard (1964) that the condition of mongolism per se causes a specific language impairment. To the contrary, it is precisely those areas of language development which are less directly related to general cognitive development, and more sensitive to experience and specific linguistic abilities, which are most advanced in these Down's Syndrome children.

#### IMPLICATIONS FOR THERAPY

From the results of this study, several implications may be drawn regarding language therapy procedures for the retarded. These implications are necessarily tentative, since they are based on results obtained from only three children. Supporting evidence is needed from a larger sampling of Down's Syndrome and other retarded children to determine the population to which these results may apply.

For those children whose language acquisition pattern resembles the pattern demonstrated by the subjects of this study, any program of language therapy must take into consideration the following conclusions:

1. The evidence presented in this study, as well as that presented by Leonard (1976), while supporting the position that semantic notions cannot be taught before the cognitive concepts underlying them have developed, does not indicate conclusively that experience has no effect upon their acquisition once those concepts have developed. No definitive conclusions may be drawn, therefore, regarding the value of encouraging the expression of those semantic notions for which the concepts have already been acquired. The evidence does indicate, however, that any attempt to encourage the expression of a given semantic notion should await evidence that the child has developed the cognitive concept upon which that notion is based. Assuming that a concept has developed but has not yet been expressed by the child, the therapist would need to observe nonverbal behaviors

for evidence of these concepts. Knowledge of the order in which semantic notions emerged in this study would serve as a guide as to which concepts to look for in the child's non-verbal behavior.

2. The areas of language which are most easily affected by experience are obviously the areas in which therapy will be most beneficial. The findings of the present study support Leonard's (1976) position that structural aspects of expression are more easily affected by experience than are semantic relations. Therefore, children who have developed semantic notions and relations but are having difficulty with their formal means of expression would be more likely to benefit from a therapy program than would be children who have not begun to express the semantic relations.

3. Evidence from this study indicates that children develop syntactic and morphological structures most easily in those contexts which have been learned earliest and are expressed most frequently. These findings are an extension of Slobin's (1971a) position that new forms are first used to express previously acquired meanings. In the present study, the majority of the higher level grammatical forms were used to express the earliest acquired and most frequently expressed notions, specifically nomination, location, and attribution. For example, of those grammatical morphemes which were used frequently by the subjects of this study, there were two, articles and copulas, which were not among the earliest developing morphemes for normal children. These

forms were used most frequently in constructions which named objects and attributes. The most highly developed syntactic constructions, prepositional and adverbial phrases, were used most frequently as locatives.

These findings suggest that syntactic and morphological structures should first be taught in those semantic contexts which occur earliest and most frequently. Since the order of acquisition and frequency of expression of semantic notions differed in these children from the order and frequencies reported for normal children, it is not sufficient to use normal order as a guide. The present study indicates that the semantic notions of nomination, attribution, and location may be the most appropriate contexts for introducing new grammatical forms to retarded children. However, since the evidence is not conclusive that all retarded children follow this pattern, observation of the individual child's use of semantic notions would be the best guide to determining which semantic notions should serve as contexts for the introduction of new grammatical forms.



APPENDIX B. Tables 22, 23, and 24 reprinted from Brown (1973).

**Table 22.** Prevalent semantic relations of two, three, and four terms expressed as percentages of total multi-morpheme types

Construction	Kendall I	Seppo I	Kendall II	Viveka	Sipili	Tofi	Eve I	Sarah I	Seppo II	Rina I	Pepe	Adam I
MLU	1.10	1.42	1.48	1.50	1.52	1.60	1.68	1.73	1.81	1.83	1.85	2.06
Multi-Morpheme Types	100	111	152	112	112	75	146	183	272	203	242	229
<b>Two-term Relations</b>												
Agent and action	22	30	20	04	03	12	10	06	24	11	05	07
Action and object	07	04	10	22	08	17	10	04	03	02	08	16
Agent and object	05	03	03	00	00	00	09	00	01	01	01	00
Action and locative	03	01	03	04	01	07	01	01	06	00	09	05
Entity and locative	18	11	09	02	01	01	05	01	10	06	05	02
Possessor and possession	19	01	09	05	14	03	10	07	04	02	12	11
Entity and attribute	06	10	05	07	01	03	04	06	12	03	07	05
Demonstrative and entity	01	00	03	23	01	00	03	10	01	25	00	01
<b>Three-term Relations</b>												
Agent, action, and object	00	06	05	00	00	01	03	04	02	10	03	06
Agent, action, and locative	00	00	03	00	00	01	00	01	07	04	04	03
Agent, object, and locative	00	00	00	00	00	00	00	00	00	00	01	01
Action, object, and locative	00	00	01	00	00	04	00	00	00	01	03	00
<b>Four-term Relations</b>												
Agent, action, object and locative	00	00	00	00	00	00	00	00	00	00	01	01

From Roger Brown, A First Language: The Early Stages. Cambridge, Mass.: Harvard University Press (1973), p. 174. Copyright © 1973 by the President and Fellows of Harvard College. Reprinted with permission.

**Table 23.** Prevalent semantic relations, with one term (*NP*) expanded, expressed as percentages of total multi-morpheme types

Construction	Kendall I	Seppo I	Kendall II	Viveka	Sipili	Tofi	Eve I	Sarah I	Seppo II	Rina I	Pepe	Adam I
MLU	1.10	1.42	1.48	1.50	1.52	1.60	1.68	1.73	1.81	1.83	1.85	2.06
Multi-Morpheme Types	100	111	152	112	112	75	146	183	272	203	242	229
<b>Two Terms with NP Expanded</b>												
Agent and action	00	01A	00	00	00	00	00	01AP	01A	01A	02AN	00
Action and object	00	00	00	01A	00	03AN	00	00	01AN	01A	02PAN	01P
Agent and object	00	00	00	00	00	00	00	00	00	00	00	00
Action and locative	00	00	00	00	00	00	00	00	00	00	01P	01P
Entity and locative	00	00	00	00	02P	00	00	00	01P	00	02PAN	01P
Possessor and possession	00	00	00	00	00	00	00	00	00	00	01AN	00
Entity and attribute	00	00	00	00	00	00	00	00	00	00	01N	01P
Demonstrative and entity	00	00	01P	01A	00	00	03P	03AP	01A	02AP	01P	00
<b>Three Terms with NP Expanded</b>												
Agent, action, and object	00	00	00	00	00	00	00	00	00	01A	01P	01A
Agent, action, and locative	00	00	00	00	00	00	00	00	00	00	01P	01A

A = attributive; N = nominative; P = possessive.

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Table 24. Percentages of multi-morpheme types expressing prevalent relations and falling into other categories

Construction	Kendall I	Seppo I	Kendall II	Vivcka	Sipili	Tofi	Eve I	Sarah I	Seppo II	Rina I	Pepo	Adam I
MLU	1.10	1.42	1.48	1.50	1.52	1.60	1.68	1.73	1.81	1.83	1.85	2.06
Multi-Morpheme Types	100	111	152	112	112	75	146	183	272	203	242	229
Prevalent Relations	81	67	72	69	30	51	58	44	74	70	70	64
Other Constructions	17	04	07	16	65	35	41	42	22	27	20	30
Uninterpretable	02	29	21	15	05	14	01	14	04	03	10	06
Total	100	100	100	100	100	100	100	100	100	100	100	100

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