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A CROSS-SECTIONAL STUDY OF THE DEVELOPMENT OF VERB INFLECTIONS IN CHILD LANGUAGE

City University of New York PH.D. 1985

A CROSS-SECTIONAL STUDY OF THE DEVELOPMENT OF VERB INFLECTIONS IN CHILD LANGUAGE

by

FRANCES KASTEN FEINTUCH

A dissertation submitted to the Graduate Faculty in Speech and Hearing Sciences in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York

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Abstract

A CROSS-SECTIONAL STUDY OF THE DEVELOPMENT OF VERB INFLECTIONS IN CHILD LANGUAGE

by

Frances Kasten Feintuch

Adviser: Professor Margaret Lahey

This cross-sectional investigation explored the relationship between the development of the verb inflections (present progressive, regular and irregular past tense and third person singular) and the semantic organization of the verbs used in children's early sentences. Specifically, the relationship between the verb inflections and a) the semantic-syntactic relations of the sentence and b) the semantics of verb aspect were examined.

Spontaneous language samples and elicited responses to a production task were collected from eighteen children. All subjects were first born monolingual English speaking children with normal language development. The MLU range investigated (1.5-4.5) coincided with Brown's (1973) stages (Late Stage I to Late Stage V). The spontaneous language data were analyzed in terms of the semantic-syntactic relations in the children's utterances and in terms of the inherent aspectual meanings of the verbs themselves (after

Bloom, Lifter, and Hafitz, 1980).

The major results of this study confirmed Bloom, Lifter and Hafitz's (1980) findings in that a) at emergence, the verb inflections were used simultaneously but selectively with different populations of verbs, and b) the verb inflections were influenced by the semantic organization of verbs, that is, their semantic-syntactic structure and aspect. The selectivity of the individual inflections with specific populations of verbs was not as obvious in the more advanced linguistic levels (III-V).

The most apparent proportional increase in verb inflectional use occurred between Stage III and Stage IV. Results generally supported the linguistic principle of Aspect before Tense more so in the spontaneous language context than in the task context. Data suggested that both lexical and rule learning may be involved in the development of verb inflections. In addition, the value of the complementary use of spontaneous language data and elicited production data in the study of verb inflections was demonstrated. Clinical implications as well as implications for future research were proposed.

In conclusion, this investigation has shown that the syntactic structure of the sentence, the semantics of verb aspect and the pragmatic context all affect the use of verb inflections and all are important dimensions in a study of their development.

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REVIEW OF THE LITERATURE

Historically, research on the emergence or acquisition of verbal inflections (present progressive, -ing; third person singular, -s; regular past, -d, -t, -ed; and irregular past) in children's early language development has focused on the syntactic and semantic complexity of the individual inflections (e.g., Brown, 1973; deVilliers and deVilliers, 1973; Johnston and Schery, 1976). Bloom, Lifter and Hafitz (1980) were the first investigators to explore the relationship between the emergence of the verbal inflections and the semantic organization of the verbs used in children's early language.

Moreover, it is just within the last decade or so that the expression "semantics of verbs" has become familiar and only a handful of investigators have examined the semantic organization of verbs used in early sentences. Bowerman (1974) examined a body of spontaneous errors made by her 2 year old daughter in order to investigate her acquisition of causative verbs. Lahey and Feier (1982) examined the semantics of verbs in the language dissolution of a woman who suffered from cerebral atrophy and compared it with the literature on early language development. Bloom, Lightbown and Hood (1975) and Bloom, Miller and Hood (1975) found that

the verbs that children acquire are organized semantically into large molar categories of verbs. In addition, they derived a developmental hierarchy of these verb categories.

Verb Categories

Three categories of verbs (action, locative action, and state) were identified in children's utterances. Bloom, Lightbown and Hood (1975) analyzed approximately 25,000 utterances of four children from the single word stage until their MLU's were approximately 2.5. The sequence of development of verb relations found in multi-word utterances was a major result of their study. Specifically, they found developmental differences between action and state relations, and between locative and non-locative actions and states.

The first semantic distinction they found among the children's verbs was between actions and states. The children encoded action events before state events in multi-word utterances. In the action relations, an ongoing or intended movement was performed by the child or by another child under his direction. An object was included in the utterance depending on whether the action verb was transitive. For example, Benjamin throw ball, #Actor - Action Verb - Object#. Intransitive verbs did not involve an effect on an object, for example, Michael dance, #Actor - Action Verb#. In the state relations, neither the child's nor another's actions were relevant to the meaning of the utterance. In other words, these events did not involve a movement that was named by the verb in the utterance. The

verb sleep was one type of state verb used by children and occurred in the sentence context #Entity - State Verb# (Baby sleep). These verbs named states that were 'public' and capable of being observed by others (Allen, 1966). The verb like was another kind of state verb. It named an internal state and occurred in the sentence context #Entity - State Verb - Object#.

The second semantic contrast found by Bloom, Lightbown and Hood (1975) was the distinction between locative and non-locative action and state verbs. In locative action events, the goal of the movement was to change the location of a person or an object usually towards a place, (e.g., go, put). Locative action utterances appeared before locative state utterances for all four children studied.

Bloom, Miller and Hood (1975) further differentiated the locative action verbs into three sub-categories of verb relations - patient, mover, and agent-locative action. They differed according to whether the object that acted was also the object that changed place. In other words, the relationship between the verb and its pre-and post-verb constituents (S-V and V-Complement) determined the difference between the three sub-categories of locative action verbs.

In patient-locative action, the agent of the action was not specified but caused another object to change place. The pre-verb constituent, the subject of the sentence, represented the patient that was the object that changed place. Bloom, Lifter and Hafitz (1980) cited the following

example: "tape recorder goes in there" (as a child, Peter, put the tape recorder into its box) - #Patient - Locative Action Verb - Place#.

In agent-locative action utterances, the pre-verb constituent was the agent of the action whose movement caused another object to change place. The affected object that was moved was part of the complement or post-verb constituent. An example cited by Bloom, Miller and Hood (1975) was "Gia away a lamb (bag)" as Gia dropped lambs into a bag - #Agent - Locative Action Verb - Object - Place#. In both patient and agent-locative action events, two different objects were involved - one that changed place and one that caused the change of place. Thus, the semantic relations were the same. However, patient-locative action and agent-locative action were syntactically different in that different word orders were used. In patient-locative action, the object that was moved was mentioned before the patient-locative action verb whereas in agent-locative action it was mentioned after the agent-locative action verb.

In mover-locative action utterances, the object was both the initiator and recipient of the action named by the verb, for example, "Mommy sit down" (as Mommy sitting down) - #Mover - Locative Action Verb - Place#. The semantic-relations of patient-locative action and mover-locative action were different. In patient-locative action, the patient that changed place was moved by another unspecified agent whereas in mover-locative action the mover

that changed place was also the agent of the movement. Although the semantic-relations for patient-locative action and mover-locative action were different, they were syntactically and lexically similar. In both instances, the sentence-subject was the object that changed place and was mentioned before the verb. Lexically, the same verbs were used in both verb relations. Bloom, Lifter and Hafitz (1980) reported that "go" was the verb used most often in both. Thus, the three locative action sub-categories, patient-locative action, agent-locative action and mover-locative action were structurally different. In addition, Bloom, Miller and Hood (1975) reported that these three locative action categories were learned sequentially, although the sequence was different for the different children.

In sum, Bloom, Lightbown and Hood (1975) and Bloom, Miller and Hood (1975) identified five categories of verbs which were distinguishable according to the semantic relations between the verb and the sentence subject. Bloom, Lifter and Hafitz (1980) diagrammed it as follows:

(Actor)
(Entity)
(Mover) Verb-Complement#
(Patient)
(Agent)

where complement is either an object, place, object-place, or Ø depending upon the meaning of the verb. Bloom, Lifter

and Hafitz (1980) stated that the implication of these few studies on the semantic organization of verbs in children's early sentences is that children learn the verbs of the language as a system and that verbs do not enter children's vocabularies one at a time only as a function of events in the context.

Grammatical Morphemes in Child Language

The development of grammatical morphemes in child language has been investigated by several researchers using a variety of research designs. In an experimental study, Berko (1958) explored children's (ages 4-7) abilities to use many of the morphological rules of English. Their use of possession, plurality, tense (past and present progressive), derived adjectives, third person singular verb form, comparative and superlative adjectival forms, and compound words was tested using nonsense words. In a longitudinal investigation, Cazden (1968) described the acquisition of five noun and verb inflections by three subjects. She found that plurals appeared before possessives, and present progressives appeared before past and present indicatives.

Brown (1973) expanded on Cazden's earlier descriptive study and compared her results with other findings in the literature. Brown (1973) studied the following 14 grammatical morphemes in three children longitudinally: the present progressive -ing, the third person singular, the present tense (regular and irregular), the plural -s, prepositions in and on, possessive -s, the articles 'a' and

'the', auxiliary verb 'be' (contractible and uncontractible forms) and the copula verb 'be'. Brown (1973) arbitrarily defined acquisition of a grammatical morpheme as 90% correct usage in obligatory contexts in three successive speech samples. He found a remarkably similar order of development of the grammatical morphemes for his subjects and for the subjects in the studies he reviewed. deVilliers and deVilliers (1973), in a cross-sectional study, described the use of the same 14 grammatical morphemes in obligatory contexts in early child speech. Speech samples were taken from 21 children, aged 16-40 months, whose MLU's ranged from 1.25-4.67. They found an order of acquisition that correlated very highly with Brown's (1973) longitudinal data.

The use of grammatical morphemes by language impaired children has been described by several researchers and compared to the data on children with normal language development. The early studies of Lovell and Bradbury (1967) and Newfield and Schlanger (1968) used Berko's techniques with mentally retarded children. The children studied by Lovell and Bradbury (1967) failed to generalize rules to new words. Johnston and Schery (1976) examined the spontaneous use of eight grammatical morphemes by 287 linguistically deficient children, ranging in age from 3 years to 16 years 2 months. Grammatical morphemes were analyzed according to the lowest level of mean utterance length at which each was used in 90% of its obligatory

contexts. They found an invariant order of acquisition of grammatical morphemes similar to the cross-sectional data of deVilliers and deVilliers (1973) and the longitudinal data of Brown (1973). Upon closer examination of the data, Johnston and Schery (1976) observed that the language deficient children's use of grammatical morphemes differed in the rate at which they moved from the first use of a morphological rule to its consistent general application. They also observed that language impaired children acquired the grammatical morphemes at higher mean utterance length levels than the normal children.

A longitudinal investigation of 18 language impaired children ranging in age from 3;2-10;2 years old was conducted by Kessler (1975). Kessler (1975) found that the order of emergence of the grammatical morphemes was very similar to the order Brown (1973) found for three normal children. Steckol and Leonard (1979) compared the grammatical morpheme usage of ten normal and ten language impaired children matched at two different levels of MLU. They found that the language impaired children displayed less grammatical morpheme usage (lower percentage of use in obligatory contexts) than the normal children with equal MLU's. They speculated that the language impaired children may have attached less communicative significance to grammatical morphemes.

The aforementioned studies on the development of grammatical morphemes by normal and language impaired

children have been primarily concerned with the order of acquisition of these morphemes. Bloom, Lifter and Hafitz (1980) highlighted that these studies implied that grammatical morphemes are learned sequentially. Another implication of these studies, as pointed out by Bloom, Lifter and Hafitz (1980), is that once a morpheme is acquired, the child applies it in all appropriate instances. For example, once a verbal inflection like present progressive is acquired, it is applied to all verb stems in which the present progressive is obligatory. In studying the emergence of verb inflections in children, Bloom, Lifter and Hafitz's (1980) results did not support the implication that the different verb inflections are learned sequentially nor did it support the implication that the verb inflection occurs in all of a child's verbs. The more traditional studies of Brown (1973), deVilliers and deVilliers (1973), Cazden (1968), and Johnston and Schery (1976) focused on the syntactic aspects of the morpheme development. In fact, only the frequency of input (Moerk, 1980; Pinker, 1981) of the morphemes and the grammatical and semantic complexity of the individual morphemes were considered as possible determinants to their order of acquisition. In contrast, Bloom, Lifter and Hafitz (1980) suggested that the semantic organization of the verb system that children learn is equally important in determining their acquisition.

Verb Inflections in Child Language

In a discussion of grammatical morpheme development,

Bloom and Lahey (1978) state, "Perhaps most important is the beginning acquisition of the system of verb inflections and auxiliary verbs that indicate time relations between the happening of an event and the occurrence of the utterance that talks about the event" (pp. 181-182). Bloom, Lifter and Hafitz (1980) investigated the longitudinal emergence of verb inflections (present progressive, -ing; third person singular, -s; regular and irregular past tense) in the spontaneous speech of four normal American English-speaking children. In contrast to the traditional "order of acquisition" results suggested previously, Bloom, Lifter and Hafitz (1980) found that the inflectional forms of the verbal auxiliary emerged in children's speech simultaneously and that these inflections were dependent on the semantic organization of the child's verb system - that is, the inflections were distributed selectively with different populations of verbs. Their results indicated that two major factors governed the emergence of the verb inflections - a) the semantic-syntactic relations in the children's sentences (the different verb categories discussed in a previous section of this paper) and b) the semantics of verb aspect (which will be defined in detail in the next section).

In reference to verb aspect, Bloom, Lifter and Hafitz (1980) specifically found that verbs that described actions which extended over time (durative) and did not have an immediate and clear end result (non-completive or non-goal

-oriented) occurred almost exclusively with the present progressive -ing marker when they emerged (e.g., ride, play). Verbs that described actions which were momentary (non-durative) and had relatively clear end results (completive or goal-oriented) occurred almost exclusively with the past tense morphemes when they emerged (e.g., throw). Verbs that occurred with third person singular -s named events that were durative and completive (continuing after completion). These verbs named actions toward the place to or at which some object logically belonged and were used by the children with a sense of assignment to some place. Thus, three verb sub-categories were distinguished semantically according to verb aspect. A fourth group of verbs consisted of pro-verbs and occurred with the present progressive, the past morpheme, and/or third person singular. These verbs appeared to take the place of more descriptive verbs. This categorization of verbs was based strictly upon the distribution of the verb inflections. Bloom, Lifter and Hafitz (1980) concluded that the children learned to use the inflectional forms of the verbal auxiliary to mark aspect before they learned to mark tense.

Aspect and Tense

Both tense and aspect are two verb sub-systems which are concerned with temporal features of actions. Tense is a deictic relation between the time a speaker talks about an event (speech time) and the time an event occurs (event time). Smith (1980) defined tense as how events are ordered

relative to a reference point such as the speech event. Simultaneity, anteriority, and posteriority are the basic ordering relations. In other words, if an event occurs before it is spoken about, the past tense would be appropriate. Similarly, if an event occurs after it is spoken about, the future tense is used. The present tense is used if the event the speaker is referring to is occurring at the moment of speaking. Thus, the present, past, and future are the main temporal distinctions.

The expression of temporal relations is obligatory in English (Smith, 1980; Miller and Johnson-Laird, 1976). The use of tense markers is the major grammatical device for expressing temporal relations. Time order can also be expressed lexically, for example, with time adverbials such as 'yesterday', 'now' (Miller and Johnson-Laird, 1976). According to Hockett (1958), English verbs are inflected only for a two-way tense contrast, present and past. Future time is expressed by other devices. Lehmann (1972) explained that because of the absence of a future tense inflection in English, some linguists prefer to label the two English tense forms, past and nonpast.

Aspect was defined by Hockett (1958) as the temporal distribution or contour of an action or event. Friedrich (1974) stated that verb aspect is not inherently relational. That is, aspect is concerned with temporal distinctions that categorize an action itself. The speech event which refers to the action is irrelevant to the aspectual feature of the

action. "Thus aspect, unlike tense, is not a deictic category; it is not relative to the time of utterance" (Lyons, 1968, p. 315). Comrie (1976) explained that the difference between "he was reading" and "he read" is not one of tense (since in both cases the past tense was used) but is one of aspect. He stated, "aspects are different ways of viewing the internal temporal constituency of a situation" (Comrie, 1976, p. 3).

The aspectual features of actions are usually labelled according to polar opposites. Aspect includes a wide variety of possible distinctions, for example, perfective/-imperfective (Comrie, 1976), completive/non-completive (Friedrich, 1974), progressive/non-progressive (Smith, 1980), durative/non-durative (Friedrich, 1974), goal-oriented/non-goal oriented (Harner, 1981), habitual/non-habitual (Comrie, 1976), etc. Friedrich (1974) highlighted the durative/non-durative and goal-oriented/non-goal-oriented contrasts as being among the most widely occurring and widely discussed varieties of aspect. These two aspectual distinctions will be addressed in this investigation.

Aspect can be coded in several ways, e.g., inflectional aspect, synthetic aspect and lexical aspect. According to Comrie (1976), aspect may be expressed by means of the inflectional morphology. Bloom, Lifter, and Hafitz (1980) referred to this as <u>inflectional aspect</u>. The children studied by Bloom, Lifter and Hafitz (1980) did not use

inflections to mark aspectual contrasts. Most verb stems occurred with only one variant (one or another morpheme). Aspectual differences can also be linguistically expressed by adverbs, by the sentential relations between verbs and adverbs, by adverbial phrases, or by verbs and prepositional phrases (Friedrich, 1974; Comrie, 1976). Friedrich (1974) referred to this as synthetic aspect. Bloom, Lifter and Hafitz's (1980) subjects had not begun to use synthetic aspect.

In addition to inflectional and synthetic aspect, the events themselves that are named by verbs have inherent aspectual meaning. Friedrich (1974) referred to this as lexical aspect. He pointed out that all languages have some kind of lexical aspect. The lexical aspect of a verb can be described in terms of whether the event named by the verb does or does not involve an end result (referred to as completive/non-completive by Friedrich, 1974; or goal-oriented/non-goal-oriented by Harner, 1981; or atelic/telic by Comrie, 1976) and/or does or does not last over time (durative/non-durative, Friedrich, 1974; or durative/punctual, Comrie, 1976). These distinctions of verb aspect appeared to guide the emergence of the different inflectional forms in the children studied by Bloom, Lifter and Hafitz (1980). Bloom, Lifter, and Hafitz (1980) reported that in the third developmental period (MLU 2.5-3.0, highest linguistic level studied) their subjects were just beginning to use inflections with more different

verbs. "This was no doubt preliminary to contrastive use and the eventual development of synthetic aspect" (Bloom, Lifter and Hafitz, 1980, p. 406).

The linguistic codings of aspect and tense vary from one language to the next. Aspect categories are notable in the Slavic languages (Lehmann, 1972). In Russian, for example, there are different linguistic devices for encoding distinctions of tense and aspect (Lyons, 1968). As an extreme example, Comrie (1976) enumerated several West African languages in which there were no specific markers of past vs. present tense, although there were markers of aspect.

In English, the two verb sub-systems of aspect and tense are partially confounded (Lyons, 1968). Separate linguistic forms are used in English for coding non-completive aspect and past tense. Harner (1981) illustrated the point with the following example: In the verb was going, was indicates the past tense and -ing indicates the continuous aspect. However, the same linguistic form is used to code completive aspect and past tense, e.g. gone. Following the same thought, Bloom, Lifter and Hafitz (1980) explained that the same inflections that code tense in English, also code differences in aspect. They offered the following example: the utterances she swam (in the past) and she is swimming (in the present) code tense but also code differences in aspect, such as the contrast between she swam (for some specific period of time and

finished swimming) and she was swimming (for some indefinite period of time). Adults use aspect and tense morphemes contrastively in these ways with the same verb stem swim (swims, swimming, swam).

Aspect Before Tense?

Divergent findings exist in the literature concerning the kinds of temporal distinctions young children encode when they use past tense.

Bronckart and Sinclair's (1973) findings were consistent with the principle of aspect before tense in language development. They experimentally studied the use of French verb forms by 74 normal children between the ages of 2;11 and 8;7. The subjects were required to describe eleven past actions performed by the experimenter with toys. The actions differed in frequency of the action, duration of the action and type of result. That is, some actions were repetitive, others were not; some actions took longer to perform, others were almost instantaneous; some actions led to a clear result, others did not. It was found that the subjects' choice of verb form was influenced by the type of result which terminated the action. Specifically, the authors found that actions that obtained a clear result were generally described in a past tense, while actions which did not lead to a definite result were mostly described in the present tense. In addition, the duration of the activities with clear results influenced the children's choice of verb forms up until age 6. Specifically, the use of the passé

composé was significantly more frequent in non-durative actions than in durative actions before age 6.

Thus Bronckart and Sinclair (1973) concluded that children used verbal inflections to code aspect before tense. The 7 and 8 year old children in the study used past tense for all types of actions which indicated that by age 6 children learned to use different verb forms to mark deictic tense relations between event time and speech time. In a discussion of their results, Bronckart and Sinclair (1973) argued that children must reach the concrete operational stage of cognitive development (approximately age 6) before they can use linguistic forms to mark tense.

Ginsburg and Opper (1969), in a comprehensive review of Piaget's theory of intellectual development, stated that when children are in the pre-operational stage of cognitive development they are limited to an egocentric view of the world and are unable to "decentre" themselves from their present state. Therefore, they are unable to talk about any time other than the present. Piaget and Inhelder (1969) described the developmental process involved in the attainment of the ability to decenter as "a transition from an initial state in which everything is centered on the child's own body and actions to a 'decentered' state in which his body and actions assume their objective relationships with reference to all other objects and events registered in the universe" (p. 94). According to Piaget and Inhelder (1969), it is not until children acquire the

cognitive abilities associated with decentering that they can talk about times other than the present.

In a study of 70 children's developing ability to decenter temporally, Cromer (1971) found that decentering correlated with verbal mental age (MA). Children did not begin to decenter until after MA 4;11 and it was not until after MA 5;11 that essentially all children decentered. As mentioned previously, Bronckart and Sinclair's (1973) subjects did not code tense until age 6. Smith (1980) refers to the view held by Bronckart and Sinclair as the Strong Decentring Hypothesis. According to Smith (1980), it supports a strong view of the relation between egocentricity or decentring and temporal reference and thus, pre-operational children are not conceptually ready to express deictic relationships. Weist, Wysocka, Witkowska-Stadnik, Buczowska and Konieczna (1984) expressed the opinion that Bronckart and Sinclair (1973) did not intend to make such a strong claim. However, Weist et al. (1984) did not further explain their opinion nor offer an alternative interpretation of Bronckart and Sinclair's (1973) results.

Other researchers have also observed the importance of aspect in the acquisition of verb inflections. In an experimental study of French-speaking children's ability to express temporal order relationships between two events, Ferreiro and Sinclair (1971) also found that verb forms were first used to express aspectual features rather than temporal relationships. An example was cited in which the

children (ages 4-7) were shown a boy-doll pushing a truck (long-duration event) and at some point during this action a cat knocked over a bottle (short duration). In describing this situation, the youngest subjects consistently used a "passé composé" (equivalent to the present perfect) for the short-duration event and the present tense or imparfait (in this case equivalent to the past progressive) for the long-duration one. In other words, the verb tenses were used to indicate the "temporal contour" of each separate action.

It is important to note that temporal and aspectual distinctions are coded differently in French and English. According to DiPaolo and Smith (1978), in French, progressive aspect is indicated by a past tense called the Imparfait. Other tenses, Présent and Passé Composé, do not express aspectual distinctions. The Présent and Passé Composé have only one set of verbal inflections which do not indicate progressive or non-progressive aspect.[1] In contrast, they explained that all English tenses have an obligatory opposition between progressive and non-progressive aspect. Thus, a sentence with a past or present inflection can either have progressive (be +ing) or non-progressive (be +ing does not occur) aspect. DiPaolo and Smith (1978) stated that sentences with progressive aspect are more complex syntactically than sentences with

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[1] In French, aspect can be coded in ways other than with use of verb inflections.

non-progressive aspect, since they have the discontinuous be +ing as well as past or present form.

Stephany (1981) studied the use of aspect and tense at an early stage of language acquisition of Modern Greek, a language in which aspect and tense are obligatorily marked on the main verb. She observed four children (age range 20-22 months; MLU range 1.5-2.0) interacting with their mothers in natural activities such as playing, eating, and dressing during a two week period. She found that the description of situations in early child language was non-deictic, either imperfective or perfective. According to Stephany (1981),"aspect is more fundamental than tense" (p. 48).

In the longitudinal phase of her study of three children's (21-30 months) acquisition of past time reference in Turkish, Aksu (1978) found that the acquisition of the verbal inflections for making temporal reference was first governed by aspectual factors. In other words, the initial use of inflections was governed by event characteristics, occurring redundantly on those verbs which already contained the given aspectual distinction as an inherent part of their meaning.

Sachs (1977) studied the use and comprehension of her daughter's speech about the "there" and "then" between the ages of 17-36 months. Between 17-26 months, Naomi referred almost exclusively to ongoing events. At approximately 22 months, she began to use past tense endings for completed

events only (e.g., I throwded it). Between 27-31 months, Naomi made reference to the past events of the day. Her verbs began to be marked with -ed endings to signal past tense as well as completion. Between 32-36 months Naomi was able to make reference to past experiences and non-present objects with no support from the immediate environmental context. Although Sachs (1977) did not make this conclusion herself, her results showed that aspect influenced the early emergence of her daughter's temporal language in that her earliest uses of the past morpheme signaled the completion of an event versus its pastness.

A study by Antinucci and Miller (1976) supported Bronckart and Sinclair's (1973) and Ferreiro and Sinclair's (1971) results. They claimed that the appearance of past tense forms is by no means haphazard. They examined the spontaneous utterances of Italian and English speaking children from 1;6 to 2;6 years and found that the children used the past tense forms when the verb described an event that resulted in a specific end state. Thus, the children's early tensed utterances expressed aspectual not deictic relations. Weist, Wysocka, Witkowska-Stadnik, Buczowska and Konieczna (1984) stated that Antinucci & Miller's (1976) results supported what Weist et al. (1984) identified as the "Defective Tense Hypothesis". Weist et al. (1984) explained this hypothesis not simply as an aspect priority hypothesis. "This hypothesis states that emerging tense is defective in its normal function since it does not code deictic

relationships" (Weist et al., 1984, p. 348).

The results of Bloom, Lifter and Hafitz's (1980) study also supported the principle of aspect before tense in language development. They reported that the children in their study did not appear to be using the inflectional morphemes as tense markers. Nevertheless, they felt that such learning does not wait until age 6, as claimed by Bronckart and Sinclair (1973) . "Although strongly influenced at the beginning by event-aspect, children are no doubt learning tense relations at the same time; they do not learn tense only after they learn aspect" (Bloom, Lifter and Hafitz, 1980, p. 407).

Weist, Wysocka, Witkowska-Stadnik, Buczowska, and Konieczna (1984) commented on Bloom, Lifter and Hafitz's (1980) study in much the same way as they did on Antinucci and Miller's (1976) work. They stated. "Bloom, Lifter and Hafitz (1980) have argued that both tense and aspect morphology are defective in English at this phase of development, but the argument was based on an equivocal verb classification system and circular argumentation" (Weist et al., 1984, p. 348).

Rispoli and Bloom (in press) responded to Weist's et al. (1984) statement by raising two major points regarding assumptions made by Weist et al. (1984) about child language theory and literature. The first point they made was that Bloom, Lifter and Hafitz did not adopt a Defective Tense (DT) Hypothesis. In fact, in their own article Bloom,

Lifter and Hafitz (1980) stated that children do not learn tense only after they learn aspect, that is, they learn tense relations at the same time as event aspect. Rispoli and Bloom (in press) reported that the DT hypothesis proposed by Weist et al. (1984) has only one logical interpretation, that "a cognitive structure exists but is missing some piece that will enable the structure to perform its full function. Implicit in the notion of defectivity is the preformation of a cognitive structure" (p. 3). Rispoli and Bloom (in press) explained that by including Bloom, Lifter and Hafitz (1980) among those who propose a defectivity argument, Weist et al. (1984) is also ascribing to them a preformationist attitude. Rispoli and Bloom (in press) explained that Bloom, Lifter and Hafitz (1980) did not make any preformationist assumptions. Instead, they attempted to show that aspectual interpretations could be made from the categories evident in child language and that tense categories of adult language were not at issue. Rispoli and Bloom (in press) stated, "Instead of proposing defectivity, Bloom, Lifter and Hafitz (1980) presented a picture of a whole system, which through successive approximations would develop into an adult system" (p. 3).

Second, Rispoli and Bloom (in press) responded to Weist's et al. claim that Bloom, Lifter and Hafitz's (1980) argument was based on an equivocal verb classification and on circular argumentation. Rispoli and Bloom (in press) pointed out that Weist et al. (1984), in a study of the

emergence of tense and aspect in child Polish, accepted a category set which was based entirely on adult judgments of grammaticality - independently derived prior to analysis. (The verb phrases in Weist et al. (1984) were classified according to Vendler-type schemas, 1967). This acceptance of a category set meant that Weist et al. (1984) "avoided the question of whether these categories translated into cognitive categories for the child in any revealing way" (Rispoli and Bloom, in press, p. 4). Thus, Weist et al. explained the origin of linguistic categories by assuming they are preformed. Rispoli and Bloom (in press) stated that the "preformism of Weist et al. (1984) comes from an acceptance of the pronouncements of linguistic investigation" (p. 4). However, Rispoli and Bloom (in press) highlighted the fact that in the linguistic literature, (e.g., Comrie, 1976) there is no linguistic theory concerning a universal vocabulary of tense and aspect. The linguist makes speculations about categories but "a universal basis for the semantic analysis of predicates is not provided...Thus, morphological distinctions, however distinct in the adult mind may not directly reflect cognitive categories for the child" (p. 5).

Rispoli and Bloom (in press) summarized by stating that Weist et al. (1984) have "attempted to adopt linguistic theory as psychological theory" (p. 6) when there is no real linguistic theory to begin with. Rispoli and Bloom (in press) concluded that only one real alternative remained -

to characterize child language data in terms of the categories derived from the child's behavior, as Bloom, Lifter and Hafitz (1980) did.

The studies of Bloom, Lifter and Hafitz (1980), Bronckart and Sinclair (1973), Antinucci and Miller (1976), Ferreiro and Sinclair (1971), Stephany (1981), Aksu (1978), and Sachs (1977) all found evidence to support the principle of aspect before tense in the early use of verbal inflections. They all reported that verb aspect played a major role in the early emergence of verb inflections. Woisetschlaeger's (1976) analysis of verbs in the adult model was consistent with the principle Aspect before Tense as well. "Our analysis of English, will place Aspect before Tense...the aspectual suffix is closer to the stem than the tense suffix" (Woisetschlaeger, 1976, p. 13).

Despite the evidence presented in the aforementioned studies, an alternative view has been presented by DiPaolo and Smith (1978), Smith (1980), Kuczaj (1977), Harner (1981), Nelson (1983), Weist (1983) and Weist, Wysocka, Witkowska- Stadnik, Buczowska, and Konieczna (1984).

DiPaolo and Smith (1978) elicited descriptions of events from 28 children, ages 4;7-6;6 in an experiment that was similar to Bronckart and Sinclair's (1973). The children were divided into three groups on the basis of age. The stimuli consisted of eight actions - four with definite endpoints and four without definite endpoints. Each action took approximately the same amount of time to perform.

Before the main task, the children were required to perform actions with the toys according to the descriptions of the experimenter. Subsequently, the children were asked to describe the actions that the experimenter performed. The results of this study were markedly different from those of the French-speaking children in Bronckart and Sinclair's (1973) study. DiPaolo and Smith (1978) found that most of the English-speaking children in their study used past inflections in their responses to both goal-oriented and non-goal-oriented past actions. In fewer than 7% of the total responses was the present tense used. In addition, there was a tendency to code aspectual differences. That is, no-endpoint actions elicited progressive forms for all groups, especially for the older children.

Kuczaj (1977) analyzed the spontaneous speech samples of 15 children (14 cross-sectionally, 1 longitudinally) ages 2;6-5;6 years for appropriate use and inappropriate use and nonuse of the past tense verbal inflection. In reporting his results, Kuczaj (1977) noted that unlike Antinucci and Miller's (1976) findings, the children in his study used past tense forms to refer to past events which did and did not result in a new present end-state.

Smith (1980) reviewed summaries of transcripts of the spontaneous speech of 17 English-speaking children. The data for two of the subjects were originally collected by Roger Brown and his colleagues. Stanley Kuczaj (1977) originally collected data on 15 of the subjects. All of the

verbs with past-tense inflections were analyzed and results revealed that all of the children used past tense inflections to report imperfective events and perfective events. Smith (1980) concluded that the children were able to express notions of temporal ordering as well as aspectual notions.

In an experimental study, Harner (1981) elicited descriptions of eight past actions and eight future actions from 100 children from 3;0-7;11 years. Half the actions were non-goal-oriented and continuous with no new end states and half were goal-oriented and completed with new resultant end states. Results showed that the past and future verb forms were used appropriately with both goal-oriented and non-goal-oriented actions. However, Harner (1981) pointed out that the children used the present progressive forms more often with the non-goal-oriented continuous past actions which indicated their attention to the aspect of the actions. Further, the past tense forms were used more often with the goal-oriented completive past actions. Thus, the children responded to both event aspect and ordered temporal relations in their descriptions of past actions.

Nelson's (1983) findings were in support of DiPaolo & Smith's (1978), Kuczaj's (1977), Harner's (1981) and Smith's (1980) work. Nelson (1983) highlighted that most of the studies on tense and aspect have been based on interactive speech and the pastness that was referred to was the past within the present situation (proximal past). She,

therefore, observed how reference to the distal past was encoded in child speech. Recordings of one child's (Emily, 22½-23½ months old) references to past events in both a) monologues during crib-talk and b) interactive speech were analyzed. One hundred forty nine references to the past were identified during the one month of data collection. A little over half of these references were inflected with irregular or -ed forms, mostly with irregular. Emily's past references occurred overwhelmingly in the crib-talk monologues rather than in the interactive dialogues.

Nelson (1983) further analyzed her data to determine whether Emily's past inflections were conditioned on aspect. She found that past forms were used with internal and external state verbs but overwhelmingly with internal states. The activity verbs were used in all possible forms (present, past, progressive). Completive verbs were used in the past and present forms but more frequently in the past. Nelson (1983) concluded that there was some evidence (e.g., use of present forms for activity verbs) to show that Emily was aware of the aspectual distinction but not that she focused on aspectual distinctions, such as completion, in her use of past tense forms. Emily was sensitive to both temporal contour and pastness. Nelson (1983) offered a possible alternative to the aspect before tense hypothesis. She suggested that maybe the child views ongoing situations as in the present and uses past tense inflections for the distal past.

Weist (1983) evaluated the Polish child's capacity to comprehend aspect and tense distinctions realized by either prefixation or suffixation. Ten children (age 2;6) and 10 children (age 3;6) were given a picture-sentence matching test. Results showed that children understood a wide range of aspect and tense distinctions.

Polish children's capacity to represent temporally deictic relationships was examined in both longitudinal and cross-sectional designs by Weist, Wysocka, Witkowska-Stadnik, Buczowska and Konieczna (1984). Three children between (1;7-1;9 years) and three children between (2;0-2;2 years) were observed in naturalistic caretaker-child interactions in the longitudinal component. Nine 2;6 and nine 3;6 year old children were used as subjects for the cross-sectional component, in which elicitation procedures were used to obtain past and future references to atelic (activity) and telic (requires a terminal point) situations. Results revealed 1) imperfective activity verb phrases in the past tense in all children starting from an early phase of tensed communication 2) telic verb phrases in the past tense used independently of resulting states 3) contrasting imperfective and perfective forms of the same verb 4) moderately remote past references and 5) deictic future references.

Weist et al. (1984) attributed the Defective Tense Hypothesis to Antinucci and Miller (1976) and Bloom, Lifter and Hafitz (1980), as reported earlier. In contrast, Weist

et al. (1984) provided evidence that tense is not defective in child Polish. The children's early tensed utterances expressed a deictic relationship. Weist et al. (1984) concluded by stating that aspectual distinctions between imperfective and perfective aspect and the deictic relationship between present and past tense evolve simultaneously in child Polish.

Tense and aspect are coded differently in Polish and English. According to Weist et al. (1984), in Polish, aspectual and deictic relationships are coded in the morphology in a relatively transparent manner. "The distinction between imperfective and perfective appears to be primitive in child Polish and children can readily process the relevant affixes" (Weist et al., 1984, p. 369). Rispoli and Bloom (in press) stated that English is a language poor in overt aspect marking. In addition, the past tense is found later in children who are learning English vs. children learning Polish (Weist et al., 1984).

In sum, DiPaolo and Smith (1978), Smith (1980), Kuczaj (1977), Harner (1981), Nelson (1983), Weist (1983) and Weist et al. (1984) found that children had an understanding of past verb tense and were able to mark it in their utterances.

The Learning of Verb Inflections: Rule Governed or Lexical

Another issue of importance which remains unresolved in the 'verb inflection' literature concerns the way in which

the verb inflections are learned (rule governed vs. lexical). The more traditional studies (e.g., Berko, 1958) concluded that the learning of verb inflections was clearly rule governed. In contrast, Bloom, Miller and Hood (1975) provided data which indicated that lexical learning is involved in the early use of inflections. They studied the same four children as Bloom, Lifter and Hafitz (1980) and found that the addition of verb inflections did not constrain utterance length. That is, verb inflections occurred as often with two as with three-constituent relations. "Thus it appeared that there was no cognitive cost in the use of inflections; what the children knew about lexical items apparently included which inflectional forms could also occur with a particular lexical item" (Bloom, Lifter and Hafitz, 1980, p. 409).

Bloom, Lifter, and Hafitz (1980) provided some indirect evidence which indicated that the learning of the verb inflections may reflect lexical (word-by-word) as well as grammatical learning (rule-governed).

Limitations of Reported Literature

A variety of studies on the development of verb inflections in children's language have been discussed above. Limitations exist within individual studies and need to be addressed. In addition, methodological and theoretical issues regarding this body of literature need to be reviewed.

First of all, Bloom, Lifter and Hafitz's (1980) study

was the only one which related verb inflectional use to both 1) the semantic-syntactic relations within the sentence and 2) the semantics of verb aspect. In the more traditional studies of Berko (1958), Brown (1973), Cazden (1968), deVilliers and deVilliers (1973) and Johnston and Schery (1976) the issue of aspect was not even addressed. Bloom, Lifter and Hafitz (1980) pointed out that many of the children's error responses in Berko's (1958) study may have been influenced by aspectual features that were not considered in an analysis of her results. Specifically, Berko (1958) used phrases like "he only did it once" or "he does it every day" in order to elicit responses from the children. These elicitation phrases are all examples of synthetic aspect and probably influenced the children's responses, e.g., choice of tense (Bloom et al., 1980). In addition, the pictures used as stimuli in the experiment depicted actions with different aspectual contours which may have influenced their responses as well. Thus, the task used by Berko (1958) was not independent of synthetic aspect or aspect inherent in the pictured action event (Bloom, Lifter and Hafitz, 1980) - yet these features were not taken into account in analyzing the results.

Second, different types of data have been collected by researchers in this area thereby making cross-study comparisons difficult. Brown's (1973), deVilliers and deVilliers's (1973), Bloom, Lifter and Hafitz's (1980), Nelson's (1983), Sachs's (1977), Stephany's (1981) and

Antinucci and Miller's (1976) studies were observational and spontaneous speech samples were used as data bases. Smith (1980) reviewed spontaneous data that were collected by other researchers which varied in quantity per language sample and context in which language was recorded. In contrast, Bronckart and Sinclair (1973), Harner (1981), Berko (1958), Ferreiro and Sinclair (1971), DiPaolo and Smith (1978), and Weist (1983) used experimental procedures.

There are both advantages and limitations to each of these methods of data collection. One advantage of using a spontaneous language sample is that it is more natural than any kind of elicited production task. Prutting, Gallagher and Mulac (1975) compared analyses of spontaneous speech with the results produced on the expressive portion of the Northwestern Syntax Screening Test among a group of four and five year old language delayed children. They found that 30% of the structures that were failed on the test were produced in spontaneous speech. They concluded that the testing situation required many psychological operations not present when collecting spontaneous speech samples. A major disadvantage of spontaneous language samples concerns the extent to which they are representative of the child's language. For example, the absence of an item from a language sample does not necessarily mean that the child cannot or does not produce it. It may simply have not been obligatory in that particular situation.

One advantage of using an elicited production task is

that one can focus in on a specific language behavior (one that may not have been observed in the language sample) and see how the child performs given obligatory conditions. Yet, the use of elicited tasks brings with it inherent limitations. There is still a question about whether children's performances on formal elicited tasks reflects their actual knowledge of language. As mentioned above, the vast majority of the studies on verbal inflections and tense/aspect development have essentially been either observational or task oriented. The two methods of data collection were used in a mutually exclusive manner. Weist et al. (1984) did collect observational and experimental data on Polish children, however, different children were used for the different research conditions.

Along the same lines, the researchers in this area have studied children at various points in development. Brown (1973), Cazden (1968), and deVilliers and deVilliers (1973) described acquisition of inflections. Berko (1958) studied even older children's abilities to generalize inflections to novel situations. In contrast, Bloom, Lifter and Hafitz (1980), Stephany (1981) and Nelson (1983), Kuczaj (1977) and Antinucci and Miller (1976) focused on the early emergence of inflections in child language. Bloom Lifter and Hafitz (1980) studied the relationship of the emergence of the verb inflections and the semantic organization of the verbs used in early sentences by observing children's language longitudinally. However, to date, there are no comparable

cross-sectional studies on the emergence of these morphemes.

In addition, most of the research (e.g., Harner, 1981; Smith, 1980; Weist et al., 1984; Nelson, 1983; and Sachs, 1977) on the influence of verb aspect on verb inflectional development reported the ages at which the subjects acquired use of verb inflections rather than MLU levels, despite evidence that MLU level is a more accurate measure of general linguistic ability at least up to an MLU of 3.0 (Brown, 1973). deVilliers and deVilliers (1973) found that MLU is a better predictor of the acquisition of grammatical morphemes than is chronological age. Bloom Lifter and Hafitz (1980) and Stephany (1981) were among the few researchers who reported MLU levels.

Nelson's (1983) and Sachs's (1977) studies were limited in that they involved single subject designs and focused solely on children's references to the distal past.

Third, a controversy exists concerning the kinds of temporal distinctions children encode when they use past tense (Aspect before Tense?) as discussed previously. In addition, much of the research related to aspect and tense development has focused on languages other than English. For example, Aksu (1978) studied Turkish, Stephany (1981) studied Modern Greek, Weist et al. (1984) studied Polish and Bronckart and Sinclair (1973) and Ferreiro and Sinclair (1971) studied French. Since tense and aspect are not coded in the same ways in these languages it is difficult to make valid cross-linguistic comparisons.

Bronckart and Sinclair's (1973) results suggested that the French-speaking children below age six understood aspectual but not temporal notions. However, since French and English differ in how tense and aspect are expressed, their results must be interpreted cautiously. Smith (1980) explained that in English tense and aspectual distinctions are obligatory consistently. "In the adult language, a verb must indicate tense and aspect; the possibilities for aspect are the same for all tenses" (Smith, 1980, p. 274). Contrastively, in French, tense is obligatory but aspect is not. Most French tenses do not indicate aspect (only one tense does indicate aspect). Thus, the English language is more systematic and less complex regarding aspect than the French language. Due to the differences in the verb systems between French and English, one cannot justifiably generalize Bronckart and Sinclair's (1973) findings to English-speaking children.

Regarding their methodology, Bronckart and Sinclair's (1973) subjects were required to describe several different types of actions and only two responses for each type of action were elicited from the subjects. Harner (1981) increased the reliability of measurement somewhat by having four responses from each child for each problem type. However, she only used stimuli that represented the aspectual distinction of completive or goal-oriented vs. non-completive or non-goal-oriented. Thus, she did not collect any data on the durative/non-durative distinction.

In addition, her youngest subjects were 3;0 and so she could not answer the question of which distinction children make first - tense or aspect - because by the time children were 3 years old, they used the past tense for both goal-oriented and non-goal-oriented past actions.

Fourth, the issue of whether the learning of verbal inflections is rule governed or lexical remains unresolved.

In sum, a number of limitations have been highlighted. To date, there is no cross-sectional data that substantiates Bloom, Lifter and Hafitz's (1980) hypothesis that verb inflections in English a) are dependent upon the semantic organization of verbs (semantic-syntactic verb categories and verb aspect) b) emerge simultaneously.

It is difficult to make generalizations or cross-study comparisons within this body of literature because the research designs and methods of data collection point in different directions. Specifically, different types of data were collected (i.e., spontaneous, observational language vs. experimental, elicited responses), different research designs were employed (i.e., cross-sectional vs. longitudinal), different age groups were studied, different points in development were emphasized (i.e., early emergence vs. acquisition) and different languages were researched.

Regarding tense and aspect studies, the earlier more traditional research did not address the issue of aspect in analyzing their results. In addition, a controversy exists

regarding the kinds of temporal distinctions children encode when they use past tense. In terms of the methods used, the number of responses that were elicited per action type in the experimental studies on tense/aspect was small. Additionally, very little data were collected on the durative/non-durative aspectual distinction for English-speaking children.

Finally, additional evidence needs to be collected in order to elucidate the issue of how verb inflections are learned (rule governed vs. lexical).

Problem to be Examined and Major Research Questions

The purpose of the present investigation is to examine the relationship between the development of the verb inflections (present progressive -ing; regular past tense, -t, -d, -ed; irregular past and third person singular) and the semantic organization of the verbs used in early sentences. More specifically, the relationship between the verb inflections and a) the semantic-syntactic relations of the sentence and b) the semantics of verb aspect will be explored (Bloom, Lifter, Hafitz, 1980).

The present study will address the issues and problems stated previously in the following ways:

First, the present study will provide cross-sectional data on the development and use of the verbal inflections in early child speech. Bloom, Lifter and Hafitz (1980) originally addressed this issue by longitudinally observing

the first emergence of the verb inflections of four children. deVilliers and deVilliers (1973) suggested that cross-sectional data can be an efficient method for validating results of longitudinal analyses.

Second, the present study will extend beyond Bloom, Lifter and Hafitz's (1980) study in that a) it will follow the development of these morphemes beyond the point of emergence and b) a larger sample size will be used.

Third, the data base used in this study will include both spontaneous language samples and elicited responses to a production task. Both methods will be used in a complementary way with the same group of children.

Fourth, this study will take aspectual features into account and will provide data which may elucidate the controversial issue of tense and aspect use. The task utilized to gather data on this issue will require the children to respond to different types of actions - goal-oriented and non-goal-oriented, and durative and non-durative. In addition, there will be an increase in the number of responses per action type as compared to previous studies.

Fifth, the present investigation will study children's verb inflectional development beyond emergence. In addition MLU levels will be considered as the basis for measuring linguistic level rather than the chronological age of subjects as reported in most studies.

Sixth, analyses of the data will be performed in an

attempt to clarify the unresolved issue of how verb inflections are learned (rule governed vs. lexical).

The major questions that the study is designed to answer are:

1. Is there a developmental change in the frequency of occurrence of contexts for the verb inflections or in the use of these inflections as a function of MLU?

2. What kind of, if any, relationship exists between the occurrence of the verb inflections and the semantic-syntactic categories (i.e., action, state, locative action) of the children's sentences at each linguistic level studied?

3. How are the verb inflections used (use is defined as the occurrence of an inflection given an obligatory context for that inflection) at each linguistic level studied? To be more specific,

   (a) Do the verb inflections emerge simultaneously or sequentially and are they used simultaneously in subsequent linguistic levels?

   (b) How do the individual children use the individual verb inflections at each linguistic level?

   (c) How are the individual inflections used for each of the verb categories at each linguistic level? Do the verb inflections apply to all of a child's verbs or are the verb inflections distributed selectively in different populations of verbs?

4. (a) What is the rank order of the relative use of the verbal inflections for each linguistic level?

   (b) How does the rank order of the relative use of the verbal inflections in this study compare to Brown's (1973) order of acquisition and Bloom, Lifter and Hafitz's (1980) order of emergence?

5. What is the role of the semantics of verb aspect in the development of verb inflections for action and locative action verbs, pro-verbs and state

verbs, and how do these results compare to Bloom, Lifter and Hafitz's (1980) findings?

6. How do children talk about the time and aspect of actions (task context)? To be more specific,

   (a) Do children demonstrate the linguistic ability to code past events at each linguistic level studied?

   (b) Do the children linguistically code different aspectual features (goal-oriented vs. non-goal-oriented, durative vs. non-durative) of action events?

   (c) Do children linguistically code the aspect of events before they code the temporal order of events in relation to the present tense, and if so, when do children begin to use verbal inflections as tense markers?

7. Is there any evidence from the data collected to support the hypothesis that the learning of verbal inflections is rule governed vs. lexical?

   The following questions will be examined:

   (a) Do the children regularize irregular past tense forms, (e.g., comed)?

   (b) Do the inflectional forms emerge together in the children's speech?

   (c) Is there a constraint on children learning synonymous forms (ed/irregular) at the same time?

   (d) Do the different verb inflections occur with the same verb or do the verbs occur with only one variant, (e.g., dance/dancing)?

8. What, if any, differences exist between the results collected from the spontaneous language sampling data and the elicited production data?

METHOD

Subjects

All 18 subjects in this investigation were middle-class monolingual English-speaking children. The subjects were first born children of college educated native American English-speaking parents living in New York. The children's motor and mental development were reported by the mother to be within normal limits. There was no suspicion of hearing loss. The children's earlier language development was unremarkable and their speech at the time of data collection had to be clearly understood by the experimenter.

Prior to the collection of any data, the experimental design was organized in the following way: Six different linguistic levels based on MLU were included. There were 3 children per level; 18 subjects in total. The MLU range investigated coincided with Brown's (1973) Stages (Late Stage I to Late Stage V[1]), as presented in Table 1.

The experimenter collected and transcribed language samples on 24 children. Each child's MLU was calculated according to Brown's (1973) guidelines. Out of these 24 children, the first 18 who filled the six MLU levels (three

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[1]The linguistic levels will hereafter be referred to without the prefix 'Late.'

per stage) were used as subjects. A complete subject description including each subject's MLU, age, stage according to Brown (1973), and number of uterrances used is presented in Table 2. The mean MLU, age and number of utterances used at each linguistic level is presented in Table 3.

Bloom, Lifter and Hafitz (1980) found that the first emergence of verb inflections in children's speech occurred when their MLUs (mean length of utterance) were between 1.5 and 2.0. deVilliers and deVilliers (1973) investigated the acquisition of grammatical morphemes (including the verbal inflections) and 4.67 was the highest MLU studied. In this study, the children's MLUs ranged from 1.94 (Stage I: MLU 1.50-1.99) to 4.30 (Stage V: MLU 4.00-4.49) and their ages ranged from 23 to 36 months. All of the subjects' MLUs were age-appropriate according to Miller and Chapman (1979) (cited in Miller, 1981). In fact, 9 of the 18 subjects performed better (reached higher MLU levels at younger ages) than Miller and Chapman's (1979) (cited in Miller, 1981) predicted values.

Materials and Design

The materials used in the collection of the naturalistic language samples included a group of toys and books which are listed in Appendix A. These toys were chosen because they could be manipulated by children in a variety of ways. Lois Bloom (1970) used these toys (in addition to others) and found that they stimulated

considerable activity, both constructive and destructive. She stated that the toys proved to be attractive to all the children at least some of the time. Each observation was recorded using a PANASONIC RQ-2108A cassette tape recorder.

The materials used in the elicited production task included 16 different objects. The object names of 13 of the toys were among the most commonly acquired words in the early vocabularies (first 50 words) of subjects reported by Nelson (1973). Three of the object names (see-saw, carriage and slide) were included in Bloom, Lightbown and Hood's (1975) transcriptions of the spontaneous language of four children with MLUs from 1.0-2.5. The experimenter performed either of two types of actions with the toys - goal-oriented or non-goal-oriented. All the actions chosen for use in the present investigation were previously categorized as goal-oriented or non-goal-oriented in one or a number of the following studies by Bloom (1978), Harner (1981), DiPaolo and Smith (1978), Smith (1980), and Bronckart and Sinclair (1973). Nine out of the 10 verbs which named these actions were included in the transcriptions of four children's spontaneous language transcribed by Bloom, Lightbown and Hood (1975) and Bloom, Lifter and Hafitz (1980). The remaining verb (swim) was included in the transcriptions of children's (ages 1;6-2;6) spontaneous speech studied by Antinucci and Miller (1976). See Tables 4 and 5 for the eight goal-oriented and eight non-goal-oriented actions performed. Half of the verbs of each type of action were

regular verbs and half were irregular. Each action that was performed had a durative and non-durative counterpart. Durative actions lasted more than three seconds and non-durative actions lasted less than three seconds.[1] Therefore each action listed in Tables 4 and 5 was performed twice - once in which the action lasted less than three seconds and once in which the action lasted more than three seconds. Thus a total of 32 actions were presented. In addition, two actions (listed as examples in Tables 4 and 5) were presented to the child to introduce the task but were not counted in the data.

The following restrictions were placed on the order in which these actions were presented:

1. The verbs which were performed as both goal-oriented (durative and non-durative) and non-goal-oriented (durative and non-durative) actions were separated by at least seven intervening action stimuli.

2. The durative and non-durative counterpart of each action was separated by at least 10 intervening action stimuli.

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[1]Bronckart and Sinclair (1973) used three seconds as the division between durative and non-durative events. They state "Fraisse (1948) has demonstrated that actions lasting less than three seconds are apprehended in a very different manner from those lasting more than three seconds; the first produce a relatively simultaneous perception of duration, the latter lead to a quantitative or qualitative estimation of duration. Accordingly, events that last less than three seconds were called non-durative, those that last longer than three seconds were called durative."

3. Goal-oriented and non-goal-oriented actions were presented alternately. Wherever possible, durative and non-durative stimuli were alternated.
Other than these restrictions, the actions were randomly distributed in the order. The same order of presentation was followed for each subject (see Appendix B).

Procedures

Prior to the collection of any data, each parent was required to read and sign a consent slip which gave permission for their child to participate in this study and also verified their child's date of birth (see Appendix C). Each child was visited twice within a one-week period. During the first visit, a spontaneous language sample was collected. During the second visit, a structured task was presented to gather production data on the child's descriptions of past actions. After both visits, a thank-you note was sent to the parents of the participating child (see Appendix D).

Language Sample

Each child was visited individually in his/her home. The naturalistic language samples for each child consisted of the verbal output of the child interacting with the experimenter in a natural play situation for 90 minutes. The total number of utterances varied from child to child; however, all the children met the criteria of using a minimum of 75 relational utterances. A relational utterance was defined as one in which the words used were

syntactically related.[1] The experimenter brought an array of toys and books which are listed in Appendix A. The experimenter acquainted herself with the child for a minimum of fifteen minutes before taping his/her language. Each observation was recorded using a Panasonic RQ-2108A cassette tape recorder. In addition to tape recording each session, hand written notes were taken on the child's language and on the specific linguistic and non-linguistic context. Each child received two prizes at the end of the session (see Appendix E).

Structured Task

Each child sat opposite the experimenter and was asked to identify the toys chosen for the task. The experimenter named the toy for each child if he/she did not recognize it. The toys were then placed into a box next to the experimenter. The experimenter spoke only in the present tense. The following instructions were given to each child: "Each toy has something to do. Watch it, and after it is over tell me about it." The experimenter then made the toy perform the action. When the action was completed the experimenter said, "Tell me about it." If the child did not respond, the experimenter asked again. If the child's response was descriptive of the toy, a prompt was given by the experimenter to encourage a description of the action.

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[1]Utterances with the present tense form of 'the copula' were excluded, as in Bloom, Lifter and Hafitz (1980).

The prompts included a) tell me more and b) tell me about _____ and _____ (two of the items were labelled, e.g., boy and car, Harner, 1981). The utterances used as prompts did not contain inflected verbs. If the child began to respond before the action was completed, the experimenter instructed the child to wait and watch. When the action was completed, the experimenter said "Now, tell me about it." The dialogue was tape recorded using a Panasonic RQ-2108A cassette recorder and later transcribed by the experimenter. In addition, hand written notes were made at the time of the recording in order to aid in the accuracy of the transcription. Each child received a sticker for every response given (correct or incorrect). After all 32 actions were presented, each child received two prizes (see Appendix E).

Data Analyses

For the analyses performed, grouped and/or individual data were used as a base depending on the particular analysis.

Language Sample

The tapes of the naturalistic language samples were transcribed by the experimenter within two weeks following a home visit. The basic procedure used for transcribing the audio-tapes was adapted from Bloom, Lightbown and Hood's (1975) conventions which appear in Bloom and Lahey (1978) pages 600-604 (see Appendix F). Their guidelines for punctuation, abbreviations and labeling were not strictly followed. All of the children's utterances were transcribed

and situational context was always provided for the children's relational utterances. For the majority of children, situational context was provided for all utterances.

In order to insure that the transcription of the language samples was accurate, reliability was obtained by having another individual independently transcribe 10% (randomly selected) of each subject's relational utterances. The transcription of these samples was then compared to those of the experimenter. Only differences that would have influenced coding were scored as same or different. The obtained value was 92% (# of same transcriptions/# of same and different transcriptions).

The total number of utterances and the number of relational utterances used by each child was calculated. As previously stated, each child's MLU was calculated according to Brown's (1973) guidelines (see Appendix G for rules for calculating MLU.)

The verb inflections under investigation in this study and examples of each are listed in Table 6. Each utterance with a verb that required a verb inflection (whether the verb inflection was used or not) was listed on the coding sheet provided in Appendix H.[1] The situational context for that utterance was also recorded. The following information

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[1]Utterances without verbs were discarded from the analysis even though the context required a verb plus an inflection. They comprised <.002 of the data.

was coded for each of these utterances and/or the specific verb used in that utterance:

1. Type of Context - This information is what led the experimenter to conclude that a verb inflection was required. See Appendix I for an explanation of the different types of contexts.

2. Specific Verb Inflection - Which verb inflection (-ing, -s, -ed or irregular) was required and was it obligatory or optional? Optional contexts were discarded from analysis (see Appendix I).

3. Use of Obligatory Verb Inflection - Was the verb inflection used, and, if so, was it used correctly?[1]

4. Type of Past Tense Used - When a past tense inflection was used (-ed, or irregular) was it a simple or progressive past?

5. Error Type - The type of error made was noted, when the obligatory verb inflection was not used.

6. Verb Category - Each utterance was categorized according to type of verb used, Action, State (internal or public), or Locative Action (patient-locative action, mover-locative action or agent-locative action). See

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[1]All inflected forms were included in the analysis. Bloom, Lifter and Hafitz (1980) followed a more strict criterion in that only verbs that appeared in a child's speech in both uninflected and inflected forms were included in their analysis. However, Bloom, Lifter and Hafitz (1980) reported that <.03 of the children's verbs occurred only in inflected form. Thus, this criterion was eliminated in the present investigation.

Appendix J for definitions and examples.

The coding of utterances was done for all subjects at each developmental stage. Two of the categorizations made by the experimenter were checked for inter-coder agreement: (a) The coding of the verbs into the action, state, or locative action verb categories and (b) The coding of the verbs according to the specific verb inflection required. Ten percent of each subject's data (randomly selected) was independently coded by a trained individual for each of these categorizations. The independent coder was a full-time faculty member of New York University. Two training sessions were utilized. Percentage of agreement was 96% for assignment of the verbs according to the verb inflection required and percentage of agreement was 89% for assignment of the verbs into the verb categories of action, state or locative action.

The two levels of analysis used in the present investigation were identical to those used by Bloom, Lifter and Hafitz (1980). The first level of analysis was structural and was based upon the semantic-syntactic relations in the children's utterances. (The second level of analysis was lexical and will be discussed in a subsequent section.) Following Bloom, Lifter and Hafitz (1980), (a) the frequency of the occurrence of contexts in which inflections should have occurred and (b) the general use of the inflections, (defined as the occurrence of the inflection given an obligatory context for that inflection)

was calculated for each linguistic level. An examination of the data was performed to determine whether there was a developmental change in contexts for inflections and in use of inflections.

Relationship Between Occurrence of Inflections and Sentence Structure

Utterances with verb inflections were then divided into the different categories of verbs (action, state, and locative action). In addition, relational utterances were divided into the different verb categories. Subsequently, the distribution of utterances with verb inflections into the different verb categories was compared to the distribution of relational utterances into the verb categories for each subject. An analysis testing the null hypothesis of independence between the relative distribution of inflections and of utterances across verb categories was performed.

Inflectional Use

The average use of the individual inflections at each linguistic level was examined. In addition, a more detailed examination of inflectional use was conducted in which (a) the individual use of the inflections by each child at each linguistic level (Stages I-V) was reported, and (b) the average use of the individual inflections with each of the verb categories (action, state, patient-locative action, mover-locative action and agent-locative action) at each linguistic level was calculated.

These analyses were performed in order to ascertain how inflectional use changed across linguistic levels and whether the different verb inflections emerged together.

Rank Order of Use

The rank order of the relative use of the verbal inflections for each linguistic level was determined. For each child, each inflection was assigned a rank order according to its magnitude of use. If the difference in use between inflections for any child was less than or equal to .03, the ranks were split.

The rank order of the relative use of the different verb inflections found in Stage I, Stage II and Stage III was then compared to Bloom, Lifter & Hafitz's (1980) data which reported the rank orderings of the inflections for the same three linguistic levels. Bloom, Lifter & Hafitz (1980) studied the emergence of the verbal inflections and also compared their results with the acquisition sequence reported by Cazden (1968), Brown (1973) and deVilliers and deVilliers (1973).

The rank ordering of the verbal inflections found in this study was compared to the average ranking of the 21 children cross-sectionally studied by deVilliers and deVilliers (1973). The following procedure (utilized by deVilliers and deVilliers 1973 - method two) was used for ordering the inflections in this study so that comparisons could be made with deVilliers and deVilliers' (1973) and Brown's (1973) data. The percentages for each morpheme were

summed across all the children (across the different MLU levels), averaged, and subsequently these mean percentages were ranked. Thus each inflection was given a rank according to its magnitude of use. Ranks were split if the difference in use between inflections was less than or equal to .03.

The second level of analysis was lexical and was based upon the inherent aspectual meanings of the verbs themselves.

Inflectional Use and Verb Aspect

Each verb used by the subjects at each linguistic level was listed and categorized according to semantic-syntactic category (action, state, locative action = patient-locative action, mover-locative action and agent-locative action) and type of inflection used. Again, borrowing directly from Bloom, Lifter and Hafitz' (1980) study, the co-occurrence of this study was compared to the average ranking of the (a) inflections and verb aspect was described for (a) action and locative action verbs and (b) state verbs.

Action verbs. (including Locative Action)

Bloom, Lifter and Hafitz (1980) concluded that "the co-occurrence of inflections and lexical aspect resulted in a semantic typology with three verb types. The three verb types coincided with three of the four intersections formed in a matrix (see Appendix K) of the two semantic oppositions that are basic to analyses of verb aspect: durative/non-durative and completive/non-completive" (Bloom,

Lifter and Hafitz, 1980, p. 398).[1] They found that the "semantic distribution of the majority of the children's action verbs according to these aspectual oppositions was co-extensive with the selective use of one or another of the verb inflections" (Bloom, Lifter and Hafitz, 1980, p. 399).

Following Bloom, Lifter and Hafitz (1980), a distribution of the subjects' action verbs according to the aspectual oppositions durative/non-durative and completive/non-completive (or goal-oriented/non-goal-oriented) was compiled. As in Bloom, Lifter and Hafitz (1980), this typology of action verbs was based solely upon the distribution of the verb inflections - the completive/-durative verbs were those that occurred with -s; the non-completive/durative verbs were those that occurred with -ing, and the completive/non-durative verbs were those that occurred with irregular/-ed. This distribution of the action verbs, which was presented in a matrix, was then compared to Bloom, Lifter and Hafitz's (1980) data.

Bloom, Lifter and Hafitz (1980) found a group of action verbs that frequently occurred with more than one inflection and that seemed to function as general, all purpose verbs. These "pro-verbs" (go, do, make and get) seemed to stand in for more descriptive verbs in that they named events with different aspectual contours. Following Bloom, Lifter and

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[1]Completive/non-completive is equivalent to goal-oriented/non-goal-oriented which were the terms used in the present investigation.

Hafitz (1980), the proportion of each of the inflections that occurred with the pro-verbs in each linguistic level was calculated. These results were subsequently compared to Bloom, Lifter and Hafitz's (1980) findings.

State verbs.

The use of different inflections with state verbs was examined. Bloom, Lifter and Hafitz (1980) found two types of state verbs:

1. Verbs that named "internal" or "private" states that were not perceptible or capable of being shared, e.g., want, like, need, think and feel, and

2. Verbs that were "public" and capable of being "shared" by others and that named the end states that resulted from actions. These verbs also appeared as action verbs elsewhere in the data, e.g., go, sit, sleep, fit, find and break.

A listing of the distribution of state verbs with inflections in each linguistic level was compiled and their use was calculated. A comparison between Bloom, Lifter and Hafitz's (1980) findings and results from the present investigation was made.

Post-Hoc Analyses

The occurrence of contexts for inflected do-support and matrix forms in each of the linguistic levels led the experimenter to perform the following post-hoc analyses.

Do-support.

A post-hoc analysis was performed on the utterances in

which do-support plus an inflection (irregular or -s) were required.

For example,

	Context	Utterance
1.	S. threw doll out of dollhouse	Child: "What you throw out of the house "
		- DID is obligatory
2.	Ch. trying to fit a puzzle piece in puzzle	Child: "Where this go "
		- DOES is obligatory

The proportional frequency of obligatory contexts for inflected do-support and the use of inflected do-support was calculated for each linguistic level. Use was defined as the occurrence of an inflected do-support given an obligatory context for it.

The utterances in which inflected do-support were used were subsequently examined for:

1. specific inflection used - s/irregular

2. semantic syntactic category of main verb in utterance - (action, state, patient-locative action, mover locative action, or agent locative action).

3. type of sentence: categorization of utterance into

(a) Question vs. Statement

Example:

What did he say? (Question)

I didn't see this book (Statement)

(b) Positive vs. Negative

e.g., Positive - Why does it close up?

e.g., Negative - She doesn't fit there.

(the use of negation)

An analysis of the types of errors made was performed on the utterances in which obligatory do-support and inflection were not used.

Matrix forms.

A post-hoc analysis was performed on the utterances in which the children used two verbs (a matrix verb and a complement infinitive verb).

For example,

	Context	Utterance
1.	J. trying to fit dog in house	Child: "He wants to go in here." want = matrix verb go = complement infinitive verb
2.	J. chasing pet	Child: "I'm trying to get him." try = matrix verb get = complement infinitive verb

The absolute frequency of "two verb" utterances was calculated. In addition, the absolute and proportional frequency of obligatory contexts and use (defined as occurrence of an inflection given an obligatory context for it) of inflected matrix verb forms at each linguistic level was calculated.

Structured Task

The tapes of the children's descriptions of the actions were transcribed by the experimenter within one week following the task presentation. In order to assess transcription reliability, 10% of each subject's responses were randomly selected and were transcribed independently by a second individual. Percentage agreement was found to be 91%. Only verb stems, verb endings and auxiliaries were scored for reliability. All the verbs in the sentence which described the action were used in the data analysis. However, descriptions were counted as responses only if they referred directly to the actions which the experimenter performed. Only the first sentence which described the action in each situation was used in the analysis because the number, length and complexity of utterances describing the actions varied from child to child. Responses were counted as correct or incorrect according to whether they did or did not include the past tense inflection. Responses that were ambiguous as to whether a past tense was used (e.g. put) were disregarded in the analysis. These

responses made up only .01 of the data.

Four coding sheets were formulated, one for each verb type (durative/non-goal-oriented, durative/goal-oriented, nondurative/non-goal-oriented, nondurative/goal-oriented Included on each coding sheet was a list of the eight corresponding action stimuli that were performed. Each response given by a subject was recorded on the appropriate coding sheet and the following information was coded: (see Appendix L):

1. Target Verb Usage Was the target verb used, and if not, what verb stem was used?

2. Past Tense Usage

   (a) Was a past tense used and if so - correctly?

   (b) Was regular or irregular past tense used?

   (c) Was simple or progressive past used?

3. Analysis of Errors

   If a past tense was not used - what type of error was made?

The proportional and absolute frequency of correct (past tense) responses for each linguistic level was calculated in order to determine whether and when children demonstrate the linguistic capacity to code events as past. An analysis comparing the number of correct responses obtained for the different linguistic levels was made, in order to test for significant differences between them.

In order to determine whether and when children demonstrate an ability to code aspectual features of events,

and whether aspect or tense takes precedence--the following data were reported:

1. The proportion and absolute number of past tense responses for the two categories of actions (goal-oriented and non-goal-oriented) at each linguistic level was calculated.

2. The distribution of the past tense responses according to the durative/non-durative feature of the verbs within each category of action (goal oriented & non-goal-oriented) for each linguistic level was compiled.

3. The past tense responses were divided into whether they were simple past or past progressive for the goal and non-goal-oriented action events for each linguistic level.

4. The types of errors made by the children were listed and examined.

Whenever appropriate, statistical analyses were performed (a) within linguistic levels (across action types) and (b) across linguistic levels to test for significant differences.

The use of verb substitutions by many of the subjects led the experimenter to perform a post hoc analysis regarding these substitutions in the structured task situation. Whenever a target verb was not used in a response, the substituted verb was recorded. Subsequently, the verb substitutions were compiled into a list according to the corresponding target verb and linguistic level. The absolute and proportional frequencies of use of verb substitutions was

calculated. In addition, the use of pro-verbs as verb substitutions was examined. The proportional use of inflected proverbs was calculated. Use was defined as the occurrence of an inflected proverb given an obligatory context for it. The proportion of past tense responses that were pro-verbs was also calculated.

Additional information on inflectional use and verb aspect was accumulated with the post-hoc categorization of all the subjects' responses (verbs) into a matrix based on the aspectual oppositions durative/nondurative and goal-oriented/non-goal oriented. The method of verb categorization into the different cells was identical to the one described earlier for the spontaneous language samples. The data from stages I, II and III were compared to Bloom, Lifter and Hafitz's (1980) matrix.

The Learning of Verbal Inflections: Rule Governed or Lexical

In order to elucidate this issue, the data were examined for:

1. regularization of irregular past tense forms
2. simultaneous emergence of inflectional forms
3. simultaneous emergence of synonymous forms (irregular and regular past tense)
4. use of different verb inflections with the same verb at emergence

Comparison of Spontaneous Language Sample and Elicited Task Contexts

The following comparisons were made between the data collected for spontaneous language sample and elicited task contexts:

1. Absolute and proportional frequency of use of the past tense
2. Inflectional use and verbal aspect
   (a) matrices based on aspectual distinctions, goal-oriented/non-goal-oriented and durative/non-durative
   (b) use of past progressive
3. The learning of verbal inflections: rule governed or lexical?
   (a) regularization of irregular past tense forms
   (b) simultaneous emergence of synonymous forms (irregular/-ed)

RESULTS

Language Sample

The total number of utterances collected from the spontaneous language samples was 9,655. The distribution of these utterances for the 18 subjects and the average number of utterances used per language level is presented in Tables 2 and 3.

The observational data base for the present study consisted of all the relational utterances used by the subjects. A total of 4,325 relational utterances were used.[1] The distribution of these utterances for the 18 subjects and the mean number of utterances with verb relations used per language level is presented in Table 7. The mean number of relational utterances increased as a function of MLU.

Occurrence of Contexts for Verb Inflections

The proportional frequency of occurrence of contexts for verb inflections is presented in Table 8. On the whole, there was little developmental change noted. All the proportional frequencies calculated were between .32 and .47 (a range of .15). The biggest proportional difference

[1]The present tense form of the copula was not included.

occurred between Stage I (.47) and Stage II (.32).

Mean Use of Verb Inflections

A developmental change was noted in the use of verb inflections as a function of MLU (see Table 9).[1] The Kruskal-Wallis " Analysis of Variance" by Ranks test was performed and yielded a significant value ($H=13.55$, $p< .02$). The most apparent difference in proportional frequency was found between Stages I, II, and III (mean use of inflections for all three stages = .33) and stages IV, IV-V and V, (mean use of inflections for all three stages = .83). A decrease in use of verb inflections was noted between Stages I (.34) and II (.22). A similar proportional decrease was noted in the previous analysis of occurrence of contexts for verb inflections.

In sum and in answer to the first research question, there was little developmental change in the frequency of occurrence of contexts for inflections. In contrast, a significant developmental change was noted in the use of verb inflections as a function of MLU.

Verb Inflections and the Semantic-Syntactic Categories of Verbs

The relative distributions of verbal inflections and of relational utterances were compared across the verb categories (action, state, patient-locative action,

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[1]Unmarked past was excluded from the data. It comprised .005 of the data.

agent-locative action, mover-locative action) for each of the eighteen subjects. In order to determine whether the occurrence of verbal inflections was independent of the verb categories for each subject, eighteen 2x5 chi square analyses were performed. The chi square values obtained for each subject are listed in Table 10. As can be seen, 16 out of 18 chi square values were significant at the .05 level; 4 degrees of freedom. Nonsignificant differences were found for subjects 1 and 4. For both of these subjects, there was a small number of observations in several cells of the 2x5 chi square table. Specifically, 4 of the 10 cells contained zeros. In addition, these two subjects had the lowest number of total observations. These facts may have influenced the resulting X^2 value. Thus for both of these subjects, the three locative action categories (patient-locative action, mover-locative action and agent-locative action) were combined thereby yielding a 2x3 X^2 table. Given the 2x3 X^2 table, significant differences were observed between the distributions for both of these subjects (see Table 10).

In sum and in response to the second research question, a dependency relationship existed between the occurrence of the verb inflections and the semantic-syntactic categories of the children's sentences. That is, for each child, the distribution of the verb inflections did not correspond to the distribution of the utterances across the different verb categories. The interaction between the occurrence of verb

inflections and the semantic-syntactic verb categories was significant for each subject at each linguistic level.

Inflectional Use

Each subject's use of the verbal inflections (-ing, -s, irregular and -ed) was closely examined. Several analyses were conducted using the subjects' use of inflections as the data base.

Use of the Individual Inflections

An analysis of the average use of the individual inflections at each linguistic level is displayed graphically in Figure 1. Three of the inflections (-ing, -s, and irregular) were used at each linguistic level with -ing and -s following a similar pattern of development. The use of these three inflections varied in relation to each other across the different linguistic stages. Nevertheless, the average percentage usage for each of these inflections was quite similar in Stages I, III, IV, IV-V and V. The biggest difference in use among these three inflections appeared in Stage II (see Table 11 for percentage values). The -ed inflection was used least frequently in all six stages of development but showed a general increase in use as a function of MLU. By Stage V, all four verb inflections were used similarly (-ing and irregular, 83%; -s, 75%, and -ed, 70%).

Individual Use of Individual Inflections

A more detailed analysis in which the use of the individual inflections by each child at each linguistic

level was performed (see Figures 2-7).

Late Stage I.

The language samples from Late Stage 1 (MLU 1.50-1.99; Subjects 1, 2 and 3) formed the data base for an analysis of the initial uses or emergence of the verb inflections. Previous research has demonstrated that verb inflections begin to emerge at this language level. The results of this analysis (see Figure 2) revealed that for two of the subjects (Subject 1 and Subject 3) three of the inflections (-ing, -s and irregular) were used at this earliest linguistic level and for one subject all four emerged at the same time. The use of the individual inflections varied in relation to each other across subjects.

Stage II. (See Figure 3)

In Stage II, the -ing and irregular inflections were used by all three subjects. Subject five used the -s inflection as well. Irregular was used most frequently and -ing was used second most frequently by all three subjects. The -ed inflection was not used by any of the subjects.

Stage III. (See Figure 4)

In Stage III, individual differences were apparent. Subject 7 used all four inflections relatively equally, Subject 8 used three inflections--with irregular occurring most frequently and Subject 9 used only two inflections very infrequently. The -s and irregular inflections were the only ones used by all three subjects in Stage III; however, their percent of use differed widely.

Early Stage IV. (See Figure 5)

In Stage IV, the subjects' performances were quite uniform. The relative use of the individual inflections was identical for all three subjects. That is, irregular occurred most frequently, -ing occurred second most frequently, -s occurred third and -ed occurred least frequently.

Late Stage IV-Early Stage V. (See Figure 6)

In Stage IV-V, the -ing, -s and irregular inflections were used by all the subjects, but their use varied in relation to each other across subjects. Individual differences in the use of -ed were noted. For Subject 13, -ed was used least frequently, for Subject 14 it was not used at all and for Subject 15 it was used more frequently than the irregular inflection.

Late Stage V. (See Figure 7)

In Stage V, results were fairly consistent in that all four inflections were used by the three subjects (at least 60 percent). However, the percentage use of the individual inflections varied in relation to one another across subjects.

In sum, at least three of the four inflections (-ing, -s, and irregular) were used simultaneously in every linguistic stage studied; even at the point of initial use--Late Stage I. There was no consistent pattern observed within each developmental level. That is, in some developmental periods the individual subjects differed

widely and in others they were more in agreement with one another.

Use of the Individual Inflections and the Verb Categories

Extention of use.

The average use of the individual inflections for each of the verb categories at each linguistic stage is presented in Table 12. As can be seen in Stage I, all four verb inflections emerged together. However, the use of these inflections was confined to one or two verb categories. For example, the -ed inflection was only used with action utterances in Stage I. At higher linguistic levels, the use of these inflections was extended to more verb categories. That is, -ing was used in two verb categories in Stage I (action and state; predominantly action) and in all five by Stage V. The -s and irregular inflections extended their usage from two to four categories and the -ed inflection extended its usage from one to two categories.

Productivity.

Inflectional use became productive (i.e., at least three obligatory contexts) for more children as a function of MLU. In Stage I, use of -ing was productive**[1] in two verb categories (action and state) and by Stage V, it was productive**[1] in four verb categories (action, state, agent-locative action and mover-locative action). In

[1]productive** = for at least two children

addition, -ing was not used at all in patient-locative action utterances in Stage I and by Stage V its use was productive.*[1]

The -s inflection was used productively** in one verb category in Stage I (state) and by Stage V it was used productively** in three verb categories (action, state and patient-locative action). In Stage I, use of -s was not productive in the patient-locative action verb category for any single child. The -s inflection was not used in mover-locative action utterances in Stage I and by Stage V it was used. It was never used in agent-locative action utterances.

The irregular inflection was used productively** in one verb category (action) in Stage I, and by Stage V it was used productively** in three verb categories (action, state and mover-locative action).

The -ed inflection was used productively** in one verb category (action) in Stage I and remained productive** for that one verb category in Stage V. The -ed inflection was not productive* in agent-locative action utterances until Stage V. It was used with state verbs in Stages III and IV-V.

Use within a verb category.

Another observation made in examining Table 12 was that more different inflections were used within a verb category

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[1]productive* = for at least one child

as a function of MLU.

Specifically for the verb category of action, three different inflections were used in Stage I and by Stage III all four inflections were used.

For state, three different inflections were used in Stage I, II, IV & V and four were used in Stages III and IV-V.

For agent-locative action, inflections were not used in stages I and II, one inflection was used in Stages III and IV, two inflections in Stage IV-V and three in Stage V.

For mover-locative action, no inflections were used in Stage I, one inflection was used in Stages II and III, two inflections were used in Stage IV-V, and three different inflections were used in Stage V.

For patient-locative action, one inflection was used in Stages I, II and IV-V and two different inflections were used in Stages III and V.

Average proportional use.

The average proportional use of the individual inflections within each of the verb categories at each linguistic level is presented in Table 12. In order to observe more clearly the developmental change in the proportional use of the individual inflections within each of the verb categories, the proportions are visually displayed in Figure 8. Only the proportions that were productive for at least two children (double asterisked numbers in Table 12) were graphed since those proportions

represented the performances of the majority of subjects in each stage. Eliminating the proportions that were productive for only one child reduced some of the variability of the data.

Proportional use of -s.

As can be seen, there is an increase in proportional use of -s in state utterances from Stage II to Stage V. A decrease was noted between Stages I and II. The -s inflection was initially used in action utterances in Stage IV and in patient-locative action utterances in Stage III. Its proportional use in action utterances increased as a function of MLU. Its proportional use in patient-locative action utterances was more erratic as a function of MLU.

Proportional use of -ing.

The -ing inflection was used in action and state utterances in each of the six developmental periods. There was a general increase in proportion of use of -ing in these two categories as a function of MLU except between Stages I and II where there was a decrease in use of -ing in action utterances. The -ing was used in mover-locative action utterances initially in Stage IV-V and decreased in proportional use by Stage V. The pattern for the use of -ing in agent-locative action utterances was different in that it first appeared in Stage IV, was not used in Stage IV-V and appeared again in Stage V.

Proportional use of irregular.

The proportional use of irregular in state utterances

showed an increase between Stages III (first appearance) and IV and then its use plateaued. The pattern of proportional use of irregular with action utterances was quite erratic with increases and decreases noted. From Stage IV to Stage V an increase in use was noted. The irregular inflection first appeared in mover-locative action utterances in Stage V (.83).

Proportional use of -ed.

The -ed inflection was used only in action utterances and showed a general steady increase in use as a function of MLU.

Thus, in sum and in answer to the third research question concerning the use of the inflections, the following results were found:

1. Three of the verb inflections were used simultaneously at the point of emergence (or earliest uses, MLU 1.50-1.99) by all three subjects and in fact one of these subjects used all four inflections simultaneously. At least three of the verb inflections were used simultaneously at each of the linguistic levels studied.

2. Variability in the individual use of the individual inflections was observed with the exception of Stage IV and V where subjects performed more uniformly. By Late Stage V, all three subjects used all four inflections at least 60% of the time. In addition, the -ed inflection was used least by most subjects. In Stages I, II, III, and IV-V, the use of the individual inflections varied in

relation to one another among the children.

3. The results concerning the use of the individual inflections and the verb categories were divided into the following:

(a) Extention of Use - At emergence (earliest uses of verb inflections, MLU 1.50-1.99) the use of the inflections (-ing, -s, -ed, and irregular) was confined to one or two verb categories. However, as MLU increased, the use of the verb inflections was extended to more verb categories.

(b) Productivity - As MLU increased, inflectional use became productive for more children in more verb categories.

(c) Use Within a Verb Category - More different inflections were used within a verb category as a function of MLU.

(d) Average Proportional Use of Inflections - No uniform pattern was followed regarding the average proportional use of the different inflections within each of the verb categories as a function of MLU. However, in the majority of cases, the proportional use of the verb inflections increased within the verb categories. This pattern was most visible for the -ed inflection. However, the -ed inflection was only used in the action utterances. The pattern became more complicated for the other inflections that were used in more of a variety of utterance types.

Thus, the aforementioned results have shown that the verb inflections were distributed selectively in different populations of verbs especially in the lowest linguistic levels. In the more advanced linguistic levels, this selectivity decreased somewhat as verb inflections began to be applied to more verb categories.

Rank Order of Verb Inflectional Use

The rank order of inflectional use at each linguistic level is presented in Table 13 and visually displayed in Figure 9. The -ed inflection was used least or not at all in all six linguistic levels studied. The -ing, irregular and -s inflections did not maintain the same rank for the different linguistic levels. As can be seen in Figure 9, -ing was ranked first in Stages I and V, second in Stages II, IV and IV-V, and third in Stage III. The irregular verb inflection was ranked first in Stages II and IV, second in Stages I, III and V and third in Stage IV-V. The -s inflection was ranked first in Stages III and IV-V, third in Stages I, II, IV and V. The same rank order of use was observed in Stages I and V.

The rank order of use of the verb inflections for the first three linguistic levels in this study was then compared to the rank order of use that Bloom, Lifter and Hafitz (1980) found for the same MLU stages (see Table 14). The orderings in Stage II were nearly identical. In Stage III, the positions of irregular and -s were reversed but -ing and -ed maintained the same rank in both studies. More

striking differences occurred in Stage I. The -ing inflection was ranked first in the present investigation and third in Bloom, Lifter and Hafitz (1980). The irregular and -s inflections maintained second and third rank in this study vs. first and second rank respectively in Bloom, Lifter and Hafitz (1980). Bloom, Lifter and Hafitz (1980) found that -ed was not used at this stage of development, whereas in the present study, it was used but least frequently of all the inflections.

A comparison of the rank order of use of the verb inflections was made between the present investigation, a cross-sectional study on extent of use; and Brown's (1973) and deVilliers and deVilliers' (1973) data on the acquisition of verb inflections (see Table 15). The results indicated that positions one and two (for -ing and irregular) were reversed and positions three and four (for -ed and -s) were reversed.

To summarize and to answer the fourth research question, the rank orders of the -ing, -s and irregular inflections varied for the different linguistic stages. The only consistent result was that -ed was ranked fourth in all stages of development in which it was used. In comparing the results of the rank order of use in Stages I, II and III to Bloom, Lifter and Hafitz's (1980) data, many similarities were noted in Stages II and III. More differences appeared in Stage I. The comparison of the rank order of the relative extent of use of the verb inflections in this

investigation to the acquisition data in Brown (1973) revealed differences that involved only one rank difference for any inflection. Since the data collected in the present investigation were cross-sectional, acquisition, as defined by Brown, (90% use in three successive speech samples) could not be achieved. In fact, the -ing and irregular inflections were the only inflections that were used in 90% of obligatory contexts and this result only occurred in Stage IV (refer back to Table 11).

Inflectional Use and Verb Aspect

All the verbs used by the subjects at each linguistic level were listed and categorized according to semantic-syntactic category (action, state, agent-locative action, mover-locative action or patient-locative action) and type of inflection used (see Tables 16-21).

Action Verbs

Following Bloom, Lifter and Hafitz (1980), a distribution of the subjects' action verbs according to the aspectual oppositions durative/non-durative and completive/non-completive was compiled into a matrix (see Figure 10). As in Bloom, Lifter and Hafitz (1980), this typology of action verbs was based solely upon the distribution of the verb inflections. The goal-oriented (completive)/durative verbs were those that occurred with -s; the non-goal-oriented (non-completive)/durative verbs were those that occurred with -ing; and the goal-oriented (completive)-/non-durative verbs were those that occurred with

irregular/-ed.

In order to compare results from the present investigation with Bloom, Lifter and Hafitz's (1980) study, only data from the first three linguistic levels (Tables 16, 17 and 18; MLU 1.50 - 2.99) was used. Thus another matrix of action verbs, which included data only from Stages I, II and III, was constructed (See Figure 11). As Bloom, Lifter and Hafitz (1980) found, in Stages I and II (Tables 16 and 17) certain verbs occurred only with -ing, other verbs occurred only with irregular/-ed and other verbs occurred only with -s. The same result was predominantly true for Stage III (Table 18) as well, with the exception of a small number of verbs that occurred in more than one category (cell).

Many similarities were noted in comparing the two matrices.[1] The most striking similarities occurred in the cell which included goal-oriented/non-durative verbs used with the past tense inflection. According to Bloom, Lifter and Hafitz (1980), the verbs break and fall were among the clearest examples of verbs that occurred with -ed/irregular and named non-durative, goal-oriented, momentary events.

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[1]Bloom, Lifter and Hafitz (1980) divided the verbs used within a cell into either best or marginal. Best instances were those verbs with clear lexical aspect, as defined by the intersection in the matrix. Marginal instances were those verbs with less clear lexical aspect. The decision as to whether a verb in a cell was categorized as a best or marginal instance was somewhat subjective. This categorization was not made in the present study.

These were the two verbs that were most frequently inflected with a past tense in the present study. As can be seen in Figure 11, out of the 16 different verbs that were used with past tense inflections in Stages I, II and III, 12 (75%) were common to both studies, and 4 (25%) were new (verb not used with any inflection in Bloom, Lifter and Hafitz, 1980). Thus, all of the verbs were accounted for as either being common to both studies or "new." None of the past tense verbs used in Stages I, II and III in the present study appeared in a different cell in Bloom, Lifter and Hafitz's (1980) data.

The verbs that occurred with -ing named non-goal-oriented, durative events. Bloom, Lifter and Hafitz (1980) listed play and ride among the clearest examples and these appeared in the present investigation as well. Twenty four different verbs in this study occurred with -ing (See Figure 11). Nineteen out of 24 of these verbs (79%) were common (appeared in same cell) to both studies. Five (21%) were new, and one (.04%) appeared in a different cell.

In the durative/goal-oriented cell, the most frequent verbs that occurred with -s were go and fit in both sets of data. These verbs named actions toward the place which an object 'belonged' (assignment to a place), as explained by Bloom, Lifter and Hafitz (1980). Verbs in this cell named events that were completive with an end result and durative in that they continued after completion. As seen in Figure 11, out of the eight different verbs used with -s, three

(38%) were common to both studies, three (38%) were new, and two (25%) were used in a different cell in Bloom, Lifter and Hafitz's (1980) study.

In sum, as Bloom, Lifter and Hafitz (1980) found, the semantic distribution of the vast majority of children's action verbs according to the aspectual distinctions durative/non-durative and goal-oriented/non-goal-oriented was co-extensive with the selective use of one or another of the verb inflections (in Stages I, II and III). A comparison of the verbs listed in the matrix of the present study to those listed in Bloom, Lifter and Hafitz (1980) revealed striking similarities. The same verb stems were used with the same verb inflections for the vast majority of the data. However, the number of different verbs used with inflections and the frequency with which these verbs were inflected in each cell was greater in Bloom, Lifter and Hafitz's (1980) data.[1]

The verbs used by all 18 children in the six linguistic stages is displayed in Figure 10. In comparing Figure 11 (data from Stages I-III) to Figure 10 (data from Stages I-V, all subjects) the number of different verbs used with inflections and the frequency with within these verbs were inflected increased, as expected. In addition, the number

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[1]The matrix in Bloom, Lifter and Hafitz (1980) consisted of data from all their subjects. However, the matrix in the present investigation was comprised of data from only nine (Stages I, II and III) of the eighteen subjects studied.

of verbs that overlapped (occurred in more than one cell) increased. That is, more verbs were being used with more than one inflection in the later stages (III, IV-V, V) of development.

Pro-Verbs

The pro-verbs go, do, make and get frequently occurred with more than one inflection beginning in Stage III. Bloom, Lifter and Hafitz (1980) explained that these action verbs "stand in for other more descriptive verbs in that they named events with different aspectual contours" (p. 400). Other, more specific verbs also occurred with more than one inflection, but not as frequently.

The proportion of each of the inflections that occurred with the pro-verbs do, go, make and get at each linguistic level is presented in Table 22. A different pattern was observed for each inflection as a function of MLU. The -s inflection increased in use from Stage I to III and then decreased in use from Stage IV to V. The pattern for -ing is less clear. There were slight increases and decreases across the linguistic stages. For irregular, there was an increase in proportional use from Stage I to II, a plateau from Stage II to III, a sharp decrease from Stage III to IV and an increase from Stage IV to V.

In comparing the results of the present investigation (Stages I, II and III) to Bloom, Lifter and Hafitz's (1980) data a similarity was noted in that there was an increase in the use of inflected pro-verbs from Stage I to Stage II in

both sets of data. Do and go were the most frequent pro-verbs used in both studies. The data differed in that there was a decrease in the use of all inflected pro-verbs in Bloom, Lifter and Hafitz's (1980) data from Stage II to Stage III whereas in the present study a decrease was noted only for the -ing inflection. An increase was observed for -s and no change was observed for the irregular inflection from Stage II to III.

Thus, in sum, the pro-verbs frequently occurred with more than one inflection beginning in Stage III. The proportional use of inflections with the pro-verbs was generally different for each individual inflection as a function of MLU. However, a proportional increase was noted for all three inflections between Stage I and II; a finding that was consistent with Bloom, Lifter and Hafitz's (1980) data.

State Verbs

The proportion of inflections that occurred with state verbs at each linguistic level is presented in Table 23. A general increase was noted as a function of MLU with a plateau for Stages III, IV and IV-V. By Stage V, almost half of the inflections used occurred with state verbs.

The distribution of state verbs with inflections is presented in Table 24. The state verbs used by the children were listed and categorized according to a) the type of state verb, that is, shared "public" state or non-shared, "private" state and b) the specific inflection used. The

shared state verbs were inflected much more frequently than the non-shared state verbs at every linguistic level. In fact, the internal state verbs were not inflected at all until Stage III. Both of these findings were consistent with Bloom, Lifter and Hafitz's (1980) data.

Non-Shared or internal state verbs.

As can be seen in Table 24, the internal state verbs occurred selectively with one or another inflection when they were initially used with inflections in Stage III. This finding is in agreement with Bloom, Lifter and Hafitz (1980). The same selectivity appeared in Stages IV, IV-V and V with the exception of the verb want in Stages IV, IV-V and V which occurred with two inflections: past tense and -s, its more common inflection. In fact, 59% of all inflected internal state verbs occurred with -s, 12% with -ing, 12% with irregular and 17% with -ed.

Shared or public state verbs

As reported earlier, the majority of inflections used with state verbs occurred with the shared state verbs. As with the internal state verbs, when the shared state verbs were inflected in the early linguistic stages (I and II), they occurred selectively with one or another inflection. In Stage III, IV and IV-V, the shared state verbs began to be used with more than one inflection. Nevertheless, the majority of state verbs still appeared with only one inflection. By Stage V, a greater percentage of the shared state verbs was used with more than one inflection. These

results support Bloom, Lifter and Hafitz's (1980) data.

Thus, a general increase in inflected state verbs was noted as a function of MLU. Public state verbs were inflected more frequently than internal state verbs, which were not inflected until Stage III. However, when public and internal state verbs were initially inflected, they both occurred selectively with one or another inflection. Use was extended to different inflections in more advanced linguistic levels.

Thus in answer to the fifth research question, the semantics of verb aspect played a major role and strongly influenced the inflections the children learned, as it did in Bloom, Lifter, and Hafitz's (1980) study. The co-occurrence of different inflections and verb aspect was evident for action verbs (including locative action) and state verbs. This influence diminished somewhat in the more advanced linguistic stages (IV, IV-V and V) as different verb inflections appeared with the same verb stem (pro-verbs and some specific verbs).

Post-Hoc Analyses

Do-Support

A post-hoc analysis of the use of "inflections with do-support" was performed. The average proportional frequency of obligatory contexts for inflected do-support is presented in Table 25. The average proportion of utterances with obligatory contexts for inflected do-support was low (.20 or less) in all the linguistic stages. The average

proportion of obligatory contexts showed a developmental increase with the exception of Stage III. In Stage III, a proportion of .20 was calculated, which was the highest proportion obtained. This high proportion was due solely to Subject 9's performance (.46 of his utterances with contexts for inflections were utterances with contexts for inflected do-support).

The absolute and average proportional frequency of use of inflected do-support was calculated and appears in Table 26. An increase in proportional use was noted from Stages I-III, then a decrease was noted from Stage III to IV-V, and then another increase was noted in Stage V.

Inflectional use with do-support.

The utterances in which do-support was used and inflected were analyzed for the following three items:

1. Specific Inflection Used

The two inflections used with do-support were -s and irregular. Sixty-two inflections were used in total, 46 (.74) were -s and 16 (.26) were irregular. The -s inflection was used more than irregular in all linguistic stages with the exception of Stage I (no inflection used) and Stage IV (3, -s; 6, irregular).

2. Semantic-Syntactic Category

The main verb in each of these utterances was categorized into one of the five verb categories (action, state, patient-locative action, mover-locative action or agent-locative action). The absolute and proportional

frequency for each verb type was calculated. An examination of the data revealed that .40 (25/62) utterances were internal state, .34 (21/62) utterances were public state, .18 (11/62) utterances were action, and .08 (5/62) utterances were patient-locative action. Thus, inflections did not occur in mover-locative action or agent-locative action utterances. In addition, 74% of all "inflected do- support" occurred in state utterances (.40 = internal, .34 = public). A distribution of these verb types according to linguistic level revealed that the majority of these inflected state verb utterances occurred in Stage V (.67 [31/46]). The other verb types (action and patient-locative action) were distributed more evenly among the linguistic levels.

3. Sentence Type

(a) Question vs. Statement

Fifty-three (.85) of the inflected utterances with do-support were used in statements and nine (.15) were used in questions. A distribution of sentence type (question or statement) by linguistic level revealed that the nine inflections that appeared in question forms occurred in Stages IV (3), IV-V (5) and V (1). Thus, all the "do inflections" that occurred in Stages II and III, and the vast majority of inflections in Stages IV, IV-V and V were statements.

(b) Positive vs. Negative

Fifty-two (.84) of the 62 inflections that were used appeared in negative sentences and 10 (.16) appeared in

positive sentences. A distribution of sentence type (positive or negative) by linguistic level revealed that the ten inflections that appeared in positive utterances were distributed in Stages IV (4), IV-V (4) and V (2). Thus, all the "do inflections" that occurred in Stages II and III and the overwhelming majority of utterances with "inflected do-support" in Stages IV, IV-V and V were negative.

In sum, the vast majority of "inflected do-support" utterances were negative statements.

Analysis of errors.

All utterances in which an "inflection with do-support" was obligatory but was not used were examined for the type of error made. Two types of error were found:

1. Do - not used; inflection not used e.g.,
   (a) Where this go?
   (b) Where she want to go?
2. Do - not used; inflection incorrectly fixed to main verb e.g.,
   (a) What it says on the bag?
   (b) Why you gave me this?

The distribution of errors at each linguistic level is presented in Table 27. With the exception of Stage III, there was a developmental increase in the number of error responses. The high frequency of error responses in Stage III was solely due to Subject 9's performance.

Only error type one (-do, - inflection) appeared in Stages I to III. In Stages IV, IV-V and V both types of

errors occurred. In Stages IV and V, the two types of errors occurred with approximately equal frequency. In Stage IV-V, there was a predominance of error type two (-do, inflection incorrectly fixed to main verb).

The overwhelming majority of error type responses occurred when the main verb was inflected with -s vs. irregular. Error type one (-do, - inflection) responses occurred when either the -s or irregular inflection was obligatory - with no clear pattern.

Matrix Forms

There were 80 utterances (distributed in Stages III-V) in which a matrix verb and a complement infinitive verb were used. All the matrix forms were categorized as state verbs (60 internal and 20 public).

The absolute and proportional frequency of obligatory contexts for inflected matrix verbs was calculated and revealed: 51 (.64) obligatory contexts for -s, 14 (.18) for -ing, 11 (.14) for -ed, and 4 (.05) for irregular. The absolute and proportional frequency of use of inflected matrix verbs is presented in Table 28. Inflected matrix verbs were not used in Stages I and II. Initial use occurred in Stage III - and use was high (.87). Use remained high (between .87 and 1.0) for Stages IV, IV-V, and V. In Stage V, all three subjects used matrix verbs with inflections.

In sum, two post-hoc analyses were performed--inflectional use with do-support and matrix forms. There

was an overall increase in occurrence of contexts and proportional use of inflected do-support as a function of MLU with some minor exceptions. The -s inflection was used more frequently than the irregular inflection at every linguistic stage except Stage IV. Seventy-four percent of all inflected do-support forms occurred in state utterances. The vast majority of 'inflected do-support' utterances were negative statements.

An analysis of the errors made when an obligatory inflection with do-support was not used revealed two error types. Only Type 1 errors ('do' not used and inflection not used) appeared in Stages I to III. A predominance of Type 2 errors ('do' not used and inflection incorrectly fixed to main verb) occurred in Stage IV-V. Both error types occurred with equal frequency in Stages IV and V.

The use of inflected matrix forms was high (.87 or more) beginning in Stage III through Stage V. They were not used in Stages I and II. All the matrix verbs were categorized as state verbs, and the majority required the -s inflection.

Structured Task

A total of 576 responses (32 per subject) were elicited from the subjects and these responses formed the data base for several analyses. Unmarked past responses were excluded from the analyses but only comprised .01 of the data.

Use of Past Tense

The absolute and proportional frequency of responses in

which a past tense was used was calculated for each linguistic level and is presented in Table 29. A Kruskal-Wallis "Analysis of Variance" by Ranks was performed and yielded a statistically significant value ($H'=13.001$, 5d.f., $p<.05$). Thus, the difference in use of past tense responses among the different stages was statistically significant. The most visible difference occurred between Stages I, II and III (mean absolute and proportional frequency, respectively = 6(.06) and Stages IV, IV-V, and V (mean absolute and proportional frequency, respectively = 56 (.58). The subjects demonstrated very little use of the past tense in Stages I, II and III. By Stage IV, use increased to (.64), which was the highest proportion obtained.

Goal-Oriented vs. Non-Goal-Oriented Actions

The past tense responses obtained at each linguistic level were divided into two categories: those used to describe goal-oriented and non-goal-oriented actions.

The absolute and proportional frequency for each action type was calculated and is presented in Table 30. A statistical analysis of the differences between the two categories at each language level was not performed because the number of responses per language level was too few. Therefore, the "linguistic stages" were eliminated as a variable and a Wilcoxon Matched Pairs Signed Ranks Test was performed to examine the differences between the two categories of actions. Results showed a significant

difference between the two groups (T=26, N=18, p<.05). The number of past-tense responses was always greater for the goal-oriented actions vs. non-goal-oriented actions.

Durative vs. Non-Durative Actions

The use of the past-tense inflections for the goal-oriented and non-goal-oriented actions was further analyzed by distributing the responses according to the durative/non-durative aspectual feature of the verbs (see Table 31 for the absolute and proportional frequencies obtained). As with Table 30, the small number of responses per language level led to the elimination of the linguistic levels as a variable. Therefore, a Wilcoxon Matched Pairs Signed Ranks test was performed for the goal-oriented actions and the non-goal-oriented actions independently in order to examine the difference between the durative/non-durative contrast within each action type. No significant differences were found for goal-oriented actions (T=83) and for non-goal-oriented actions (T=43).

Simple Past vs. Past Progressive

The past tense inflections used by the subjects were subsequently categorized according to whether they were simple past or past progressive for both goal and non-goal-oriented actions. The absolute and proportional frequencies for each are listed in Table 32.

As can be seen, the past progressive was not used in Stages I, II, III or IV-V. All past tense responses in these stages were simple past. In Stage IV, the past

progressive was used for both goal oriented (31% of the past inflections used were past progressive) and non goal-oriented (42% of the past inflections used were past progressive) actions. However, the majority of the past inflections were simple forms (69% for goal-oriented and 59% for non-goal-oriented). Further analysis into individual data revealed that the majority of the responses were attributed to a single child. In Stage V, the past progressive was used for non-goal-oriented past actions (20% of past tense inflections used were past progressive). However, the majority of past tense responses for non-goal-oriented actions were simple past.

Errors

An analysis of the types of errors made by the subjects was performed. An error response was defined as any response that did not include use of the past tense. The following is a list of the types of errors made:

1. use of the present progressive, -ing
2. use of the third person singular, -s
3. no verb inflection used (just verb stem)
4. no verb used
5. use of an action instead of a verbal response
6. no response

The absolute and proportional frequencies of each type of error made for goal- and non-goal-oriented actions at each linguistic level is presented in Table 33.

The same basic pattern of errors was found in goal- and

non-goal-oriented actions for Stages I, II and III. In Stages I and II, no verb inflection was the most common error made but at least three other types of errors appeared. In Stage III, use of present progressive and no verb inflection were the most common error types. In Stages IV, IV-V and V, no verb inflection was again the most common error made. The -ing inflection was a more frequently used error in non-goal-oriented vs. goal-oriented actions in Stages IV and IV-V. The durative/non-durative opposition did not influence their error responses.

More variety of errors occurred in the lower MLU levels. In Stage 1, for example, five different types of errors were made for both goal-oriented and non-goal-oriented actions. By Stage V, only three different types were made (-ing, -s and no verb inflection) for each action type.

In summary, the aforementioned results on the use of the past tense, goal-oriented vs. non-goal oriented and durative vs. nondurative aspectual contrasts, past progressive and error responses all focused on answering the sixth research question regarding tense and aspect.

Specifically, the children demonstrated very little use of the past tense inflection in Stage I, II and III (mean proportional frequency of use=.06). They more clearly demonstrated the linguistic ability to code events as the past in Stages IV, IV-V, and V (mean proportional frequency of use=.58). The highest proportional use of past tense

usage was obtained for Stage IV (.64). The children's responses were influenced by event aspect in that significantly more past tense responses were obtained for goal-oriented actions vs. non-goal-oriented actions. Yet, some of the children used the past tense to describe non-goal-oriented actions as well. In contrast, the durative/non-durative opposition did not influence the children's responses (correct or error) significantly. It is important to note that linguistic level was eliminated as a variable in testing for significance of the two aforementioned aspectual contrasts.

Regarding the past progressive, there were no differences in the non-use of the past progressive forms for goal and non-goal-oriented actions in Stages I, II, III, and IV-V. Differences were noted in Stages IV and V, in which the past progressive was used more often in non-goal-oriented actions vs. goal-oriented actions.

An analysis of the errors revealed that the same types of errors occurred with similar frequency for the goal and non-goal-oriented actions in all stages with the exception of Stage IV and IV-V. In these two stages, the use of the present progressive was a more frequent error in non-goal-oriented actions. Overall, more variety of errors occurred in the lower MLU levels and 'no verb inflection' was the most frequent error.

In conclusion, data from the task context revealed that by Stage IV, tense and aspect were coded linguistically.

The infrequent use of the past tense in Stages I-III did not provide the investigator with adequate data to answer the question "Aspect before Tense" or "Tense before Aspect?" The data did suggest though, that for some of the children (who used the past tense morpheme for goal and non-goal oriented actions) both tense and aspect may be coded in these earliest linguistic stages.

Post-Hoc Analyses

Verb Substitutions

A post-hoc analysis on verb substitutions (verbs used as substitutions for target verbs) was performed. The absolute frequency of use of substitution verbs for each action type (durative/non-goal-oriented, nondurative/-non-goal-oriented, durative, goal-oriented, and nondurative/goal-oriented) at each linguistic level is presented in Table 34. On the whole, the number of verb substitutions used per stage decreased as a function of MLU. An examination of the verb substitutions across the four action types revealed that the number of verb substitutions was distributed evenly across action types in Stages I, II, III, and IV. In Stages IV-V and V more verb substitutions were noted for goal-oriented actions. Duration of action did not have any effect on the number of verb substitutions used.

A further look into the verb substitutions made by the children revealed that pro-verbs were being used as substitutions at each linguistic level. The average

proportional frequency of pro-verb substitutions used at each linguistic level is presented in Table 35. With the exception of Stage II (where pro-verbs constituted only 22% of the verb substitutions), there was a steady decrease in the proportion of pro-verb substitutions as a function of MLU. In Stage I, 79% of the verb substitutions were pro-verbs and by Stage V only 37% were pro-verbs. Thus at Stage V, 63% of the substitutions were different specific verbs (e.g., write/draw, rock/push).

The absolute and proportional frequency of inflected pro-verb substitutions was calculated for each stage and appears in Table 36. As can be seen, the average proportion of inflected pro-verb substitutions was low in Stages I, II, and III, increased markedly in Stages IV and IV-V and then decreased considerably by Stage V.

An additional analysis was performed in order to determine the proportion of total inflected (past tense) verb responses that were pro-verb substitutions (see Table 37 for the absolute and proportional frequencies). There was an increase in the proportion of inflected verbs that were pro-verbs from Stage I to III and then a decrease was noted from Stage III to V. The most obvious difference in proportional use was between Stage III (where inflected pro-verbs accounted for all the inflected verbs used) and IV (only .31 of all past tense responses used were pro-verbs).

In sum, the number of verb substitutions (often pro-verbs) used decreased as a function of MLU and were

distributed evenly across action types in Stages I-IV. In Stages IV-V and V more verb substitutions were noted for goal-oriented actions. Inflected pro-verbs accounted for a) approximately half of all the past tense inflections used in Stages I and II and b) all of the past tense inflections in Stage III. In Stages IV, IV-V, and V inflected pro-verbs accounted for much less of all the past tense inflections, as more specific inflected verbs were used.

Inflectional Use and Verb Aspect: Matrix

All of the verbs (target and substitution) used by the subjects as responses were categorized into a matrix based on the aspectual distinctions durative/nondurative and goal/non-goal-oriented (see Figure 12). In order to compare these data justly with Bloom, Lifter and Hafitz's (1980) data, a matrix including the data only from the first three stages was constructed. As can be seen in Figure 13, all four (100%) verbs which appeared with irregular/-ed also appeared in the same cell in Bloom, Lifter and Hafitz's (1980) study. Three out of five (60%) of the -s inflected verbs appeared in the same cell in both studies, one verb (20%) did not appear inflected at all in Bloom, Lifter and Hafitz's (1980) data, and one verb (20%) appeared in a different cell in Bloom, Lifter and Hafitz (1980). Of the 15 verbs used with -ing, 10 (67%) occurred in the same cell in both studies, 4 (27%) did not appear with any inflection in Bloom, Lifter and Hafitz (1980) and 1 (.07) appeared in a different cell.

To summarize, the two matrices were quite similar. That is, the overwhelming majority of the verb stems and inflections that appeared in the task situation also appeared in the same cell in Bloom, Lifter and Hafitz's (1980) spontaneous language samples. As Bloom, Lifter and Hafitz (1980) found, the semantic distribution of the children's verbs according to aspectual distinctions was co-extensive with the selective use of one or another inflection.

The Learning of Verbal Inflections: Rule Governed or Lexical

Regularization of Irregular Past Tense Forms

Data from both the spontaneous language sample and the structured task contexts contributed to this analysis (see Table 38). In the spontaneous language sample context, regularization of irregular past tense forms did not occur in Stages I, II, and IV-V. It did occur in Stages III, IV and V, with greatest proportion of use in Stage III (.17). In the structured task context, regularization of irregular past tense occurred once in Stage I, did not occur in Stages II and III and was consistently used in Stages IV (.31), IV-V (.43) and V (.40).

Simultaneous Emergence of Inflectional Forms

This information was reported earlier in an analysis of the individual use of the individual inflections at Stage I. Results revealed (see Figure 2) that for two of the subjects, three of the inflections (-ing, -s and irregular)

were used at this earliest linguistic level and for one subject, all four emerged at the same time.

Simultaneous Emergence of Synonymous Forms (irregular and regular past tense)

An examination of the language sample context revealed that in Stage I (earliest linguistic level - emergence), two out of the three subjects did not use the irregular and regular past tense forms simultaneously. They solely used the irregular past tense form. The Stage II subjects showed evidence of non-simultaneous use (used irregular only). In both Stages III and IV, the majority of subjects in each stage used only the irregular inflection. By Stage IV-V and V, the synonymous forms were used simultaneously.

The structured task context showed evidence of non-simultaneous emergence of the synonymous forms (regular and irregular). The irregular was the only past tense inflection used in Stages I, II and III. By Stage IV, both forms were used simultaneously.

Use of Different Verb Inflections with the Same Verb

The absolute and proportional frequency of verbs that were used with more than one inflection was calculated and is presented in Table 39. In Stages I and II (earliest linguistic stages), all the verbs used occurred with only one verb inflection for each child. In Stage III, IV, and IV-V, 15%-16% of the verbs used with inflections were used with more than one inflection. In Stage V, 25% of the verbs used occurred with more than one inflection.

Thus, at emergence, the verbs occurred with only one variant; that is, different verb inflections did not occur with the same verb. From Stage III to Stage V, different verb inflections did occur with the same verb and the proportion of occurrence increased developmentally.

Many of the verbs that were used with more than one inflection were pro-verbs. In fact, in Stage III, 67% of the verbs used with more than one inflection were pro-verbs; in Stage IV, 30%; Stage IV-V, 57%; and in Stage V, 23%. Thus, in Stage V, 25% of the verbs used with inflections were used with more than one inflection, and only 23% of these verbs were pro-verbs. That is, 77% of the verbs that occurred with more than one inflection were more specific descriptive verbs.

In sum and in answer to the seventh research question-

1. Overall, regularization of irregular past tense forms did not occur in Stages I or II in either data context with one minor exception. This phenomenon did occur more consistently in the more advanced linguistic stages.

2. At least three of the inflections (-ing, -s and irregular) were used at the earliest linguistic level for all subjects. For one of the subjects, all four inflections (including -ed) emerged together.

3. Based on the results, there appeared to be a constraint on children learning synonymous forms, -ed/irregular, at the same time. At the point of initial usage (Stage I), the synonymous forms (regular and irregular

past tense) were not used simultaneously by all subjects in the task contexts and by two out of three subjects in the spontaneous language context (the third subject used the -ed inflection only once). In fact in the task context, they were not used simultaneously by any of the subjects until Stage IV. In Stages IV-V and V, the synonymous forms were consistently used simultaneously in both contexts.

4. At emergence (earliest linguistic Stages I and II), all of the verbs occurred with only one variant, one verb inflection. In the more advanced linguistic levels, Stages III-V, different verb inflections occurred with the same verb stem; many of which were pro-verbs. By Stage V, however, most of the verb stems that appeared with more than one inflection were more specific descriptive verbs.

Comparison of Spontaneous Language Sample and Elicited Task Contexts

Use of Past Tense Inflections

A comparison between the absolute and average proportional frequency of use of the past tense (irregular/-ed) inflections in the spontaneous and elicited contexts was made and is presented in Table 40. The absolute frequency of past tense inflections was higher for the spontaneous language context in all stages with the exception of Stage IV. The average proportional frequency of use of past tense inflections was higher for the spontaneous language context at every linguistic level;

however, the developmental pattern was similar in both contexts. That is, in Stages I, II and III the proportional uses were similar and in Stages IV, IV-V and V, the proportional uses were similar for each context. Also, the most apparent difference in proportional frequency occurred between Stages I, II and III (combined as a unit) and Stages IV, IV-V and V (combined as a unit) for both contexts.

Inflectional Use and Verb Aspect

Matrix

A comparison between the two matrices (one for spontaneous language context and one for elicited production task) based on aspectual distinctions was made and revealed the following (see Figures 10 and 12):

1. Ten different verbs occurred with the -s inflection in the task data. Seven out of ten (70%) verbs that were used with -s in the task data were also used in the language sample context. Two out of ten (20%) were not inflected in the language sample and one out of ten (10%) appeared in a different cell.

2. Nineteen different verbs were used with the -ing inflection in the elicited task context. Fourteen out of 19 (74%) were common to both sets of data. Three out of 19 (16%) verbs did not occur in inflected form in the language sample context, and 2 out of 19 (11%) appeared in a different cell in the spontaneous language sample context.

3. Nineteen different verbs occurred with the irregular/-ed inflection in the task data. Six out of

19 (32%) were common to both sets of data. Five out of 19 (26%) did not occur in inflectional form in the language sample context and 8 out of 19 (42%) appeared in a different cell in the language sample context.

In general, more verbs appeared in each cell of the spontaneous language matrix than in the elicited task matrix. The data from the durative/goal-oriented (verbs with -s) and durative/non-goal-oriented (verbs with -ing) cells of the spontaneous language and elicited task contexts were very similar. Over 70% of the verbs that appeared in these cells in the task data also appeared in the same cell in the spontaneous language data. The data in the non-durative/goal-oriented cell (verbs with irregular/ed) showed more disparity when comparing the two sets of data.

Use of Past Progressive

An analysis of the use of the past progressive in the spontaneous language data revealed that it was not used until Stage V (MLU 4.00-4.49). At that linguistic level, it was used four times which accounted for only 4% of the past tense inflections used at that stage. All four verbs were action verbs that described non-goal-oriented types of activities. An analysis of the task data revealed that the use of the past progressive first appeared in Stage IV (22 instances) which accounted for 36% of the past tense inflections used. Twelve of these instances described non-goal-oriented actions and ten of these instances

described goal-oriented actions. The past progressive was used again in Stage V (four instances) which accounted for 8% of the past tense inflections used. All four instances depicted non-goal-oriented actions.

Thus in comparing the two contexts, spontaneous and elicited, the subjects' performances were very similar with the exception of Stage IV. In Stages I, II, III, and IV-V the present progressive was not used in either context. In Stage V, there were four instances of the past progressive in each context (equivalent to 4% of the spontaneous language data and 8% of the task data), and all of them described non-goal-oriented actions. In Stage IV, the past progressive was not used in the spontaneous language context but was used in the elicited task context. All twenty two instances occurred in one subject's data (Subject 10).

The Learning of Verbal Inflections: Rule Governed or Lexical

Regularization of Irregular Past Tense Forms

A comparison of the two sets of data (see Table 38) by subject (18 total) revealed similarities and differences. Ten (56%) of the subjects performed similarly in both contexts. Specifically, seven subjects did not regularize irregular past tense forms in both contexts and three subjects did regularize irregular past tense forms in both contexts. For the three subjects that did regularize irregular past forms in both contexts, the proportional use

was greater in the task context. Eight (44%) of the subjects performed differently in the two contexts (regularization of irregulars in one context and not in the other context). The majority of the subjects regularized the irregular past tense forms in the task context vs. the spontaneous language context.

In sum, more subjects regularized irregular past tense forms and many more irregular verbs were regularized in the task data. Specifically, five subjects regularized irregular past tense forms in the spontaneous language context and nine subjects did so in the elicited task context. A comparison of the average proportional use of regularized irregular forms by linguistic level revealed a higher proportion in the task context for the majority of stages (I, IV, IV-V and V) and an equal proportion in Stage II (0). Stage III is the only developmental level in which average proportional frequency was higher in the spontaneous language context.

Simultaneous Emergence and Use of Synonymous Forms (irregular/-ed)

The distribution of past tense inflections at each linguistic level was examined in both sets of data, the spontaneous language samples and the elicited task (see Table 41). In the spontaneous language context, the irregular inflection was used more frequently at every stage. The regular inflection was used infrequently at all stages and not at all in Stage II. Overall, the

proportional use of the irregular inflection decreased from .91 to .69 from Stage I to Stage V (with some increases and decreases in between). Inversely, the proportion of regular past tense forms increased from .09 to .31 (with increases and decreases in between).

In the elicited task data, as in the spontaneous language data, the irregular was inflected more frequently at each linguistic stage. The regular inflection was not used at all in Stages I, II, and III. The proportion of irregular past tense forms decreased from Stage I, II, and III (all 1.0) to .50 at Stage V. Inversely, the proportion of regular past tense forms increased from 0 (Stages I, II and III) to .50 at Stage V. Thus, at Stage V, irregular and regular past tense inflections were used equally.

Regarding emergence, the synonymous forms (regular and irregular past) were not used simultaneously in the elicited task situation and for two out of three subjects they were not used simultaneously in the spontaneous language context. In fact, in the task context, they were not used simultaneously until Stage IV. In the spontaneous language context, they were not used simultaneously in Stage II.

Thus, in sum and in response to the eighth research question, comparisons between the two contexts were made regarding use of past tense inflections, inflectional use and verb aspect (matrix), use of past progressive, regularization of irregular past tense forms and simultaneous emergence and use of synonymous forms

(irregular/-ed). While the absolute and average proportional frequency of past tense inflections was higher in the spontaneous language sample, the developmental pattern was similar for both contexts. That is, the past tense inflection was used relatively infrequently in Stages I, II, and III and increased markedly in use in Stages IV, IV-V, and V.

A comparison of the matrices (based on inflectional use and verb aspect) revealed that the overwhelming majority of the verbs in the durative/goal-oriented (verbs with -s) and durative/non-goal-oriented (verbs with -ing) cells were common to both contexts. The data in the non-durative/goal-oriented cell (verbs with irregular/-ed) showed more disparity between the two contexts. In addition, more verb stems appeared in the spontaneous language context vs. the task context. The use and non-use of the past progressive forms were very similar in the two contexts with the exception of Stage IV where one subject's responses accounted for all of the past progressive forms in the task context.

Regarding regularization of irregular past tense forms, 56% (10/18) of the subjects performed similarly in both contexts. For the subjects that performed differently in the two contexts, more subjects regularized irregular past tense forms and many more irregular verbs were regularized in the task context.

The same basic pattern of use for the irregular and

regular past tense inflections occurred in the two contexts. In both contexts, the irregular inflection was used more frequently. In addition, the proportional use of the irregular inflection decreased and inversely the proportion of regular inflections increased as a function of MLU. At emergence (earliest linguistic level), the synonymous forms (irregular and regular past tense) were not used simultaneously by any of the subjects in the task context and for two out of three subjects in the spontaneous language context. In fact, in the task context, they were not used simultaneously by any subject until Stage IV. In the spontaneous language context, they were not used simultaneously by any subject in Stage II.

In conclusion, differences did exist between results collected from the spontaneous language data and the elicited production data.

Summary

The results of this study are summarized as follows:

1. There was little developmental change in the frequency of occurrence of contexts for inflections. However, a significant developmental change was noted in the use of verb inflections.

2. A dependency relationship existed between the occurrence of the verb inflections and the semantic-syntactic categories of children's sentences at each linguistic level.

3. Use of inflections.

(a) Three of the verb inflections (-ing, -s, and irregular) were used simultaneously at emergence and at each of the subsequent linguistic levels.

(b) Individual differences were noted regarding the use of the individual morphemes in the majority of linguistic stages. However, in Late Stage V, all three subjects used all four inflections at least 60% of the time.

(c) At emergence, the inflections were distributed selectively with different populations of verbs. As utterance length increased, use of the verb inflections was extended to more verb categories, was productive for more children, and more different inflections were used within a verb category. In the majority of cases, the proportional use of the verb inflections increased within the verb categories.

4. The rank orders of the -ing, -s, and irregular inflection varied for the different linguistic levels. The -ed inflection, however, was consistently ranked last. More similarities than differences were noted in comparing the rank orders found in the present investigation to Bloom, Lifter and Hafitz's (1980) data. Minor differences were noted in comparing the results to Brown's (1973) order of acquisition. Differences between Brown's (1973) data and the present investigation were noted in the rate of acquisition of the verb inflections.

5. (a) The semantics of verb aspect played a major

role in the development of the verb inflections. In accordance with Bloom, Lifter and Hafitz's (1980) study, the semantic distribution of the children's action verbs according to the aspectual contrasts goal-oriented /non-goal-oriented and durative/non-durative was co-extensive with the selective use of one or another of the verb inflections. A comparison of the verbs listed in the different cells of the matrix in Bloom, Lifter and Hafitz (1980) and the present investigation revealed a high degree of correspondence.

(b) Pro-verbs were frequently used and often occurred with more than one inflection. An increase in the use of inflected pro-verbs was noted from Stage I to II, as in Bloom, Lifter and Hafitz's (1980) data. With the exception of Stages I and II, the use of the different inflections with the pro-verbs did not follow a consistent developmental pattern.

(c) State verbs occurred selectively with one or another inflection when they were initially inflected. Public State verbs were inflected more frequently than Internal State verbs.

6. Two post-hoc analyses on (a) do-support and (b) matrix forms revealed that both of these linguistic structures occurred selectively with different populations of verbs and specific verb inflections.

7. Elicited task context results revealed that:

(a) The past tense inflection was used

infrequently in Stages I, II and III and increased significantly in use by Stage IV.

(b) The children's responses were influenced by the goal-oriented/non-goal-oriented aspectual opposition. The durative/non-durative contrast did not affect their responses significantly. Additional evidence was obtained that revealed their attention to verb aspect (use of present and past progressive forms).

(c) The children were linguistically encoding both tense and aspect by Stage IV. However, there was some (sparse) evidence to suggest that both of these semantic notions may be encoded at an earlier linguistic level.

8. Post-hoc analyses on the task data revealed that:

(a) Pro-verbs were often substituted for target verbs and inflected pro-verbs accounted for the vast majority of inflected verbs used in the early linguistic stages (I, II and III).

(b) A matrix based on aspectual oppositions was generally consistent with Bloom, Lifter and Hafitz's (1980) data.

9. Evidence was gathered in support of each of the following hypotheses:

(a) The learning of verb inflections is rule governed (regularization of irregular past tense forms, simultaneous emergence of inflections and non-simultaneous emergence of synonymous forms.

(b) The learning of verb inflections is lexical

(verbs occurred with only one verb inflection at emergence, and irregular inflections ranked first or second in Stages I, II, and III).

10. Many similarities (e.g., in the developmental pattern for overall past tense usage and for use of regular and irregular past tense) were noted in comparing the two contexts (spontaneous language samples and elicited production task). However, some differences were also observed (e.g., proportional use of past tense inflection, use of past progressive, and regularization of irregular past tense).

DISCUSSION

The verb system plays an integral part in the development of language structure (Bloom, 1978). The relationship between the development of verb inflections and the semantic organization of verbs in child language has been explored in this study and has proven to be both complex and fascinating. The findings of the present investigation will be discussed in terms of the major questions that this study was designed to answer.

The first major point is that while there was little developmental change in the frequency of occurrence of contexts for verb inflections, there was a developmental change noted in the use of verb inflections, as a function of MLU. These results are consistent with Bloom, Lifter and Hafitz's (1980) findings. In fact, the average proportional frequencies for the occurrence of contexts for inflections were extremely similar, .36 and .40, for Bloom, Lifter and Hafitz's (1980) study and the present investigation, respectively.

An examination of the developmental use of the verb inflections revealed that the most apparent proportional increase occurred between Stage III (.43) and Stage IV (.88). Children in Stages I, II and III performed

similarly, as did children in Stages IV, IV-V and V. The same pattern was observed when the chronological ages of the children were examined. That is, the greatest age difference among the subjects was found between Stage III (mean age=26 months) and Stage IV (mean age=30.3 months). Again, the ages of the children were very similar within Stages I, II and III and within Stages IV, IV-V and V.

The correspondence found between verb inflectional use and age indicates that age may be a good predictor of use of inflections. Similarly, the overall increase in use of inflections as a function of MLU indicates that MLU is also a predictor of verb inflectional use. Brown (1973) suggested that MLU and age taken together might be a better indicator of the acquisition of grammatical morphemes than either is alone. deVilliers and deVilliers' (1973), on the contrary, suggested that MLU is a far better predictor of the acquisition of the morphemes in the early stages of language development than is chronological age. The speculation that age may be a good predictor of verb inflectional use in the present investigation may be explicable given the methodological differences between the present study and deVilliers and deVilliers' (1973) research. The present investigation focused on the relative use of verb inflections, whereas, deVilliers and deVilliers (1973) studied the acquisition of all fourteen grammatical morphemes.

The significant differences found between Stages III

and IV and the similarities found within Stages I, II, and III (MLU < 3.0) and within Stages IV, IV-V and V (MLU > 3.0) for verb inflectional use and chronological age are not idiosyncratic. The same pattern was observed for use of the past tense inflection in both contexts, proportional frequency of inflected pro-verbs in the task context, and proportional frequency of regularization of irregular past tense forms in the task context. Thus an MLU of 3.0 appears to represent a critical turning point in the development of verb inflectional use. Up until an MLU level of 3.0, the verb inflections were used infrequently. More consistent use appeared when MLU increased beyond the 3.0 level. This point in development may signify children's initial application of a general rule for inflectional usage. It may also be consistent with children's initial encoding of tense relations ('aspect' and 'tense' will be examined in a subsequent section of this discussion). Bloom, Lifter and Hafitz (1980) studied children's use of inflections until an MLU of 3.0, so cross-study comparisons regarding this 'turning point' were not possible. deVilliers and deVilliers (1973) did not make particular mention of this MLU level although it was included within their MLU range. Future research is needed to confirm the importance of this critical level.

The second major finding was that an interaction existed between the occurrence of the verb inflections and the semantic/syntactic verb categories (action, state,

agent-, patient-, and mover-locative action) at each linguistic level (MLU 1.5-4.5). This result is consonant with Bloom, Lifter, and Hafitz's (1980) data on early language development (MLU 1.5-3.0).

> The occurrence of inflections was not independent of the verb typology that was based upon verb meaning differentiated according to whether a) relevant movement occurred (the Action/State distinction); b) the goal of movement was a change in place (the Action/Locative Action distinction); and/or c) the object that changed place was also the agent of the movement (the distinction among Mover-, Patient- and Agent-Locative Action). (Bloom, Lifter and Hafitz, 1980, p. 393)

Thus, the semantic organization of the children's verb system is an important factor in the learning of verbal inflections, not only at emergence but also at more advanced linguistic levels (MLU 4.5-highest linguistic level studied). In fact, the semantic organization of verbs has been shown to be the major influence on what children learn about several structural aspects of language, not only verb inflections. Specifically, "learning the structure of simple sentences, complex sentences, questions, and discourse is mediated by the meanings of verbs" (Bloom, 1978, p. 2).

The third major point concerns the individual use of the verb inflections. Two main results were found

from the various analyses performed.

1. At least three (-ing, irregular and -s) of the verb inflections emerged together and were used at each linguistic level and

2. The inflections occurred selectively with different categories of verbs in the earliest linguistic stages and gradually became more widely used as MLU increased.

These results concur with Bloom, Lifter and Hafitz's (1980) data but differ from the earlier research of Brown (1973), Berko (1958), and deVilliers and deVilliers (1973). Their studies implied that grammatical morphemes are learned sequentially and apply in general to all of a child's verbs (Bloom, Lifter and Hafitz, 1980).

The selectivity found for verb inflectional use in this investigation has been reported to be related to different syntactic structures. For example, Bloom, Merkin and Wootten (1982) found that the wh- question forms were used selectively with different populations of verbs. In addition, the three syntactic structures that have been observed in children's complex sentences (conjunction, relativization, and complementation) developed with different populations of verbs (Bloom, Lahey, Hood, Lifter & Fiess, 1978).

The fourth point is related to the rank order of inflectional use. Results revealed that most of the inflections (-ing, -s, and irregular) maintained different

positions at different linguistic stages. The only consistent results were: (a) -ed was ranked last in all linguistic stages in which it was used, (b) all four verb inflections were used at each linguistic level (with the exception of Stage II, when -ed was not used) and (c) the same order of use was observed in Stages I and V. Bloom, Lifter and Hafitz's (1980) results were far more consistent in that for all three developmental periods (I, II and III), overall use was greatest for irregular and least for -ed. The higher degree of consistency across linguistic levels found by Bloom, Lifter and Hafitz (1980) may mean that following the same children longitudinally leads to more uniform developmental results than observing different children cross-sectionally.

Many similarities were noted in Stages II and III, when comparing the rank orders of the present investigation to Bloom, Lifter and Hafitz's (1980) study. More differences appeared in Stage I (point of emergence). These divergent findings in rank order, however, do not seem to be as important as the result that all four inflections were used simultaneously at emergence (Stage I) and at all the subsequent linguistic levels (with the exception of Stage II).

Relatively minor differences were found in comparing the rank orders in the present investigation to Brown's (1973) and deVilliers and deVilliers' (1973) data. However, Brown (1973) reported that all three of his subjects reached

his criterion for acquisition for -ing, and one of his children reached criterion for irregular in Stage II. On the contrary, in the present investigation, the -ing and irregular inflections were used in 90% of obligatory contexts only in Stage IV. Brown (1973) concluded that while order of acquisition was almost invariant, rate of acquisition varied widely among the children.

The fifth major point pertains to the complex issue of tense and aspect. Many of the results from both the spontaneous language sample and the elicited production task contexts (research questions five and six) relate to this topic.

The distributional analysis that was performed on the verb inflections used with action verbs in the spontaneous language context (Stages I-III) revealed a matrix (based on aspectual distinctions, durative/non-durative and goal-oriented/non-goal-oriented) that was remarkably similar to the one included in Bloom, Lifter and Hafitz (1980). That is, the majority of the data revealed that the same verb stems appeared with the same verb inflections in both studies. Thus, the different verb inflections were used selectively, and this selectivity co-occurred with distinctions of verb aspect. The aspectual meanings of the individual verbs in both studies influenced the learning of verb inflections--specifically, the selective use of the different morphemes.

Beginning in Stages III, IV and IV-V, approximately 15%

of the verbs used with inflections were used with more than one inflection. Bloom, Lifter, and Hafitz (1980) also found that this had begun to happen in the third developmental period in their study. By Stage V, 25% of the verbs that were used occurred with more than one inflection. Bloom, Lifter and Hafitz (1980) claimed that the occurrence of different inflections with the same verb would be considered as evidence that children are encoding tense.

According to Bloom, Lifter and Hafitz (1980), another piece of evidence which would show that children are encoding tense is the inflection of the auxiliary be. One or two instances were noted in which the present tense form of be was used in Stages I and II. Its frequency of use increased developmentally beginning with Stage III. However, only in Stage V were both variants of the auxiliary be (is and was) used with -ing. Similarly, Harner (1981) found that the 3 year olds in her study used both the present and past forms of be.

Thus, from the spontaneous language data, we can conclude that verb aspect is the major influence on the children's learning of verb inflections in the earliest linguistic stages. This result is consistent with Aksu (1978), Stephany (1981), Bloom, Lifter and Hafitz (1980) and Antinucci and Miller (1976). Beginning in Stage III, we see evidence (e.g., different verb inflections for same verb stem) of children encoding tense as well as aspect.

The present findings sharply contrast with Bronckart

and Sinclair's (1973) statement that children must be able to decenter in order to code tense. According to Bronckart and Sinclair (1973), children who are in the pre-operational stage of language development (approximately up to age 6) can not encode tense relations. The children in this study coded tense long before age 6. "It is undeniable that children's time talk becomes more complex notionally and syntactically, at or near the age of six years; but they have the notion of pastness and the linguistic means for expressing it well before that age" (Smith, 1980, p. 273). Weist (1983) also agreed that relatively young children are capable of decentration. Assuming then that cognitive development is essentially the same in all cultures, Stephany (1981) explained that the differences between languages in terms of when tense is coded, must be attributable to differences in the formal linguistic structure between languages.

The results of the task context, as in the spontaneous language data, indicated that aspect is a major factor in the children's use of verb inflections. Significantly more past tense inflections were used when the children described goal-oriented versus non-goal-oriented past actions. The children's attention to and their linguistic coding of aspect was further evidenced by (a) the more frequent use of past progressive forms for non-goal-oriented actions in Stages IV and V and (b) the more frequent use of the present progressive form (error response) for non-goal-oriented

actions in Stages IV and IV-V. DiPaolo and Smith (1978) found that for their younger subjects (approximately 4 1/2 or 5 years old), there was no clear relation between type of error and action type.

The aspectual contrast durative/non-durative did not influence the children's responses significantly in the task context. Likewise, Weist et al., (1984) found that the durative/non-durative distinction is not a basic opposition in child Polish. In contrast, Aksu's (1978) results revealed that the punctual/durational aspectual distinction may be the first one made in Turkish. Bronckart and Sinclair (1973) found that this distinction influenced their subjects' responses significantly only for perfective (goal-oriented) events and only for those subjects between the ages of 3 and 6. "Imperfective (non-goal-oriented) events are considered to be of indeterminate duration precisely because of the absence of a result "(Bronckart and Sinclair, 1973, p. 123) . . . "Possibly, duration is not an 'aspect' by itself" (p. 126).

Another important finding of the task context was that some children in each of the linguistic levels studied demonstrated an understanding of temporal relations, that is, events were coded as past regardless of verb aspect. However, the evidence from Stages I, II and III cannot be weighed heavily since use of past tense was so infrequent in these early linguistic levels. Nevertheless, it is noteworthy that more of the children in these stages used

the past tense to describe both types of actions, rather than confining its use to describe goal-oriented actions only, as Antinucci and Miller (1976) found.

In the more advanced linguistic levels (IV, IV-V, and V), all of the subjects used the past tense for both goal and non-goal-oriented actions, that is, they were able to code deictic tense relations.

In summary, results of the task context revealed that both tense and aspect were clearly coded in children's responses in Stages IV, IV-V and V. Such strong claims cannot be drawn from the first three linguistic levels since past tense usage was so low and because results were not consistent for all subjects. What can be said, though, is that there is some evidence (although sparse) to show that while some children were solely coding aspectual distinctions, others were beginning to code tense relations as well in these early stages of language development.

In coordinating the results from the two contexts, the spontaneous language context more clearly supports the linguistic hypothesis that children code Aspect before Tense. Evidence for coding tense did not consistently appear until Stage III, while event aspect exerted an influence on verb inflections prior to that linguistic level.

In the task context, results showed that both aspect and tense were coded in Stages IV, IV-V and V. The lack of sufficient data (infrequent use of past tense) in Stages I,

II, and III did not enable the investigator to reach a firm conclusion on whether aspect preceded tense in these stages. As noted earlier, however, the little data that were obtained revealed the possibility that for some children aspect and tense are coded as early as Stage I. This suggestion sharply contrasts with Brown (1973) who stated that tense, aspect and mood are omitted from Stage I grammar.

In conclusion, the data from the present investigation generally supports the notion of Aspect before Tense in language development. This finding is in agreement with Stephany (1981), Antinucci and Miller (1976), Bloom, Lifter and Hafitz (1980) and Aksu (1978). DiPaolo and Smith (1978) and Harner (1981) studied older children (3-8) and they were already encoding both aspectual and temporal features of actions when they described past actions. Despite the evidence in the present investigation that supported the principle of Aspect before Tense, there are data (however sparse) to show that for at least some of the children, tense may be learned simultaneously. That is, aspect is clearly the major influence on verb inflectional development, but tense may be learned concurrently for some children. Harner (1981) and Weist et al. (1984) suggested "Tense and Aspect concurrently" rather than "Aspect before Tense."

In order to answer the question of which distinction (tense or aspect) is made first, future investigators need

to gather more production data on children's use of past tense inflections in the earliest linguistic levels. In fact, since some of the children provided occasional examples of coding tense and aspect in the lowest linguistic stage, future research should include data on children with MLU's below 1.5, in order to ensure the capture of the initial point of tense shifting (use of past morpheme to code tense) in children.

Along the same lines, future research should also extend beyond an MLU of 4.5 (highest MLU level studied in this investigation) since the verb inflections were still in the process of being acquired at this level. Smith (1980) categorized children's development of time talk into phases. In Phase I, Smith (1980) explained that children's temporal ordering system involves only two times, Speech Time (ST) and Event Time (ET) and the basic relational values of simultaneity and sequence. Their orientation is fixed at ST. According to this model, past refers to a time preceding ST. Children within this stage can signal aspectual distinctions, but "linguistic complexity can interfere with the integration of aspect and temporal ordering" (Smith, 1980, p. 276). The syntax of Phase I is limited to verb inflections and occasional use of adverbials. All of the subjects in the present investigation fall into this phase of development. Smith (1980) describes Phase II as one in which children can narrate a sequence of times from a point of view other than

the present. According to Smith (1980), this phase begins by about the fourth year. None of the children in the present investigation had attained this phase of development. Data on children with MLU's above 4.5, need to be collected. Smith (1980) concludes with an explanation of the adult system of time talk which has a third time, Reference Time (RT) that is related to the others (ST and ET) by simultaneity or sequence. In addition, orientation time is no longer fixed at ST.

The low incidence of past tense usage in the task contexts in Stages I, II and III needs to be addressed. This result may be explained by the simple fact that the production task may have been too difficult for the children Harner (1981) suggested the possibility that her youngest subjects (age 3) did not fully grasp that what was wanted was a description of the past action, and instead they described a condition or state of the toy, such as its capacity for performing a given action at any time. The children in the present investigation (Stages I-III) were even younger (between 2 and 2 1/2 years old) than Harner's (1981) subjects.

In addition, the procedures involved in administering the task may have contributed to the infrequent use of the past tense, according to Weist et al. (1984). Weist et al. (1984) claimed that use of the neutral elicitation phrase, "Tell me about X" as Bronckart and Sinclair (1973), DiPaolo & Smith (1978), Harner (1981), and the present investigator

did, is ambiguous and simply asks what children do in ambiguous contexts.

Contrary to this, Weist et al. (1984) used varied elicitation questions and the verbs were imperfective in aspect and in the past tense. Weist et al. (1984) stated that they created the linguistic and non-linguistic obligatory context for a past tense response and that they asked what children can do in an explicit context. Bronckart and Sinclair (1973) purposely avoided using elicitation phrases that included the past tense because they reported that young children tend to use the same tense as the experimenter, thereby biasing the child's response. Weist's et al. (1984) suggestion needs to be incorporated into future studies. The use of more explicit elicitation phrases may prove to facilitate the children's use of past tense without biasing their responses.

Future research on the study of aspect and tense should not only be extended in terms of linguistic levels (as previously suggested), but should be extended to include both future tense and distal past, as well. Little attention has been given to the acquisition of future reference in the literature (with the exception of e.g., Harner, 1982; Herriot, 1969).

Regarding past tense usage, the children in the present study were extremely involved in the actions, events, and objects within the immediate play context (in both spontaneous and task contexts). Thus, it follows that the

past references they encoded were directly related to events that occurred within the present situation (reference to the proximal past). This is not to say that the children were unable to make reference to events and objects outside the immediate context, it is just that they had little opportunity to do so. As stated above, they were primarily concerned with the objects in sight and events currently occurring. In addition, the use of time adverbials to make past references was rare.

Stoel-Gammon and Cabral (1977), in studying children's use of language to describe events absent in space and time, found that the amount of interest a child had in reporting an event and the interactor's prior knowledge of the event were important pragmatic factors in the child's use of the reportative function. Both of these factors (strong interest in immediate context and no common past with the experimenter) may have contributed to the children's infrequent reference to events outside the immediate context. Recent approaches to the study of language acquisition have suggested the importance of pragmatic considerations. Bloom and Lahey (1978) delineated various stages of pragmatic development and sensitivity to context which co-occur with semantic-syntactic development. Specifically, they described the gradual development of the ability to talk about the objects and events that are removed in time and space from the immediate situation. Thus, in examining the development of verbal inflections in

child language, it is necessary to consider the role of pragmatic factors.

Nelson (1983) highlighted that most of the research on tense and aspect has focused on interactive speech and has been concerned with the proximal past. Perhaps in future studies, if children's monologues are recorded in addition to dialogues (as Nelson did, 1983) and if children are visited more often, more opportunities to code the distal past may be established. Another suggestion for future research is to change the focus from experimenter-child interactions to mother-child dyads (as Stephany, 1981 did in the study of Modern Greek). The study of mother-child dyads may prove to be more productive since reference to distal past would be more probable. Following this thought, if more references to the distal past are made, the use of adverbials such as 'yesterday', 'then', 'that day', and 'last time' may become more frequent.

The fact that the current investigation is concerned primarily with the proximal past may also explain the contrasting results between the present investigation and Nelson's (1983) results regarding State verbs. The results of the present investigation indicated that Public State verbs were inflected much more frequently than Internal State verbs, as in Bloom, Lifter and Hafitz's (1980) study. In contrast, Nelson (1983) found that Internal State verbs were overwhelmingly referred to with the past inflection. These divergent results may be explained by the fact that in

the present investigation, as in Bloom, Lifter, and Hafitz's study (1980), interactive speech and proximal past were studied. On the other hand, Nelson (1983) included the distal past and crib talk monologues in her analysis. Under these situational conditions, it was plausible that her subjects would have talked about past internal states. Thus, the type of context in which data are collected can influence verb (State) and verb inflectional usage. Both contexts (interactive dialogues and monologues) may need to be examined in order to form an accurate picture of children's State verb usage.

The results of the present investigation on tense and aspect suggest two clinical implications.

1. In diagnostic procedures used to test children's knowledge of verb inflections, aspectual features must be considered in the selection of appropriate stimulus materials and elicitation phrases. Specifically, pictures used as stimuli can depict actions with different aspectual contours. Similarly, elicitation phrases can describe different aspectual features (e.g., 'he does it everyday' vs. 'he only did it once').

2. If therapeutic intervention is based on normal development then--

(a) the aspectual contrast, goal-oriented/non-goal-oriented should be considered in the selection of verbs and activities to be used in the training of verb inflections.

(b) the verb inflections should be taught simultaneously but selectively with different populations of verbs, as opposed to sequentially and across all verb categories as traditionally done.

The present investigator has begun to examine the importance of the semantics of verbs in relation to verb inflectional development in the language disordered population (Birenbaum and Feintuch, 1979; Rand, Kornet, and Feintuch, 1981) using single subject designs. The importance of integrating semantic and pragmatic variables in the training of a syntactic form (verb inflections) was highlighted in Rand, Kornet, and Feintuch, 1981. Additional research using larger sample sizes of children with language disorders is clearly needed.

The sixth major point is related to the post-hoc analyses performed on the data. The occurrence of contexts for, and the actual use of both inflected do-support and matrix forms is what led the present investigator to examine these linguistic forms.

In retrospect it seems evident that the auxiliary 'do' must be included in a study of the verb inflectional system. "Verb inflections cannot be easily separated from the complex system of English auxiliaries" (Cazden, 1968, p. 439). Jacobsen (1978) stated that do-support is a very pervasive phenomenon in the English language.

In both questions and negatives, the markers for tense and person shift to the dummy auxiliary 'do'" (Cazden, 1968,

p. 439). Cazden (1968) offered the following examples:

He walked. Did he walk? He didn't walk.

He walks. Does he walk? He does walk.

According to Gleason (1955), the verb 'do' as an auxiliary (in all its forms-do, did, does, done) is meaningless; it is merely used as a position marker (i.e. of stress). It "occurs in English only where sentence structure demands it . . . it is never required by the meaning" (Gleason, 1955, p. 174). Palmer (1974) referred to 'do' as the 'neutral' or 'empty' auxiliary because it is used only where the grammatical rules for English require it.

In the present investigation, there were occurrences of contexts for inflected do-support and matrix forms in all the linguistic levels. In fact, several instances of inflected do-support and matrix forms appeared in the earlier linguistic levels (Stages II and III for 'do' and Stage III for matrix forms). Yet, Bloom, Lifter and Hafitz (1980) who studied comparable MLU levels did not mention them. It is possible that their subjects had not begun to use these forms, but it seems unlikely that obligatory contexts for their use did not appear by Stage III.

Inflected do-support most often occurred in state utterances which were negative statements. Both the past and the third person singular inflections were used, but with a predominance of third person singular. Nelson (1983) reported that Emily used negative do forms in past utterances. Nelson (1983) speculated that Emily used the

past do-support forms as past markers for verbs for which she did not know the irregular past. It is difficult to support Nelson's (1983) speculation in the present investigation because of the infrequent use of past do-support forms in the early stages (only one instance of 'did' from Stage I-III). By Stage IV, when 'did' was used more frequently, there was evidence that the children used 'did' in sentences with verbs for which they knew the irregular past. In fact, as reported in the results, a frequent error made by children was that the do-support was deleted and the irregular past was used, but incorrectly fixed to the main verb (e.g. Why you gave me this?).

The importance of studying matrix forms is clear as well. "Because sentences with infinitive complements include two verbs, how children acquire infinitive complements is relevant to extending our understanding of the particular relation between the acquisition of complex syntax and the development of the verb system in child language" (Bloom, Tackeff, and Lahey, 1984, p. 392). According to Limber (1973), the structure of infinitive complements is one of the first complex structures to appear.

Inflected matrix forms and infinitive complements began to be used in Stage III (MLU 2.50-2.99). Bloom, Tackeff and Lahey (1984) found that for all four of their subjects, infinitive complements emerged in complement-verb contexts when MLU was about 2.5. All the inflected matrix forms in

the present investigation were state verbs and most of them occurred with -s. Similarly, Bloom, Tackeff and Lahey (1984) found that initially children used a small number of matrix verbs primarily 'want', 'go', 'got' and 'have' as modal verbs expressing the child's mood with a wide variety of different main verbs. This occurred in the present investigation as well. Non-modal matrix forms (e.g., try and ready) appeared after modals in both Bloom, Tackeff and Lahey (1984) and the present investigation.

In sum, the selective populations of verbs with which both do-support forms and matrix forms occurred in the present investigation should be considered as further evidence for the importance of the verb system as a factor in the acquisition of linguistic forms.

In a post-hoc analysis of the verb substitutions made by the children in the task context, it was observed that pro-verbs (e.g., do, go, make and get) were often substituted for the target verbs. A developmental decrease in pro-verb substitutions was noted (with the exception of Stage II). Similarly, Bronckart and Sinclair (1973) found that their youngest subjects up to age 5 or 6 "tended to use in all their descriptions the same, rather vague verbs, for example, 'go' and 'make'" (p. 124). After 6, they reported that standard verbs appeared.

An examination of verb inflectional usage and pro-verb usage revealed that in the earlier linguistic levels (Stages I-III) inflected pro-verbs accounted for approximately half

to all of the inflected verbs used, whereas, in the later linguistic levels (Stages IV, IV-V and V) they accounted for much less (between .14-.31) of all inflected verbs. That is, in these more advanced linguistic levels more specific verbs were used with inflections.

The use of pro-verbs is evident in the spontaneous language data as well. 'Do' and 'go' were the most frequently occurring inflected verbs. In addition, the pro-verbs were the first and most frequent verbs to be used with more than one inflection. The more specific verbs occurred overwhelmingly with only one inflection (at least until Stage IV).

Similarly, Bloom, Merkin and Wootten (1982), in a study of the development of Wh- questions, found that the children made more frequent use of general all-purpose pro-verbs (e.g., go and do) than the more descriptive verbs (e.g., dance and sing) which are "semantically more complex in that (a) they carry more information (b) they involve more restrictions on the selection of other parts of the sentence (e.g., subject and object) and (c) they involve many more conditions for the appropriateness of their use" (p. 1087). Specifically, they found that the great majority of all the children's Wh- questions (what, where and who) with verbs occurred with the pro-verbs. The children learned to ask Wh- questions with descriptive verbs mainly with those Wh-question forms that were acquired late and the verbs that the children used were restricted to one of the Wh- forms

(how and/or why). Thus the children's use of pro-verbs with the wh- pronominals (what, where and who) meant that the child "did not have to sort out the individual semantic and syntactic relations between different nouns and main verbs. The children could have bypassed the difficulty in learning to use main verbs for asking questions by using pro-verbs with Wh- pronominals" (Bloom, 1978, p. 22). The Wh-questions used with main verbs were acquired later.

Thus, both the present investigation and Bloom, Wootten and Merkin's (1982) study have shown that when a linguistic structure is learned, it is used selectively with a few very general high-frequency pro-verbs at first, while the children are still in the process of acquiring a greater variety of more specific verbs. "Having begun to learn something of the structure, the children proceeded to learn other verbs in the context of learning the structure" (Bloom, 1978, p. 27).

The issue of whether the learning of verbal inflections is rule-governed or lexical needs to be addressed. The results of the present investigation provided some indirect evidence to support each of these hypotheses.

The fact that all of the verbs used by the children in the earliest linguistic stages (I and II) occurred with only one variant, one verb inflection (e.g. dance/dancing, break/broke) lends support to the hypothesis that each of these forms may have been learned as individual lexical items. In addition, the irregular inflections were always

ranked first or second in these early linguistic stages (first in I and III and second in II) whereas the -ed inflection was always ranked last. Bloom, Lifter and Hafitz's (1980) results were quite similar. Most of their subjects' verbs also occurred with only one variant and the irregular inflection was always ranked first in their data. The irregular inflection was also ranked first when the deVilliers and deVilliers' (1973) 'method two' of ranking was utilized. This high ranking of the irregular inflection may also indicate that children were learning inflectional forms at first as separate items.

Bloom, Miller and Hood's (1975) study also provided evidence for the notion that verb inflections may be lexically learned. As reported in the literature review, they found that the addition of verb inflections did not constrain utterance length. That is, verb inflections occurred as often with two as with three constituent relations. "There was no cognitive cost in the use of inflections; what the children knew about lexical items apparently included which inflectional forms could occur with a particular lexical item" (Bloom, Lifter and Hafitz, 1980, p. 409).

In contrast to the aforementioned findings supporting the view that lexical learning is involved in the learning of inflections, the results also contain evidence to support the view that grammatical learning is involved.

First of all, the children regularized irregular past

tense forms beginning in Stages III and IV, in the spontaneous language contexts and elicited production contexts (with one exception), respectively. "Overgeneralizations show that the morphological mechanism is productive and regularly applicable to all verbs" (Antinucci and Miller, 1976, p. 181). Bloom, Lifter and Hafitz's (1980) subjects had not yet begun to regularize irregular past tense forms.

Second, results of the task context revealed that some of the children in the earliest linguistic levels showed evidence of encoding past events regardless of verb aspect.

Third, at least three of the inflections (-ing, -s and irregular) were used simultaneously by all subjects at the earliest linguistic level. For one of three subjects, all four inflections emerged together. "The simultaneous emergence and use of the different inflections may indicate that the children had begun to learn a general rule for verb inflection, with variable probabilities for using the different inflections with one or another verb" (Bloom, Lifter and Hafitz, 1980, p. 409).

Fourth, the synonymous forms (regular and irregular past) were not used simultaneously by any of the subjects in Stages I, II and III in the task context. In the spontaneous language context, two out of three subjects did not use these forms simultaneously in Stage I, and it was not until Stage IV-V that they were used simultaneously.

Bloom, Lifter and Hafitz (1980) enumerated four sources

of evidence which "would support the assumption that learning of inflections of the verb entailed learning a rule of grammar . . . one would be the encoding of speech time/event time relations regardless of verb aspect, another would be the regularization of irregular forms . . . another would be the simultaneous emergence/use of the verb inflections and another would be the non-simultaneous emergence of -ed/irregular (synonymous forms)" (p. 409). The first two pieces of evidence were not yet manifest in their data, the last two were included. All four sources of evidence appeared in the present investigation.

The results on the use of regular and irregular past forms revealed that as the proportional use of the irregular inflections decreased developmentally, the proportion of regular inflections increased in both contexts. This inverse relationship indicates that initially the irregular past tense inflections (e.g., came, ate) are memorized as separate unanalyzed lexical items with no past meaning for the child (Kuczaj, 1977). Likewise, Bowerman (1974) found that children's causative verbs are initially unanalyzed forms and only later does the child become aware of their internal structure. Subsequently, when the child begins to learn a single general rule for the past tense, he applies it more and more, as less memorized forms appear in the data. Hence, an increase in regular past tense inflections with a compensating decrease in irregular past tense inflections occurs. Eventually, the child learns that the

irregular past tense forms are exceptions to the general rule and he begins to acquire them as true past tense forms (Kuczaj, 1977).

Following this logic, Kuczaj (1977) reports that the irregular inflection is a more difficult acquisition than the regular past tense form. The children in this study, even at the highest linguistic level (Stage V) were still in the process of acquiring the regular past tense rule. This explains the high incidence of "no verb inflection" error in Stage V. Kuczaj (1977) reports that only after the child has gained full control of the past tense rule, will he stop using errors (verb without inflection).

Bloom, Lifter and Hafitz (1980) concluded by stating, "Lexical and grammatical learning inform one another, and appear to be complementary rather than mutually exclusive processes. The learning of rules for verb inflection appears to be facilitated by the semantics of the verb and the semantic-syntactic relations of the sentences that the children learn. With development, the probability of using different inflections with one or another verb would change, when children learn to consider deictic information" (Bloom, Lifter and Hafitz, 1980, p. 410).

The final issue concerns the value of using spontaneous language data and elicited production data on the same children in a complementary way in order to study a specific language behavior. The advantages and disadvantages of using either of these methods independently has been raised

in the literature review.

In the present investigation, many of the results were similar in both contexts. For example, in both sets of data, the same developmental pattern was found for the use of the past tense inflections; the irregular inflection was used more frequently and in earlier linguistic levels than the regular inflection; the synonymous forms did not emerge together; and the use of the irregular inflection decreased developmentally as the regular inflection increased inversely. Other similarities were found in the matrices (based on the aspectual contrasts), specifically, in the cells in which the verbs with the -s and -ing inflections appeared.

Despite the aforementioned similarities, differences were found as well. For example, (a) some children coded deictic temporal relations (although evidence was sparse) earlier in the task context vs. the spontaneous language context, (b) the children used the past progressive form (indication of attention to aspect) in an earlier linguistic stage in the task context, (c) children used the past tense inflection more frequently (absolute and proportional) in the spontaneous language context, (d) more children regularized the irregular past tense forms more frequently in the task context vs. the spontaneous language context and (e) regarding the matrices (based on aspectual oppositions) many of the verbs that occurred with -ed in the task context occurred in different cells in the spontaneous language

context.

This list of differences is not exhaustive and some of these differences are more important than others. In addition, many of the differences are explicable given the nature of the contexts. Nevertheless, the important point is that some of the differences would have led the investigator to reach different conclusions if only one of the contexts been used as a data base. For example, if the spontaneous language context had been used exclusively--a strong claim could have been made for the principle of Aspect before Tense. On the other hand, if only elicited production data had been collected, the principle of Aspect and Tense concurrently could have been suggested.

Thus, the value of the complementary use of spontaneous language and elicited production contexts is apparent. It leads to a more complete and accurate description of a child's knowledge. Similarly, Bloom and Lahey (1978) state "the combined use of information from low structured observations and elicitation tasks provides the most complete picture of the child's content/form/use interactions" (p. 440). These results suggest a clinical implication as well. Observational language samples should always be collected in conjunction with elicited task data in evaluating a child's language capabilities. The value of using these two data bases in a complementary way has been shown to offer a more comprehensive and accurate picture of the child's linguistic knowledge. The use of either of

these contexts independently may lead to an incomplete evaluation of the child's abilities.

Summary and Conclusion

The purpose of the present investigation was to explore the relationship between the development of the verb inflections (present progressive -ing, regular and irregular past tense and third person singular) and the semantic organization of the verbs used in early sentences. More specifically, the relationship between the verb inflections and a) the semantic-syntactic relations of the sentence and b) the semantics of verb aspect were examined (Bloom, Lightbown and Hood, 1980).

Another main objective of this investigation was to provide cross-sectional data on the development of the verb inflections in early child language and to determine whether these data would validate Bloom, Lifter and Hafitz's (1980) findings.

The major results of the present investigation confirmed Bloom, Lifter and Hafitz's (1980) findings in that (a) at emergence, the verb inflections (-ing, -s and irregular) were used simultaneously but selectively with different populations of verbs, (b) the verb inflections were influenced by and, in fact, were dependent upon the semantic organization of verbs (the sentence relations between verbs and other constituents/semantic-syntactic structure and verb aspect). This confirmation of Bloom, Lifter, and Hafitz's (1980) findings provides added support

for the hypothesis that cross-sectional data can be used as an effective and efficient means for validating longitudinal results (as deVilliers and deVilliers, 1973 and Brown, 1973).

Results generally supported the linguistic principle of Aspect before Tense but there was sparse evidence to suggest that for some children both may be encoded simultaneously. Future research was suggested to investigate this possibility. Clinical implications were proposed.

The present investigation extended beyond Bloom, Lifter and Hafitz's (1980) MLU range (1.50-3.00) and results revealed that a significant interaction existed between the occurrence of verb inflections and the semantic-syntactic verb categories even at Stage V (MLU 4.5-highest linguistic level studied). However, the selectivity of the individual verb inflections with specific populations of verbs was not as apparent in these more advanced linguistic levels.

In addition, the value of the complementary use of spontaneous language data and elicited production data in the study of verb inflections was demonstrated and a clinical consideration was highlighted.

Evidence was gathered in support of the hypothesis that both lexical and grammatical learning may be involved in the learning of verbal inflections.

The major conclusion, as Bloom, Tackeff and Lahey (1984) found in their study of to in complement constructions, is that "both lexical and syntactic features

of verbs exert a major influence on the acquisition of linguistic structures in children's sentences and that the development of the verb lexicon and the development of grammar are mutually dependent" (p. 405). Hence, this investigation provided an example of the synergy between syntax and semantics.

Finally, it is important to put this piece of research into an historical perspective. Syntax and semantics have often been viewed as autonomous entities. According to Chomsky (1957), the syntactic component of the grammar made the most important contribution to sentence structure. In fact, most studies of child language development in the early 1960's focused on syntax--the formal regularity in children's use of word order (e.g., Braine, 1963). In the early 1970's, the semantic regularity in the meaning relations between words became the primary source of attention (e.g., Bloom, 1970). In line with the thinking of that era, the studies on grammatical morphemes up until the late 1970's focused on their order of acquisition and on the syntactic and semantic complexity of the individual morphemes. The use and function of children's language (pragmatics) became an important component of language acquisition studies in the middle to late 1970's (e.g., Bates, 1976; Dore, 1979).

The interaction of all three components: syntax, semantics and pragmatics is evident in the study of verb inflectional development. The results of this study have

focused primarily on the interrelation of syntax and semantics but pragmatics has been shown to be an important variable as well. The syntactic structure of the sentence, the semantics of verb aspect and the context (e.g., here and now vs. there and then, type of listener and setting etc.) all affect the use of verb inflections and must all be considered as important dimensions in a study of their development.

Table 1

MLU Levels Under Investigation

Brown's Stage	MLU Range of Stage
Late Stage I	1.50 - 1.99
Stage II	2.00 - 2.49
Stage III	2.50 - 2.99
Early Stage IV	3.00 - 3.49
Late Stage IV-Early Stage V	3.50 - 3.99
Late Stage V	4.00 - 4.49

Table 2

Subject Description

Subject	MLU	Age in Months	No. of Utterances Used	Brown's Stage
1. J.P.	1.94	23	301	I
2. J.S.	1.95	28	289	I
3. B.F.	1.98	24	594	I
4. D.M.	2.36	29	368	II
5. M.B.	2.40	30	624	II
6. J.B.	2.47	23	454	II
7. L.W.	2.74	24	606	III
8. A.S.	2.86	25	576	III
9. V.D.	2.91	29	366	III
10. Aim.S.	3.14	36	349	IV
11. J.L.	3.40	31	825	IV
12. J.C.	3.43	24	367	IV
13. P.G.	3.68	31	416	IV-V
14. J.H.	3.74	25	685	IV-V
15. J.W.	3.87	32	849	IV-V
16. C.W.	4.04	28	702	V
17. R.F.	4.16	31	603	V
18. Y.S.	4.30	30	681	V

Table 3

Mean MLU, Chronological Age, and Number of Utterances At Each Linguistic Level

Stage	Mean MLU	Mean Age in Months	Mean # of Utterances
I	1.96	25	395
II	2.41	27.3	482
III	2.84	26	516
IV	3.32	30.3	514
IV-V	3.76	29.3	650
V	4.17	29.7	662

Table 4

Goal-Oriented Actions

1.	X climb into (bunk) bed
2.	X break cookie
3.	X draw dog
4.	Dog jump over blocks as ran into house
5.	X go down slide
6.	X walk into schoolhouse
7.	X push truck into house (garage-type)
8.	X ride bike to house

Example - X close book.

Note. X = A variety of dolls were used.

Table 5

Non-Goal-Oriented Actions

1.	X swim in water
2.	X dance
3.	X ride bicycle round and round
4.	X walk
5.	X push baby carriage around and around
6.	X draw scribbling
7.	X go up and down see-saw
8.	X jump on floor

Example - X rock crib.

Note. X = A variety of dolls were used.

Table 6

The Verbal Inflections Under Investigation

	Verbal Inflection	Example
1.	Present Progressive	She is laughing.
2.	Third Person Singular	She laughs.
3.	Regular Past	She laughed.
4.	Irregular Past	You came.

Table 7

Absolute Frequency of Relational Utterances per Subject and Mean Frequency Per Language Level

Subject	Relational Utterances	Stage	Relational Utterances
1	78		
2	121	I	130.33
3	192		
4	78		
5	272	II	174
6	172		
7	319		
8	253	III	246.33
9	167		
10	168		
11	352	IV	255
12	245		
13	200		
14	359	IV-V	290.33
15	312		
16	309		
17	374	V	345.67
18	354		

Table 8

Proportional Frequency of Occurrence of Contexts for Inflections at Each Linguistic Level

Stage	Occurrence of Contexts for Inflections
I	.48
II	.32
III	.43
IV	.39
IV-V	.39
V	.44

Table 9

Proportional Frequency of Use of Verb Inflections at Each Linguistic Level

Stage	Use of Verb Inflections
I	.34
II	.22
III	.43
IV	.88
IV-V	.81
V	.80

Table 10

Comparison of Distribution of Verb Inflections and Relational Utterances Across the Verb Categories; Chi Square Values

Subject	X^2 Value	Significance Level (2x5 Chi Square Test, 4 d.f.)	Significance Level (2x3 Chi Square Test, 2 d.f.)[a]
1	7.26	NSD	.05
2	20.16	.001	
3	31.54	.001	
4	7.57	NSD	.05
5	9.50	.05	
6	20.43	.001	
7	36.74	.001	
8	54.62	.001	
9	14.07	.01	
10	21.61	.001	
11	16.48	.01	
12	39.47	.001	
13	21.24	.001	
14	16.11	.01	
15	48.97	.001	

(table continues)

Subject	X^2 Value	Significance Level (2x5 Chi Square Test, 4 d.f.)	Significance Level (2x3 Chi Square Test, 2 d.f.)[a]
16	15.91	.01	
17	9.49	.05	
18	36.05	.001	

Note. NSD=No Significant Difference

[a] performed on data from subjects 1 and 4 only.

Table 11

Average Percentile Usage of Inflection at Each Linguistic Level

Stage	Inflection	Average Percentile Usage
I	-ing	46
	-s	29
	irregular	30
	-ed	6
II	-ing	27
	-s	5
	irregular	52
	-ed	0
III	-ing	37
	-s	47
	irregular	41
	-ed	20
IV	-ing	90
	-s	85
	irregular	98
	-ed	23

(table continues)

Stage	Inflection	Average Percentile Usage
IV-V	-ing	83
	-s	81
	irregular	74
	-ed	38
V	-ing	83
	-s	75
	irregular	83
	-ed	70

Table 12

Use of Individual Inflections Within Verb Categories

Stage	Verb Category	-ing	-s	irregular	-ed
I	Action	.60**		.40**	.06**
	State	.08**	.17**	.36*	
	ALA				
	MLA				
	PLA		.33		
II	Action	.26**		.68**	
	State	.25**	.04**	.17*	
	ALA			.33	
	MLA	.15*			
	PLA		.05*		
III	Action	.57**	.67	.43**	.11**
	State	.31**	.50**	.29**	.26*
	ALA	.50*			
	MLA			.33*	
	PLA	.33*	.59**		

(table continues)

Stage	Verb Category	-ing	-s	irregular	-ed
IV	Action	.93**	.41**	.33*	.25**
	State	.90**	.60**	1.0**	
	ALA	.55**			
	MLA	.61*		.67*	
	PLA	.33*	.98**		
IV-V	Action	.80**	.84**	.55**	.37**
	State	.80**	.70**	.93**	.33
	ALA	.64*		.67*	
	MLA	.86**		.22*	
	PLA		.80**		
V	Action	.86**	.92**	.77**	.62**
	State	.90**	.77**	.93**	
	ALA	.25**		.89*	.33*
	MLA	.61**	1.0	.83**	
	PLA	.33*	.78**		

Note. A blank cell represents either:
1. inflection did not occur, or
2. the use of the inflection was non-productive within a category (fewer than three contexts for inflection)

* - inflection was productive (at least three obligatory contexts) for only one child
** - inflection was productive for at least two children
unasterisked - inflection was not productive for any single child

Table 13

Rank Order of Inflection Use at Each Linguistic Level

Stage	Inflection	Average Rank[a]
I	-ing	1.67
	irregular	2.17
	-s	2.50
	-ed	3.67
II	irregular	1.0
	-ing	2.0
	-s	3.0
III	-s	1.67
	irregular	2.17
	-ing	2.50
	-ed	3.67
IV	irregular	1.17
	-ing	2.0
	-s	2.83
	-ed	4.0

(table continues)

Stage	Inflection	Average Rank[a]
IV-V	-s	1.83
	-ing	2.0
	irregular	2.50
	-ed	3.67
V	-ing	1.66
	irregular	2.0
	-s	3.0
	-ed	3.33

Note. Within child differences were split if the difference in use was less than or equal to .03 (3%)

[a]Averaged across children within a linguistic level.

Table 14

Comparison of Rank Order of Inflection Use by Bloom, Lifter and Hafitz (1980) and Present Investigation

	Bloom, Lifter and Hafitz (1980)	Present Investigation
Stage		
I	irregular	-ing
	-s	irregular
	-ing	-s
		-ed
II	irregular	irregular
	-ing	-ing
	-s	-s
	-ed	
III	irregular	-s
	-s	irregular
	-ing	-ing
	-ed	-ed

Table 15

Comparison of Rank Order of Acquisition of Verb Inflections in Brown (1973) and deVilliers and deVilliers (1973) and Rank Order of Use in Present Investigation

Brown (1973) and deVilliers and deVilliers (1973)	Present Investigation
-ing	irregular
irregular	-ing
-ed	-s
-s	-ed

Note. Criterion for Acquisition or Extent of Use

Brown (1973) - The presence of the morpheme in 90% or more of obligatory contexts in three successive speech samples from a particular child. The morphemes were then ranked in order of acquisition for each child and rank-order correlations among the three orderings were calculated.

deVilliers and deVilliers (1973) - Method II - The percentages for each morpheme were summed across the children and averaged and then these mean percentages were ranked.

Present Investigation - Identical to deVilliers and deVilliers (1973).

Table 16

Distribution of Inflections and Verbs According to Semantic-Syntactic Category - Stage I

Semantic-Syntactic Category	Co-Occurrence of Inflections and Verbs							
	-ing		-s		irregular		-ed	
Action	do	5[a]	say	2	break	9	happen	2
	tie	5	hop	1	buy	4		
	fly	3			get	3		
	go	3			take	2		
	take	2			fall	1		
	come	1						
	cry	1						
	dance	1						
	eat	1						
	fish	1						
	knock	1						
	ride	1						
	run	1						
State	look	1	open	1	find	1		
			say	1	hear	1		
Agent-Locative Action								
Mover-Locative Action								
Patient-Locative Action			fit	2				

[a] Frequency of occurrence.

Table 17

Distribution of Inflections and Verbs According to Semantic-Syntactic Category Stage II

Semantic Syntactic Category	Co-Occurrence of Inflections and Verbs							
Action	-ing		-s		irregular		-ed	
	do	6[a]			do	3		
	play	1			fall	2		
					bite	1		
					break	1		
					give	1		
					make	1		
State	sleep	2	stay	1	find	1		
	look	1						
	watch	1						
Agent-Locative Action					bring	2		
Mover-Locative Action	come	4						
Patient-Locative Action			go	1				
			fit	1				
			put	1				

[a] Frequency of occurrence.

Table 18

Distribution of Inflections and Verbs According to Semantic-Syntactic Category - Stage III

Semantic-Syntactic Category	Co-Occurrence of Inflections and Verbs			
	-ing	-s	irregular	-ed
Action	turn 3[a] shake 2 dance 1 draw 1 get 1 go 1 have 1 sing 1 sweep 1 talk 1 touch 1 wipe 1	open 2 come- off 1	break 9 fall 4 make 4 buy 3 do 2 get 2 go 1 say 1	close 2 kick 1
State	go - sleep 4 look 3 sleep 2 sit 1 smile 1	smell 9 go 4 sit 2 want 2 have 1 know 1	see 3 have 1 sleep 1	remem- ber 11
Agent-Locative Action	get 1 take 1			
Mover-Locative Action	go 1		go 2 come 1	
Patient-Locative Action	go 7	go 19 stay 1		

[a] Frequency of occurrence.

Table 19

Distribution of Inflections and Verbs According to Semantic-Syntactic Category - Stage IV

Semantic-Syntactic Category	Co-Occurrence of Inflections and Verbs									
Action	**-ing**			**-s**		**irregular**		**-ed**		
	do	35[a]	open	2	open	7	do	3	bounce	1
	run	13	take-off	2	drive	1	give	2	happen	1
	go	6	build	1	fall	1	fall	1	open	1
	play	5	drive	1	go	1	say	1	work	1
	ring	5	kiss	1			take	1		
	turn	4	laugh	1						
	climb	3	rough - ride	1						
	come	3	sweep	1						
	eat	3	swim	1						
	paint	3	try	1						
	pick	3	work	1						
	ride	3	write	1						
	dive	2								
	get	2								
	happen	2								
	make	2								
State										
	sit	9	lay	1	want	10	find	2		
	look	3	listen	1	say	5	was	11		
	sleep	2	stand	1	belong	1	have	1		
	watch	2	try	1	have	1	hurt	1		
	guess	1			like	1	leave	1		
					look	1	see	1		
					sit	1	want	1		
					stand	1				
Agent-Locative Action										
	take	9					take	1		
	pick-up	1								
Mover-Locative Action										
	go	5					come	6		
	come	1					go	1		
Patient-Locative Action										
	go	2			go	28	come	2		
	come	1			come	4				
	get	1			belong	1				
					fit	1				

[a] Frequency of occurrence.

Table 20

Distribution of Inflections and Verbs According to Semantic-Syntactic Category - Stage IV-V

Semantic Syntactic Category	Co-Occurrence of Inflections and Verbs									
Action	-ing			-s		irregular		-ed		
	do	11[a]	close	1	stop	8	say	8	open	4
	go	8	cry	1	do	4	fall	4	happen	3
	make	5	dance	1	open	4	break	3		
	drink	3	fall	1	go	3	do	3		
	eat	3	help	1	close	2	make	3		
	talk	3	play	1	spin	2	get	3		
	backup	2	put	1	walk	2	give	1		
	build	2	rewind	1	drop	1	take	1		
	open	2	ring	1	fly	1	take -			
	turn	2	walk	1	make	1	off	1		
					turn	1	tell	1		
State										
	lay	4	go	1	have	15	see	7	want	1
	watch	4	go-		belong	6	was	4		
	look	3	sleep	1	go	6	find	2		
	sit	3	hold	1	sit	6	forget	2		
	stand	2	miss	1	close	1	lose	2		
	wait	2	try	1	lay	1				
			wake	1	like	1				
					look	1				
					need	1				
					say	1				
					sleep	1				
					walk	1				
					want	1				
					work	1				
Agent-Locative Action										
		put	6				take	2		
		bring	2				bring	1		
		do	2				get	1		
		get	2							
		take	1							
Mover-Locative Action										
		come	7	come	2		go	2		
		go	7							
		get	1							

(table continues)

Semantic Syntactic Category	Co-Occurrence of Inflections and Verbs			
-ing	-s		irregular	-ed
Patient-Locative Action				
	go	36	go 1	
	fit	2		
	come-off	1		

[a] Frequency of occurrence.

Table 21

Distribution of Inflections and Verbs According to Semantic-Syntactic Category - Stage V

Semantic-Syntactic Category	Co-Occurrence of Inflections and Verbs									
Action	-ing			-s		irregular		-ed		
	do	8[a]	dump	1	do	7	fall	13	happen	17
	close	3	eat	1	come-		do	8	close	4
	fall	2	fight	1	off	1	break	3	knock	2
	knock	2	fish	1	close	1	get	3	crash	1
	move	2	happen	1	daven	1	say	3	cry	1
	lay	2	jump	1	go	1	make	2	fool-	
	say	2	kiss	1	move	1	give	1	around	1
	sweep	2	laugh	1	open	1	take	1	snap	1
	come-		talk	1	say	1				
	off	1	tickle	1	talk	1				
	cry	1	wash	1						
State										
	wear	10	hide	1	want	27	wake	4	want	1
	sleep	7	lay	1	have	17	have	3	happen	1
	try	6	look	1	go	16	lose	3		
	sit	3	take-		belong	11	think	3		
	stand	3	nap	1	sleep	7	was	3		
	hold	2	wake-		come		find	2		
	come	1	up	1	out	3	mean	2		
	have	1			sit	3	break	1		
					lay	2	go	1		
					wake up	2	see	1		
					feel	1				
					hold	1				
					like	1				
					stand	1				
					work	1				
Agent-Locative Action										
			leave	1	pickup	1	take-		pickup	5
			put	1			out	2		
			take	1			bring	1		
							go	1		
							get	1		

(table continues)

Semantic-Syntactic Category	Co-Occurrence of Inflections and Verbs							
	-ing		-s		irregular		-ed	
Mover-Locative Action								
	go	11	come	3	go	6		
	climb	1			come	3		
					get	2		
	go	11			fly	1		
Patient-Locative Action								
	fit	3	go	18	go	1		
	attach	1	attach	6				
	go	1	fit	4				
			come	2				

[a] Frequency of occurrence.

Table 22

Proportion of Inflections that Occurred With the Pro-Verbs "do" "go" "make" and "get"

Stage	-ing	-s	irregular
I	.21	0	.13
II	.33	.08	.33
III	.22	.65	.32
IV	.34	.38	.09
IV-V	.38	.33	.23
V	.26	.28	.34

Table 23

Average Proportion of Inflections that Occurred with State Verbs

Stage	Inflections with State Verbs
I	.08
II	.17
III	.28
IV	.22
IV-V	.27
V	.45

Table 24

Distribution of State Verb with Inflections

Stage	Shared State Verb				Proportion	Non-Shared State Verb				Proportion
	-ing	-s	irregular	-ed		-ing	-s	irreg	ed	0
I	look 1[a]	open 1 say 1	hear 1 find 1		1.0					
II	sleep 2 watch 1 look 1	stay 1	find 1		1.0					
III	smile 1 sleep 2 go sleep 4 sit 1 look 3	smell 9 have 1** sit 2 go 4	see 3 sleep 1 is 1 have 1**		.70		know 1** want 2		remember 11	.30
IV	sleep 2 look 3 watch 2 sit 9 stand 1 lay 1 listen 1	sit 1 have 1 say 5 stand 1 look 1 belong 1	find 2 have1** leave 1 see 1 is 11		.75	try 1 guess 1	want 10 like 1	want** hurt 1		.25
IV-V	sit 3 go sleep 1 watch 4 lay 4 wake 1 stand 2 look 3 hold 1 go 1 wait 2	belong 6 have 15 sleep 1 work 1 sit 6 walk 1 look 1 go 6 lay 1 close 1	is 4 see 7 lose 2 find 2		.91	miss 1 try 1	need 1 like 1 want 1	forget 2	want 1	.09

(table continues)

Stage	Shared State Verb				Proportion	Non-Shared State Verb				Proportion
	-ing	-s	irregular	-ed		-ing	-s	irreg	ed	0
V	take nap 1 wear 10 stand 3 sit 3 come 1 sleep 7 wake up have 1 hide 1 lay 1 look 1 hold 2	lay 2 have 17 go 16 sit 3 sleep 7 wake up 2 belong 11 look 1 hold 1 stand 1 come 3 work 1	wake 4 have 3 find 2 is 3 go 1 break 1 lose 3 see 1	happen 1	.74	try 6	like 1 want 27 feel 1	think 3 mean**2	want 1	.26

[a] Frequency verb inflected

** Do support used and inflected

Table 25

Average Proportional Frequency of Occurrence of Contexts for Inflected Do-Support at Each Linguistic Level

Stage	Occurrence of Context
I	.04
II	.06
III	.20
IV	.08
IV-V	.13
V	.16

Table 26

The Absolute and Average Proportional Frequency of Use of Inflected Do-Support at Each Linguistic Level

Stage	Use of Inflected Do-Support
I	(0) 0
II	(1) .06
III	(7) .44
IV	(9) .33
IV-V	(12) .14
V	(33) .55

Table 27

Distribution of Errors - (Do Support)

	Error Type		
	Type 1	Type 2	
Stage	-Do, - Inflec.	-Do, + Inflec. on Main Verb	Total Errors
I	8	0	8
II	8	0	8
III	52	0	52
IV	8	7	15
IV-V	6	30	36
V	20	17	37

Table 28

Absolute and Proportional Frequency of Use of Inflections with Matrix Verbs

Stage	Use of Inflection
I	0 (0)
II	0 (0)
III	17 (.87)
IV	13 (1.0)
IV-V	7 (1.0)
V	36 (.88)

Table 29

The Absolute and Proportional Frequency of Correct (Past Tense) Responses - Structured Task

Stage	Correct Responses
I	7** (.07)
II	6 (.06)
III	5 (.05)
IV	61 (.64)
IV-V	56 (.58)
V	50 (.52)

Note. Total possible correct responses per stage=96

Table 30

Absolute and Proportional Frequency of Past Tense Responses for the Two Categories of Actions

Stage	Past Goal-Oriented	Past Non-Goal-Oriented
I	4 (.57)	3 (.43)
II	5 (.83)	1 (.17)
III	4 (.80)	1 (.20)
IV	32 (.52)	29 (.48)
IV-V	34 (.61)	22 (.39)
V	30 (.60)	20 (.40)

Table 31

Absolute and Proportional Frequency of Past Tense Responses for Durative and Non-Durative Counterparts of Goal-Oriented and Non Goal-Oriented Actions

	GOAL-ORIENTED		NON-GOAL-ORIENTED	
Stage	Non-Durative	Durative	Non-Durative	Durative
I	1 (.25)	3 (.75)	2 (.67)	1 (.33)
II	3 (.60)	2 (.40)	1 (1.0)	0 (0)
III	2 (.50)	2 (.50)	1 (1.0)	0 (0)
IV	16 (.50)	16 (.50)	16 (.55)	13 (.45)
IV-V	17 (.50)	17 (.50)	11 (.50)	11 (.50)
V	15 (.50)	15 (.50)	11 (.55)	9 (.45)

Table 32

Absolute and Proportional Frequency of Simple Past and Past Progressive Responses for Past Actions

	GOAL-ORIENTED		NON GOAL-ORIENTED	
Stage	Past Progressive	Simple	Past Progressive	Simple
I		4 (1.0)		3 (1.0)
II		5 (1.0)		1 (1.0)
III		4 (1.0)		1 (1.0)
IV	10 (.31)	22 (.69)	12 (.41)	17 (.59)
IV-V		34 (1.0)		22 (1.0)
V		30 (1.0)	4 (.20)	16 (.80)

Note. Blank Cell - no occurrence

Table 33

Absolute and Proportional Frequencies of Error Responses

Stage	GOAL-ORIENTED Present -ing		Present -s		No verb inflection		No verb		AC/VR[a]		NR[b]		NON GOAL-ORIENTED Present -ing		Present -s		No verb inflection		No verb		AC/VR		NR	
I	(2)	.05	(10)	.24	(18)	.43	(8)	.19			(4)	.10	(1)	.02	(8)	.18	(27)	.60	(4)	.09			(5)	.11
II	(1)	.02			(30)	.71	(10)	.24	(1)	.02			(2)	.04			(27)	.60	(12)	.27	(4)	.09		
III	(17)	.39	(7)	.16	(16)	.36	(3)	.07	(1)	.02			(20)	.43	(6)	.13	(21)	.45						
IV	(1)	.07	(1)	.07	(11)	.79	(1)	.07					(5)	.26	(1)	.05	(12)	.63	(1)	.05				
IV-V	(1)	.07			(11)	.79	(2)	.14					(7)	.27	(2)	.08	(16)	.62	(1)	.04				
V	(2)	.12	(4)	.24	(11)	.65							(2)	.07	(5)	.17	(22)	.76						

Note. Blank Cell = no occurrence

[a] AC/VR = action/verbal response

[b] NR = no response

Table 34

Absolute Frequency of Verb Substitutions For Four Action Types Per Language Level

Stage	D/NG	ND/NG	D/G	ND/G	Total
I	16	13	12	13	54
II	12	10	11	12	45
III	11	12	10	11	44
IV	9	10	10	13	42
IV-V	7	7	12	10	36
V	5	7	11	9	32

Note. D/ND = Durative/Non-Goal-Oriented

ND/NG = Nondurative/Non-Goal-Oriented

D/G = Durative/Goal-Oriented

ND/G = Nondurative/Goal-Oriented

Table 35

Average Proportional Frequency of Pro-Verb Substitutions

Stage	Pro-Verb Substitutions
I	.79
II	.22
III	.58
IV	.49
IV-V	.44
V	.37

Table 36

Absolute and Proportional Frequency of Inflected Pro-Verb Substitutions

Stage	Inflected Pro-Verb Substitutions
I	(3) .07
II	(3) .30
III	(5) .20
IV	(19) .90
IV-V	(16) .94
V	(7) .58

Table 37

Proportional Frequency of Past Tense Responses Which were Pro-Verbs

Stage	Pro-Verbs/Past Tense Responses
I	.43 (3/7)
II	.50 (3/6)
III	1.0 (5/5)
IV	.31 (19/61)
IV-V	.29 (16/56)
V	.14 (7/50)

Table 38

Absolute and Proportional Frequency of Regularization of Irregular Past Tense Forms Per Subject and Mean Proportional Frequency Per Stage in Spontaneous Language Sample and Structured Task Contexts

		LANGUAGE SAMPLE		STRUCTURED TASK	
	Subject	Regularization	Mean Use	Regularization	Mean Use
I	1				
	2		0		.17
	3			(1) .50	
II	4				
	5		0		0
	6				
III	7	(2) .13			
	8	(3) .38	.17		0
	9				
IV	10			(1) .50	
	11		.03	(3) .16	.31
	12	(2) .10		(3) .27	

(table continues)

		LANGUAGE SAMPLE		STRUCTURED TASK	
Subject		Regularization	Mean Use	Regularization	Mean Use
	13			(4) .29	
IV-V	14		0		.43
	15			(10) 1.0	
	16			(1) .33	
V	17	(2) .09	.04	(5) .56	.40
	18	(1) .04		(3) .30	

Note. Blank slot = no occurrence

Table 39

Absolute and Proportional Frequency of Verbs Used with More Than One Inflection

Stage	Verbs With More Than One Inflection
I	(0) 0
II	(0) 0
III	(7) .15
IV	(13) .16
IV-V	(14) .15
V	(28) .25

Table 40

The Absolute and Average Proportional Frequency of Use of the Past Tense (irregular/-ed) in Spontaneous Language Sample and Elicited Task Contexts

Stage	Language Sample		Elicited Task	
I	(23)	.23	(7)	.07
II	(12)	.36	(6)	.06
III	(48)	.39	(5)	.05
IV	(40)	.77	(61)	.64
IV-V	(58)	.64	(56)	.58
V	(109)	.76	(50)	.52

Table 41

Distribution (Absolute and Proportional Frequency) of Past Tense Inflections (irregular and regular) in Spontaneous Language Sample and Elicited Task Contexts

	Language Sample				Elicited Task			
Stage	Irregular		Regular		Irregular		Regular	
I	(21)	.91	(2)	.09	(7)	1.0	(0)	0
II	(12)	1.0	(0)	0	(6)	1.0	(0)	0
III	(34)	.71	(14)	.29	(5)	1.0	(0)	0
IV	(36)	.90	(4)	.10	(44)	.72	(17)	.28
IV-V	(50)	.86	(8)	.14	(38)	.68	(18)	.32
V	(75)	.69	(34)	.31	(25)	.50	(25)	.50

Figure 1. Average percentage usage of inflections at each linguistic level.

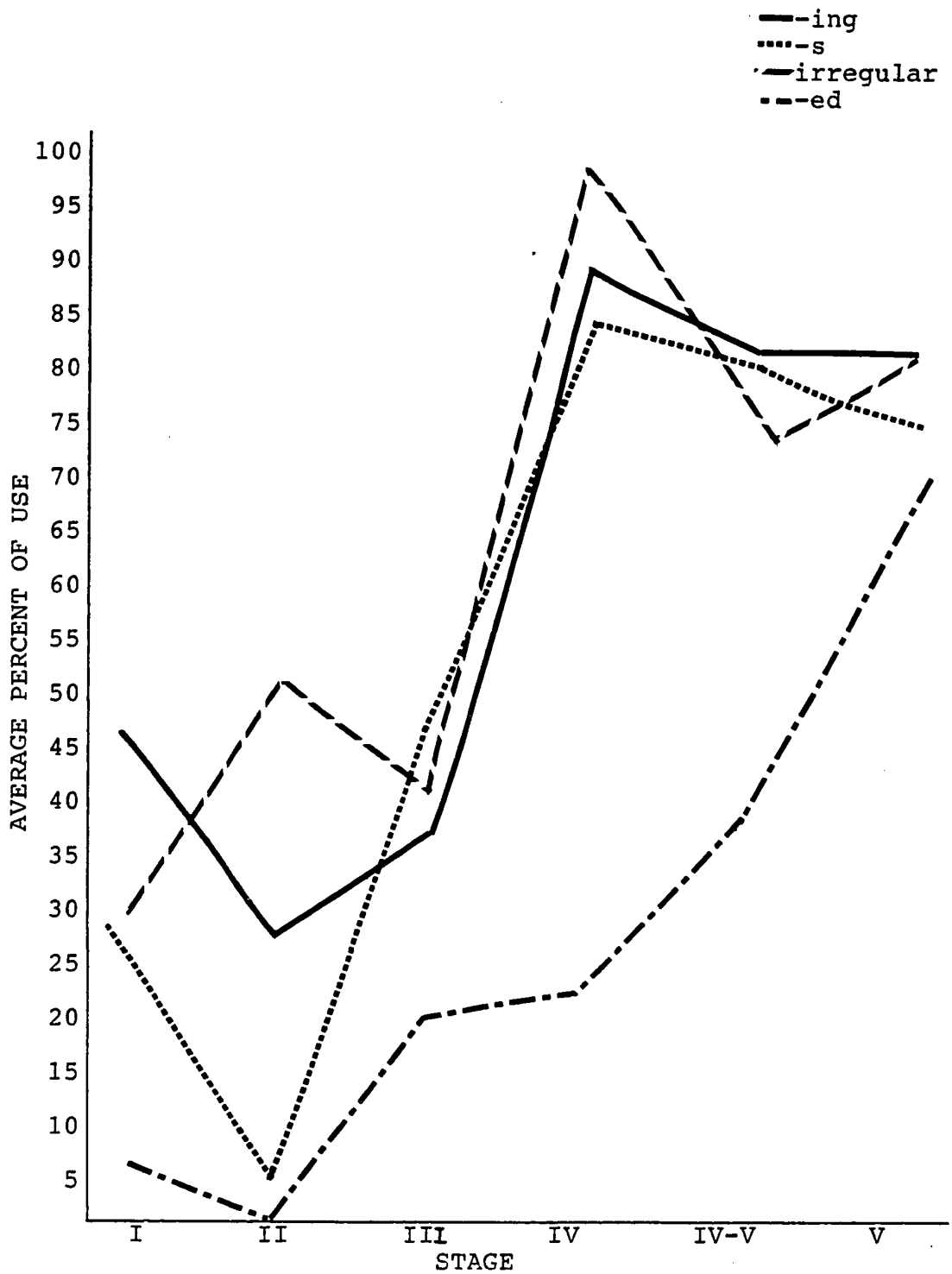


Figure 2. Use of individual inflections at Late Stage I.

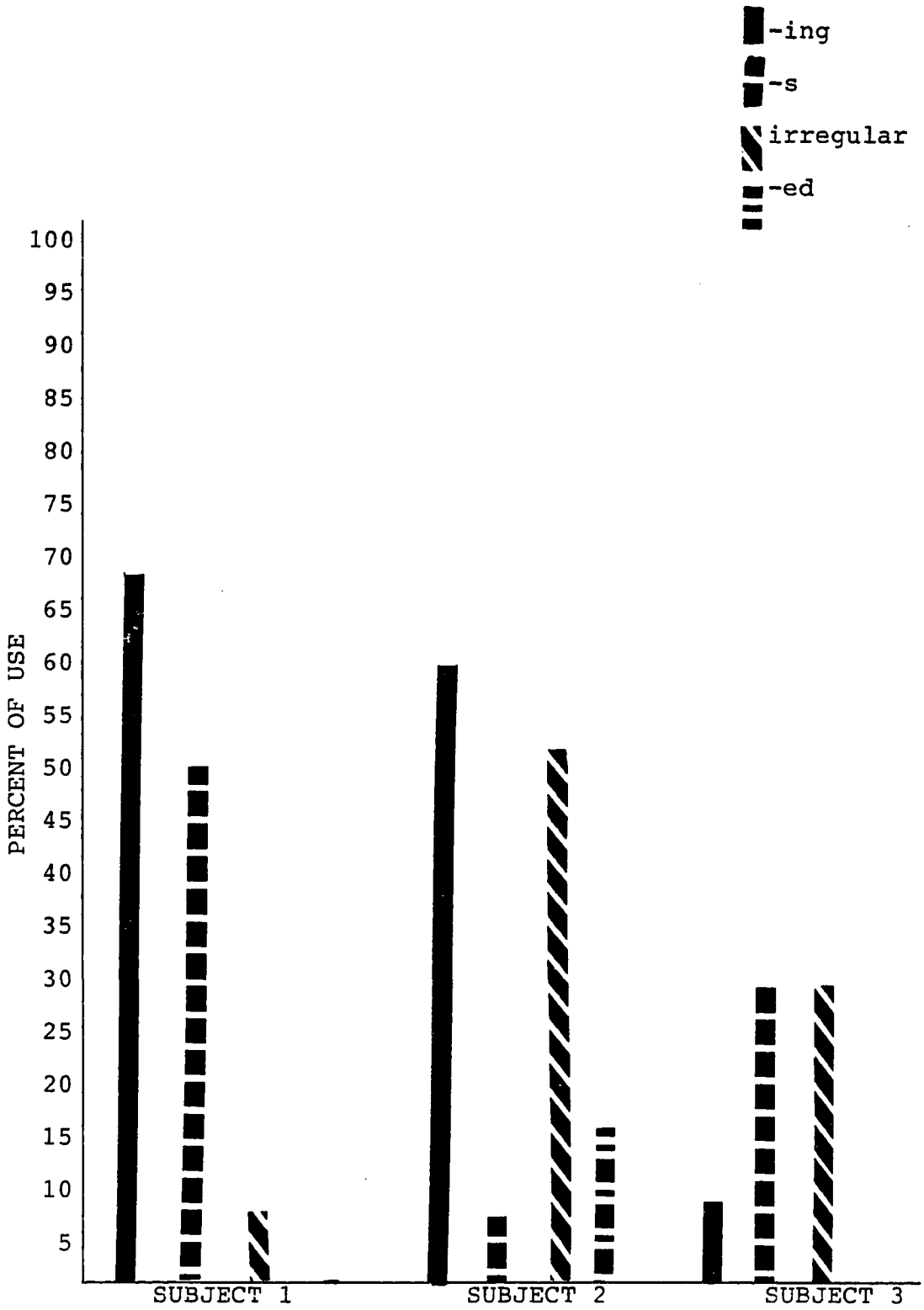


Figure 3. Use of individual inflections at Stage II.

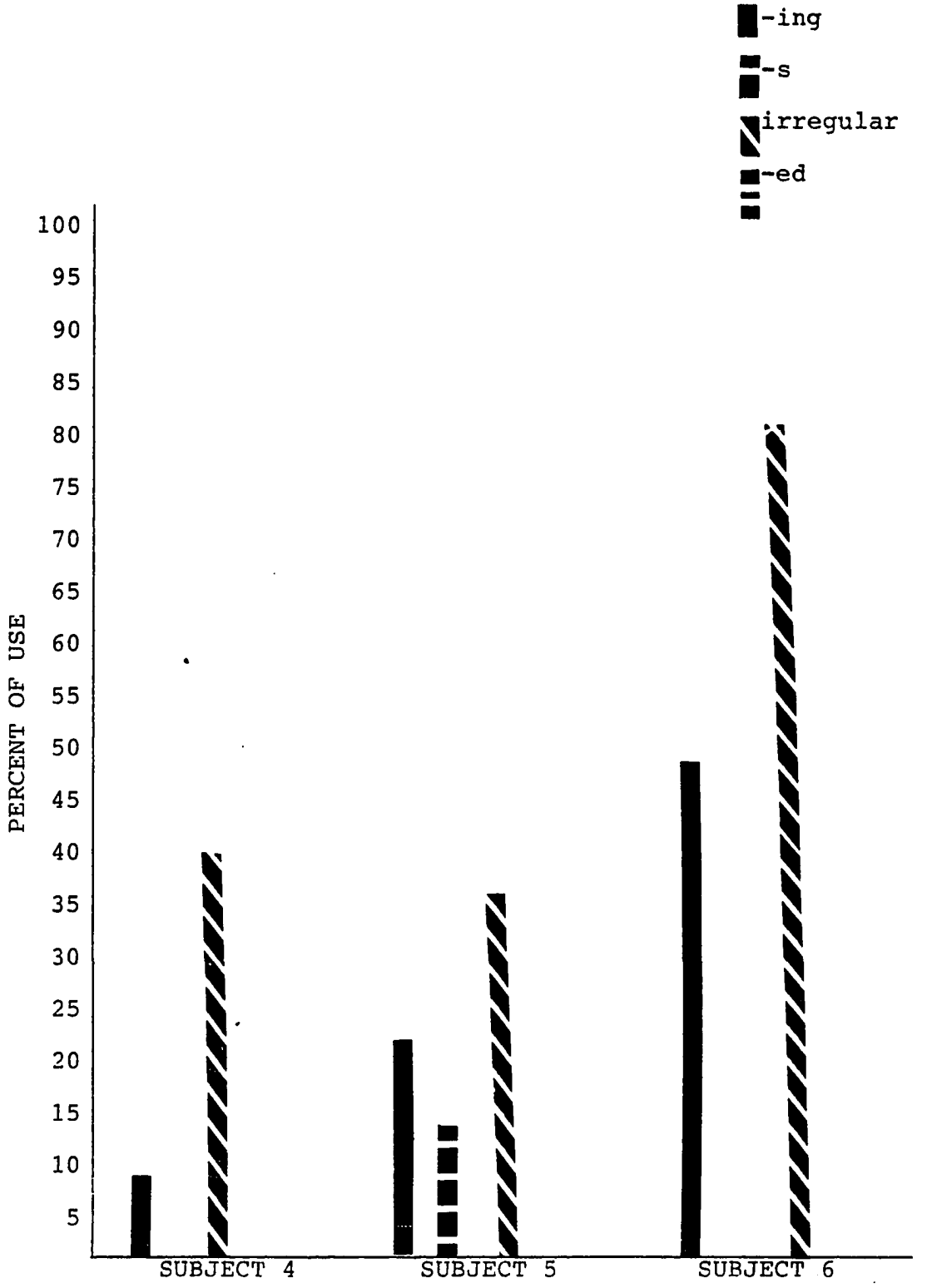


Figure 4. Use of individual inflections at Stage III.

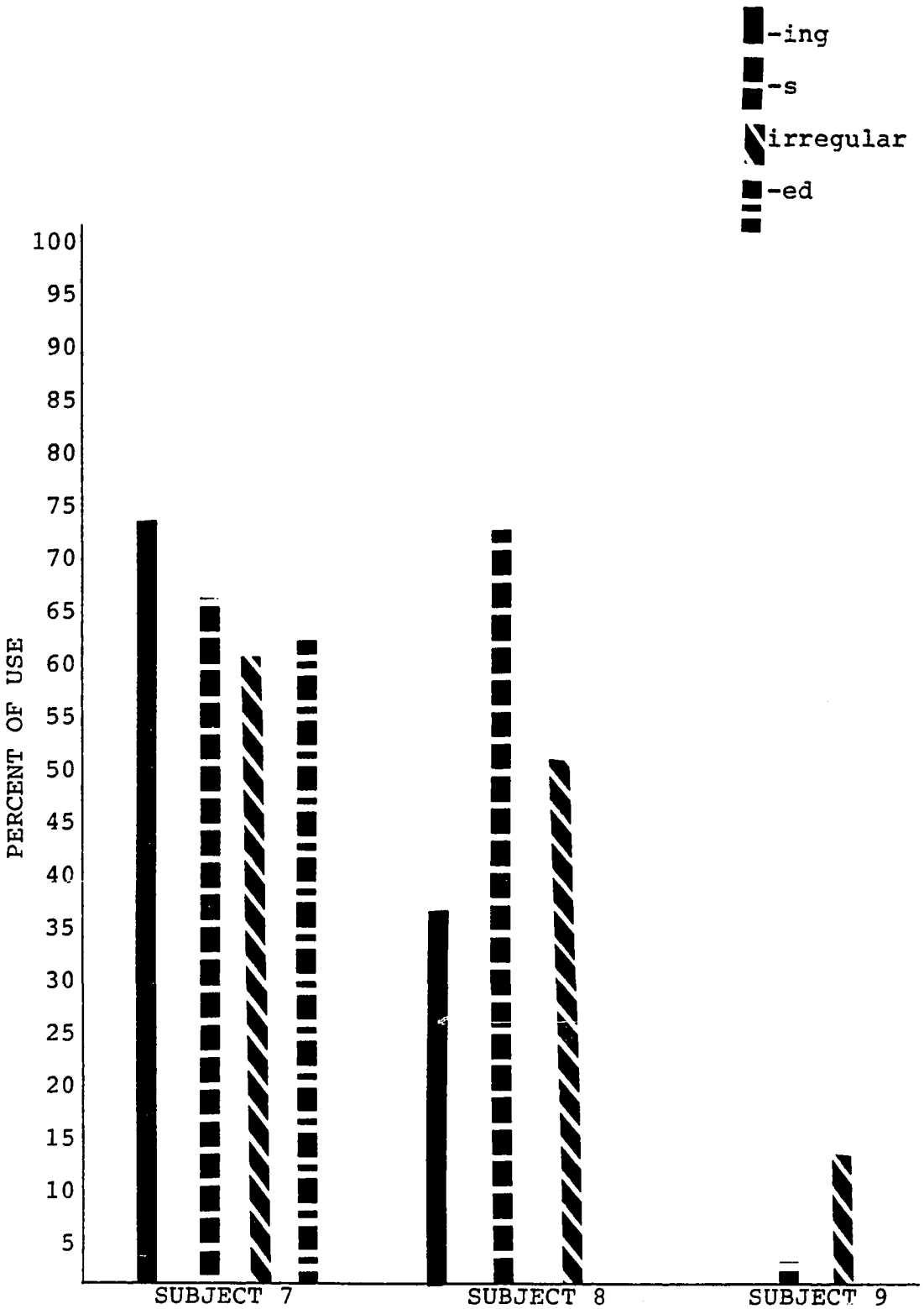


Figure 5. Use of individual inflections at Early Stage IV.

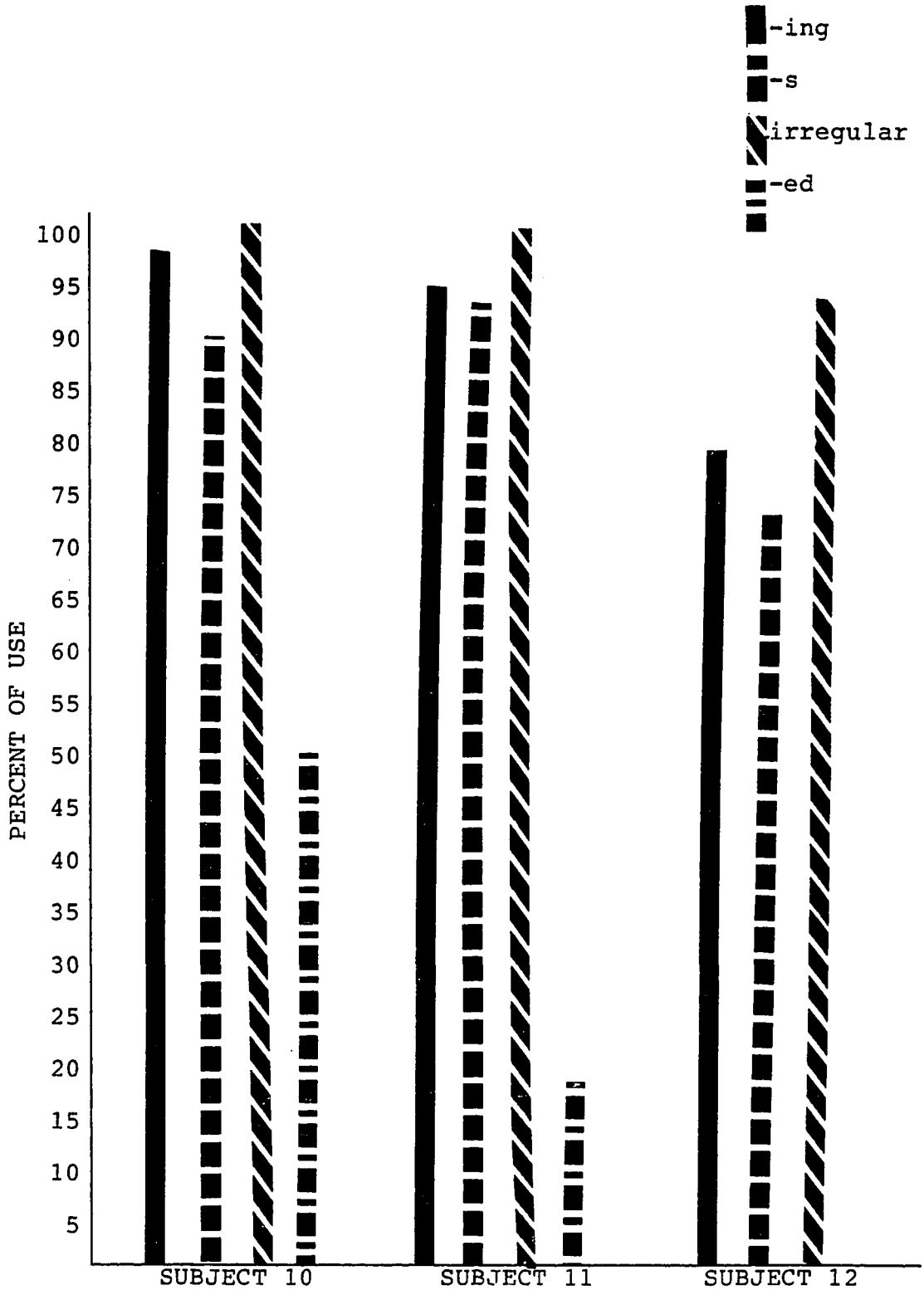


Figure 6. Use of individual inflections at Late Stage IV-Early Stage V.

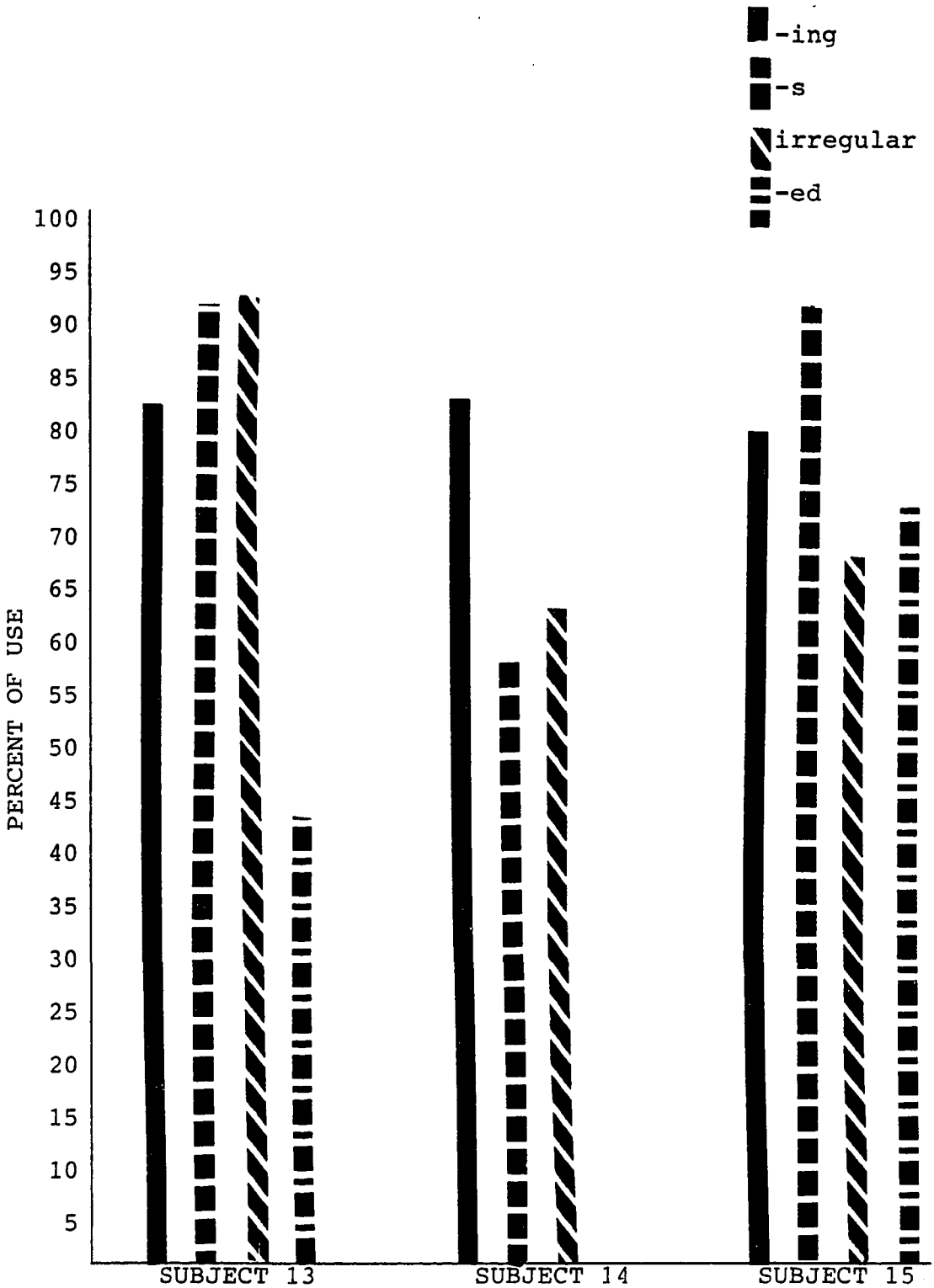


Figure 7. Use of individual inflections at Late Stage V.

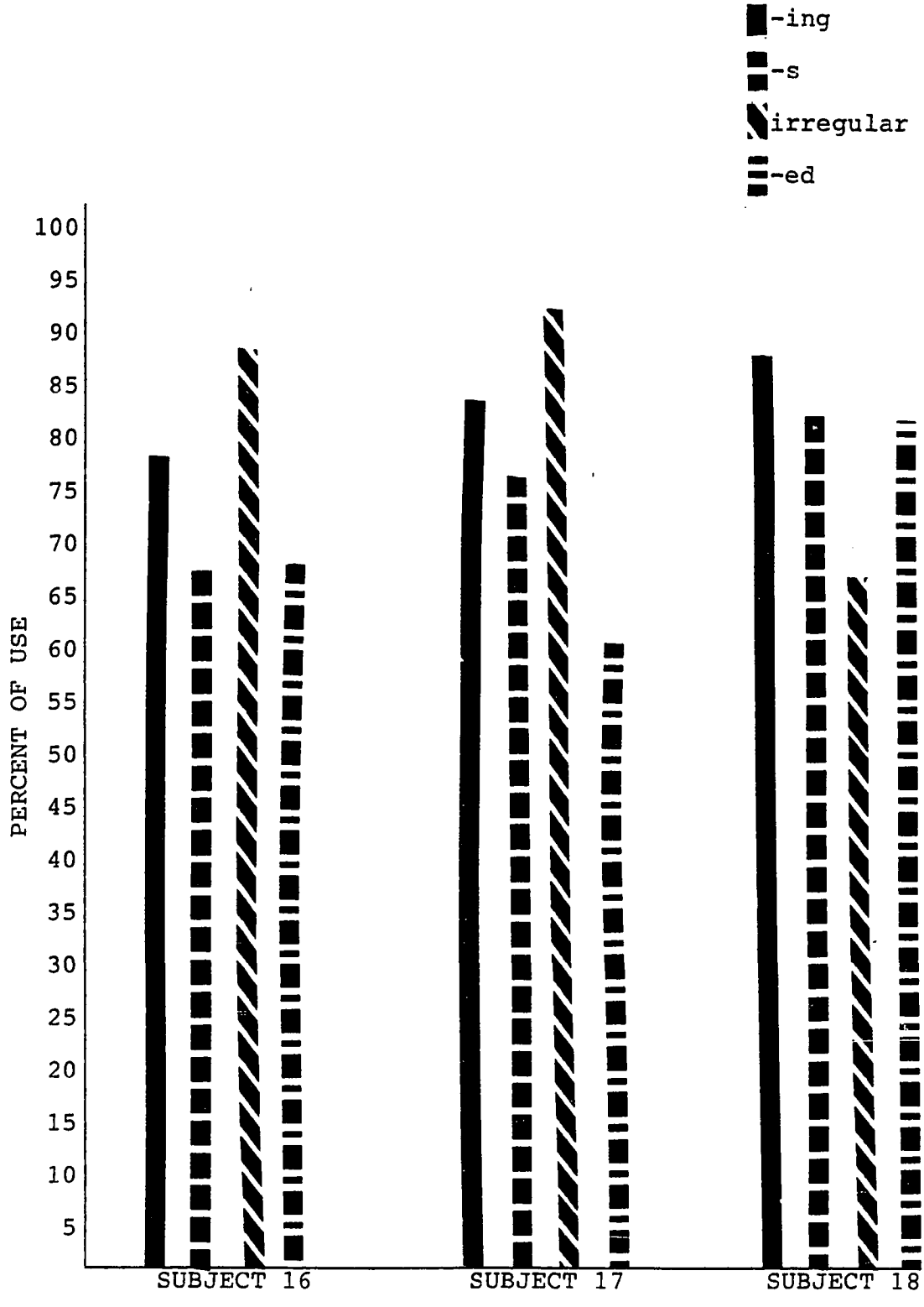


Figure 8. Average proportional use of verb inflections within the verb categories across developmental stages.

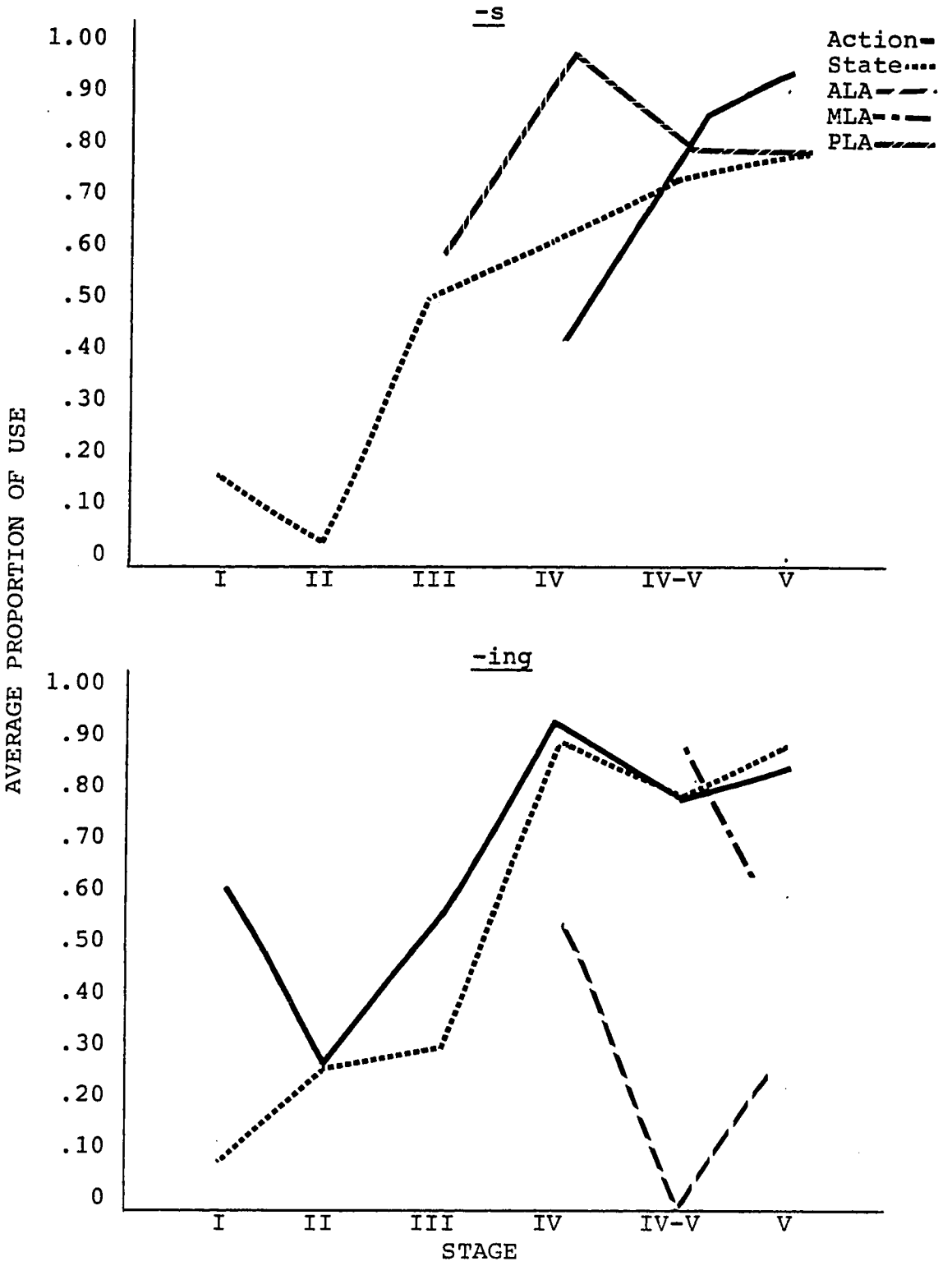
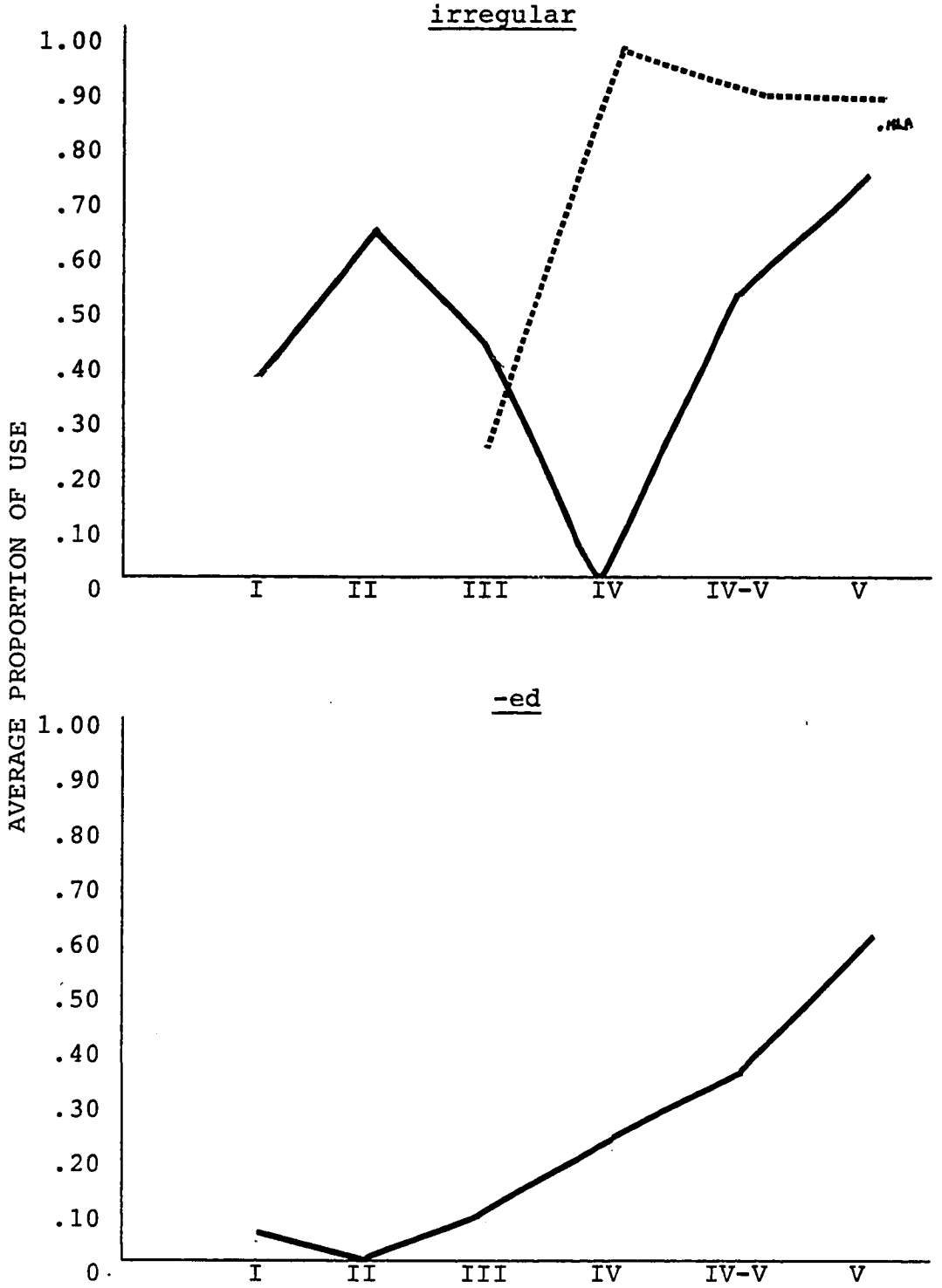
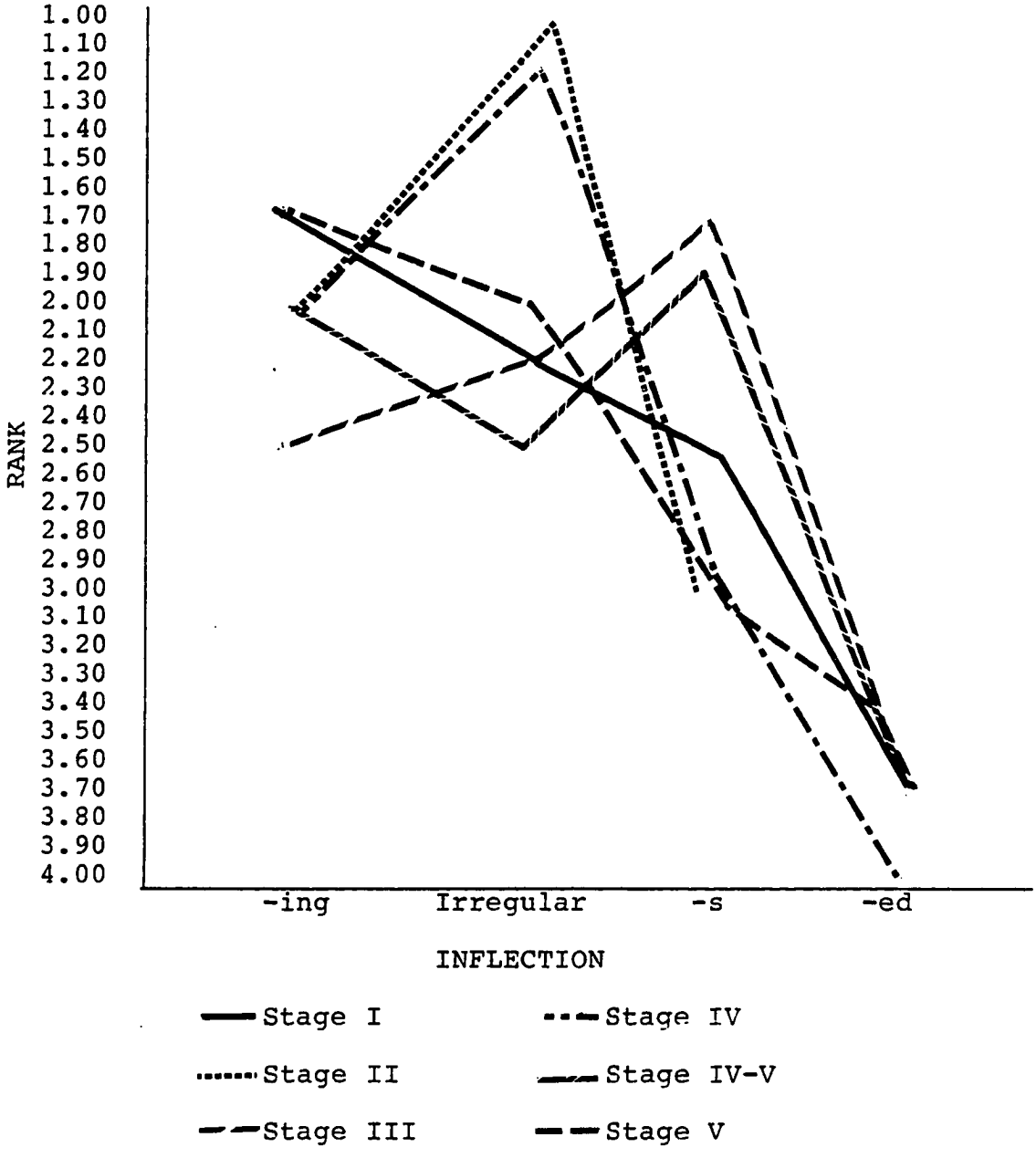


Figure 8 (continued)



Note. Only inflections which were productive for at least two children were graphed.

Figure 9. Rank order of inflection use at each linguistic level.



Note. Within child differences were split if the difference in use was .03 (3%).

Figure 10. Matrix of action verbs according to co-extensive distribution of inflections and lexical aspect.

	DURATIVE		NONDURATIVE	
	Verbs with -s		Verbs with irregular/-ed	
GOAL-ORIENTED	go 108[a]	fall 1	fall 25	bring 4
	open 14	belong 1	break 24	knock 2
	come 11	put 1	happen 23	take out 2
	do 11	make 1	do 20	bite 1
	fit 10	drop 1	get 13	kick 1
	stop 8	fly 1	say 13	bounce 1
	attach 6	turn 1	come 12	work 1
	say 3	daven 1	go 11	take off 1
	close 3	talk 1	make 10	tell 1
	come off 3	move 1	take 8	cry 1
	spin 2	pick up 1	buy 7	fool around 1
	walk 2		close 6	snap 1
	hop 1		pick up 5	crash 1
	stay 1		open 5	fly 1
	drive 1		give 5	
	Verbs with -ing			
NON-GOAL-ORIENTED	do 74	ride 4		
	go 44	dance 3		
	come 17	fall 3		
	run 14	happen 3		
	play 9	fit 3		
	take 9	cry 3		
	turn 9	fly 3		
	put 8	paint 3		
	eat 8	pick 3		
	get 8	build 3		
	make 7	drink 3		
	ring 6	knock 2		
	tie 5	move 2		
	take 5	bring 2		
	talk 5	dive 2		
	sweep 4	back up 2		
	open 4	shake 2		
	climb 4	laugh 2		
	close 4	take off 2		

(figure continues)

Note. Data for all subjects combined

[a] Frequency with which verb was inflected

	DURATIVE Verbs with -s	NONDURATIVE Verbs with irregular/-ed
GOAL-ORIENTED		
NON-GOAL-ORIENTED	Verbs with -ing	

kiss	2	wash	1
fish	2	dump	1
knock	1	fight	1
touch	1	say	1
have	1	come off	1
sing	1	tickle	1
draw	1	leave	1
wipe	1	attach	1
drive	1		
try	1		
write	1		
rough ride	1		
swim	1		
work	1		
pick up	1		
rewind	1		
help	1		
walk	1		
jump	1		

Figure 11. Matrix of action verbs according to co-extensive distribution of inflections and lexical aspect for Stages I, II & III.

	DURATIVE	NON-DURATIVE
GOAL-ORIENTED	**Verbs with -s** *** go 21[a] *** fit 3 ** open 2 * say 2 *** come 1 ** hop 1 ** stay 1 * put 1	**Verbs with -ed/irregular** *** break 18 *** fall 7 *** buy 7 *** get 5 *** make 5 *** do 5 *** go 3 *** take 2 *** bring 2 ** happen 2 *** bite 1 *** come 1 *** say 1 ** give 1 ** kick 1 ** close 1
NON-GOAL-ORIENTED	**Verbs with -ing** *** go 12 *** do 11 *** tie 5 *** come 4 *** fly 3 *** take 3 * turn 3 *** dance 2 *** get 2 ** shake 2 *** wipe *** sweep *** draw *** cry 1 *** have 1 *** eat 1 *** talk 1 *** ride 1 *** play 1 *** touch 1 ** knock 1 ** run 1 ** fish 1 ** sing 1	

* verb appeared in different cell in Bloom, Lifter and Hafitz (1980)

** verb not used with any inflection in Bloom, Lifter and Hafitz (1980)

*** verb occurred in same cell in Bloom, Lifter and Hafitz (1980)

[a]Frequency verb inflected

Figure 12. Matrix of verbs used in task context according to co-extensive distribution of inflections and lexical aspect.

	DURATIVE	NONDURATIVE
GOAL-ORIENTED	Verbs with -s +++ go 25[a] +++ do 7 +++ walk 2 +++ come 1 + jump 1 +++ make 1 ++ push 1 +++ ride 1 ++ slide 1 +++ stay 1	Verbs with irregular/-ed +++ go 56 +++ break 19 + draw 14 + walk 13 + jump 11 ++ push 9 + swim 9 + dance 7 +++ make 6 + climb 2 ++ color 2 + hop 2 ++ swing 2 ++ crack 1 +++ do 1 +++ snap 1 + spin 1 ++ step 1 +++ take 1
NON-GOAL-ORIENTED	Verbs with -ing +++ walk 17 +++ go 15 ++ push 8 +++ dance 6 +++ write 6 +++ drive 5 +++ ride 5 +++ swim 5 + break 3 +++ climb 3 ++ slide 3 +++ draw 2 + hop 2 +++ jump 2 +++ do 1 +++ come 1 +++ run 1 +++ shake 1 ++ swing 1	

Note: Data for all subjects combined
[a] frequency with which verb was inflected
+ verb appeared in a different cell in language sample
++ verb not used with any inflection in language sample
+++ verb appeared in same cell in spontaneous language sample

Figure 13. Matrix of verbs used in task context according to co-extensive distribution of inflections and lexical aspect for Stages I, II, and III.

	DURATIVE	NONDURATIVE
GOAL-ORIENTED	Verbs with -s *** go 20 * do 7 *** come 1 *** make 1 ** stay 1	Verbs with irregular/-ed *** go 8 *** break 6 *** make 3 *** do 1
NON-GOAL-ORIENTED	Verbs with -ing *** go 9 *** walk 9 *** push 4 * break 3 ** swim 3 ***write 3 *** drive 2 ** slide 2 *** ride 2 *** come 1 *** dance 1 *** draw 1 *** do 1 ** shake 1 ** swing 1	

* verb appeared in different cell in Bloom, Lifter & Hafitz

** verb not used with any inflection in Bloom, Lifter and Hafitz (1980)

*** verb occurred in same cell in Bloom, Lifter and Hafitz (1980)

Appendix A

Toys Used in Collection of Language Samples

Truck with removable driver

Bendable rubber people (10)

Stacking or nesting barrels--"Kittie in the Kegs"

See-Saw with removable riders

Circus wagon with door

Puzzle "The Head Beagle" Peanuts Characters, Playskool, United Feature Syndicate, Inc. 1952.

Freight train with interlocking cars

Dress-me doll

Bridge or Arch (made from three wood blocks)

Folding dollhouse with doors

Dollhouse furniture including chairs, bed, chest with four removable drawers, bathtub, sink, stove, refrigerator, couch, playpen, tables, television and silverware

Car with removable driver and attachable wagon

Box with metal reflector on bottom

Finger puppets - (12) - (Sesame Street and others)

Farmer and animals - (horse, pig, dog, cow, giraffe, chicken, rooster, sheep, lion and frog)

Books:

1. Doing, "Show Baby Plus" Series, English Edition, Brimax Books, England, 1974.

2. See No Evil, Hear No Evil, Smell No Evil - A Golden Scratch and Sniff Book, A.J. Hays/Pictures by J. Mathieu, Sesame Street, CTW, USA, 1975.

3. Let's Play, Gyo Fujikawa, Grosset & Dunlap, Printed and bound in Japan by Zokeisha Publications Ltd., 1975

4. The Count's Counting Book - Sesame Street Pop-Up, Illustrated by Tom Cooke, Paper Engineering by Ib Penick, Random House/CTW, USA, 1980.

Note. These toys may not exactly match those used by Bloom (1970). For example, the sizes, colors, and construction materials of the toys, and the exact books and puzzles may differ.

Appendix B

Order of Presentation of Task Stimuli

NG, DUR	1. Frog jump on floor
G, ND	2. X push truck into garage house
NG, ND	3. X ride bike round and round
G, DUR	4. X go down slide
NG, ND	5. X draw scribbling
G, DUR	6. X walk into schoolhouse
NG, DUR	7. X swim in water
G, ND	8. X break cookie
NG, DUR	9. X push baby carriage round and round
G, ND	10. Dog jump over blocks as ran into house
NG, ND	11. X go up and down see-saw
G, DUR	12. X ride bike to house
NG, ND	13. X walk
G, DUR	14. X draw dog
NG, DUR	15. X dance
G, ND	16. X climb into (bunk) bed
NG, ND	17. X swim in water
G, DUR	18. X push truck into garage house
NG, ND	19. Frog jump on floor
G, DUR	20. Girl break cookie
NG, DUR	21. X ride bike round and round
G, ND	22. X go down slide
NG, DUR	23. X draw scribbling

G, ND	24. X walk into schoolhouse
NG, ND	25. X dance
G, DUR	26. X climb into (bunk) bed
NG, ND	27. X push baby carriage round and round
G, DUR	28. Dog jump over blocks as ran into house
NG, DUR	29. X go up and down see-saw
G, ND	30. X ride bike to house
NG, DUR	31. X walk
G, ND	32. X draw dog

Note. G = Goal Oriented
NG = Non-Goal Oriented
DUR = Durative
ND = Non-Durative

Appendix C

Consent Slip

I hereby give permission for my son/daughter _____ to be observed and audio-recorded while he/she interacts with the researcher in play activities. This research study will not involve any hazard and will not place my child under any stress. I understand that the results of this study will be used for research purposes only and that the data will not be identified by name. I understand that I can withdraw my child from participating in this study at any time.

_____
Signature of Parent

_____
Date

Birthdate -

Appendix D

Thank-You Note to Parents

Dear _____

Thank you so much for allowing _____ to participate in my study. It was truly a pleasure playing with him/her. In addition, I really appreciate the warm hospitality you extended to me in your home.

Thanks again for your interest and cooperation.

Sincerely,

Fran Kasten Feintuch

Appendix E

List of Prizes

1. rings
3. watches
4. yo yo's
4. bracelets
5. crazy straws
6. mini-playing cards
7. kazoos
8. whistles
9. clown and ladder sets
10. trucks
11. robot pencil tops
12. paint sets
13. cars
14. box of raisins
15. make-up sets

Note. The specific prizes given to an individual child were chosen by the experimenter based on age and interests of the child.

Appendix F

Conventions for Transcription of Child Language Recordings[a]

(From Bloom and Lahey, 1978, pp. 600-604)

1. All speech by the child and all speech to the child or within the child's hearing is fully transcribed on paper divided by a vertical line. Utterances by the child appear on the right side. Utterances by other speakers appear on the left. The person is identified by an initial (M for Mommy, L for Lois, D for Daddy, etc.). Information about the situational context also appears on the left and is enclosed in parentheses.

(M takes cookie from bag; offering it to A)	
M: Look what I have/	
(A taking cookie)	cookie/

[a]Prepared in collaboration with Lois Hood and Patsy Lightbown.

2. An action or event that occurs simultaneously with the child utterance appears on the same line with that utterance.

(E banging blocks together) crash/

3. When an utterance precedes or follows an action or event, the utterance appears on the preceding or succeeding line.

(E throws block)
no block/

(E picks up another block)
more/

4. Note the differential use of verb tenses in describing the situations: progressive for simultaneous action; simple present for actions or events that precede or follow an utterance.

5. For situational information accompanying utterances by someone other than the child, use the same verb tense conventions, but utterances and description can, of course, succeed one another on different lines since there is rarely enough space to put both on the same line.

(L reaching in bag)

L: Do you know what I have?

(L pulls out truck)

L: I think I'll make the truck go under the bridge/

6. Utterances that succeed each other immediately--with no change in situation--follow each other on the same line.

(G reaching for box of cookies) more/ more/ cookie/

If there is any change in situation, the utterances appear on different lines.

(G reaching for box of cookies; more/
taking box off counter; more/
reaches in;
pulling out cookie) cookie/

When in doubt about the situational context, use separate lines.

Punctuation

7. For utterances of child and other speakers, the usual sign of utterance boundary is a slash (/). The boundary is determined by length of pause before the next utterance and by its apparent terminal contour.

The judgment is sometimes very difficult to make. With older children and adults, the slash may be considered equivalent to a period, but it is important to make each judgment carefully and as objectively as possible.

8. Utterances by adult or child may be followed by an exclamation mark. When a child utterance is exclamatory, it should be followed by both an exclamation mark and the usual slash.

(Peter takes tire off car)

there!/finish/

9. Adult questions are indicated by question marks. For the child utterance, however, there are two different ways of indicating that an utterance has question form. For Wh questions, a question mark may be used.

(P looking in toy bag) where's ə car?/

When a child utterance seems to be a question because it has rising intonation, it should be followed by a rising arrow (↑) instead of a question mark.

(P shaking empty box) no more in there↑ /

Even for a "well-formed" yes/no question (i.e., one with subject-verb inversion), the arrow to indicate rising intonation is more informative than a simple question mark.

(K meeting L at door) did you bring the toys today ↑/

In either case, a slash should also be used to mark the utterance boundary clearly.

10. A pause within an utterance is indicated by a dot (˙)

(E trying to fit peg in hole) put˙this one in/

11. A long pause between utterances within the same general situation is indicated by horizontal dots across the center line.

wheel goes in there/

(P tries to get wheel on car)

...

(P succeeds)

there!/

12. A long pause between utterances where there is a change in the general situation is marked by three vertical dots on the center line.

(G trying to stack blocks) Gia make ə house/

.
.
.

(G running to kitchen) juice!/Gia drink juice/

13. A colon is used to indicate that an utterance or word is drawn out.

(E trying to fit large block inside small one) no:/

14. A curving arrow is used when there is some kind of utterance boundary, but the utterance sounds unfinished, such as when the child is counting or "listing."

one↷/
two↷/
three ↷ /

15. Stress marks indicate strongly emphasized words.

L: Do you want this one? (L giving G a blue disc) no!/

(G reaching for red one L is holding) thát one/

Capitalization

16. Names are capitalized. Initial letter of child utterance is not. Initial letter of adult utterance may be.

Other "Punctuation"

17. An utterance may be followed by falling arrow (↓) when it is important to emphasize the fact that the utterance had falling terminal contour.

(P looking in toy bag; pulls out tire for car) wheel ↑/

wheel ↓/

18. When a child or other speaker suddenly interrupts their own utterance--apparently leaving the utterance unfinished--a line (_____) indicates the abrupt stop.

L: Do you want some _____/

(E picks up cup and spills juice)

19. When a child or other speaker interrupts their own utterance apparently to change or correct it, a "self-correct" symbol (s/c) is used.

L: Those are your s/c my toys/

don't s/c want toys/

20. An unintelligible utterance or portion of an utterance is indicated by three dashes (---). If possible, a phonetic transcription is used instead.

(E pushing over house of blocks,

making loud crash) no more/---/house/

Abbreviations

21. When a child or other speaker repeats their own utterance completely and exactly, an X is used to show the repetition. Any change in the utterance must be indicated, including clear changes in intonation.

L: Be careful/X/

(P touching tape recorder) open/X/X/

X!/

22. When an adult repeats a child's utterance, an equal sign (=) is used to show the repetition. When a child repeats an adult utterance, however, the child's utterance is written in full, even if the repetition is exact. An equal sign can never represent a child utterance, although an equal sign may be placed next to the utterance to indicate that it is a repetition of an adult utterance.

two cookies/

M: =/ I only see one in there/

one in there/=

23. The symbol # may be used to indicate that there is material on the tape that is not transcribed. It can only appear on the left side and usually represents conversations between adults. The symbol is only used when it is resonable to assume that the child is not attending to or, in fact, does not hear the conversation.

24. (lf) = laugh
(wh) = whisper
(cr) = cry
(wm) = whimper
(wn) = whine
(y) = yell

These abbreviations may be useful for behavior that occurs fairly frequently. The abbreviation should appear on the left side of the line.

(gr) = grunt

Labeling

25. Pages should be numbered front and back, with numbers in upper right corner.

26. In order to make it easier to locate material on the tape, a number should be placed in the right margin every time the counter on the tape recorder registers a multiple of 50.

27. Every time a new tape or a new side of a tape is started, the tape number, side number (1 or 2) and the date and time of the recording session (if different from the previous tape or side) should be indicated.

Appendix G

Rules for Calculating MLU (from Brown, 1973, p. 54)

1. Start with the second page of the transcription unless that page involves a recitation of some kind. In this latter case start with the first recitation-free stretch. Count the first 100 utterances satisfying the following rules.

2. Only fully transcribed utterances are used; none with blanks. Portions of utterances, entered in parentheses to indicate doubtful transcription, are used.

3. Include all exact utterance repetitions (marked with a plus sign in records). Stuttering is marked as repeated efforts at a single word; count the word once in the most complete form produced. In the few cases where a word is produced for emphasis or the like (no, no, no) count each occurrence.

4. Do not count such fillers as mm or oh, but do count no, yeah, and hi.

5. All compound words (two or more free morphemes), proper names, and ritualized reduplications count as single words. Examples: birthday, rackety-boom, choo-choo,

quack-quack, night-night, pocketbook, see saw. Justification is that no evidence that the constituent morphemes function as such for these children.

6. Count as one morpheme all irregular pasts of the verb (got, did, went, saw). Justification is that there is no evidence that the child relates these to present forms.[a]

7. Count as one morpheme all diminutives (doggie, mommie) because these children at least do not seem to use the suffix productively. Diminutives are the standard forms used by the child.

8. Count as separate morphemes all auxiliaries (is, have, will, can, must, would). Also all catenatives: gonna, wanna, hafta. These latter counted as single morphemes rather than as going to or want to because evidence is that they function so for the children. Count as separate morphemes all inflections for example, possessive (s), plural (s), third person singular (s), regular past (d), progressive (ing).

[a]This procedure was modified. If the present and past tense of a verb was found in the data (e.g., do and did), the past tense verb was counted as two morphemes.

Appendix II

Coding Sheet for Utterances with Contexts for Verb Inflections

Utterance	Situational Context	Type of Context[a]			Specific V.I. Required[b]		Was Oblig. V.I. Used	Correctly	Past Tense V.I.		Error Type	Verb Category		
		CLC	PC/ALC	NLC	Oblig Context	Optional Context			Simple	Progressive		Action	State[c]	Loc. Action[d]
					-ing -s, -ed, irreg	-s -ing							int pub	pla mla ala

[a] CLC = child's linguistic context
PC/ALC = prior child or adult linguistic context
NLC = non linguistic context

[b] V.I. = verb inflection

[c] int = internal
pub = public

[d] pla = patient locative action
mla = mover locative action
ala = agent locative action

Appendix I

Obligatory and Optional Contexts

Brown (1973) used both linguistic and non-linguistic criteria for determining the contexts for inflections in children's utterances. He used four criteria for obligatory contexts: 1) the linguistic context of the verb in the child's own utterance required the use of an inflection, 2) the prior linguistic context of the child or adult required the use of an inflection, 3) the non-linguistic context of the speech situation required the use of an inflection and 4) subsequent linguistic context, where succeeding adult expansions of the child's utterance would require the occurrence of a morpheme. Bloom, Lifter and Hafitz (1980) used the first three criteria in their study (see the end of Appendix I for examples.) They did not use the fourth criterion because they stated that it was not always clear as to whether the adult expansion and the child's prior semantic intent were indeed the same. The present investigation used the same three criteria as Bloom, Lifter and Hafitz (1980).

Contexts were not always clear as to which inflection was required. For example, either -ing or -s could occur in certain speech situations. Bloom, Lifter and Hafitz (1980) cite the following example--the child is putting a peg figure into a car: Child: "man go car" where either going or goes could have occurred. Thus, the context for -ing and -s in this example was optional. Thus, if it was not

clear from the context as to which morpheme was required, it was discarded from the analysis.

Examples of Obligatory Contexts for Verb Inflections

(Taken from Bloom, Lifter and Hafitz, 1980)

	CONTEXT	EXAMPLE	
1)	linguistic context in child's utterance	Child:	"I'm go outside" -ing is obligatory
2)	prior linguistic context (child or adult)	Adult:	"What are you doing?"
		Child:	"I eat it." -ing is obligatory
3)	non-linguistic context of speech situation	(Book had just fallen off the table)	
		Child:	"Book fall down" irregular past is obligatory

Appendix J

Definitions and Examples of Action, Locative Action, and State Utterances[a]

CATEGORIES OF VERB RELATIONS

The categories of Action and Locative Action identified in Bloom, Lightbown, and Hood (1975) were the following:[b]

1. ACTION. Utterances referred to movement by an agent that affected an object where the goal of the movement was not a change in the location of an object or person (see Locative Action). At least two of the three components of an action relation (Agent-Action-Object) had to be represented in the utterance in order for the utterance to be included within the category.

---

[a]Definitions of Action and Locative Action verb categories were taken directly from Bloom, Miller and Hood (1975) and definition of State verb category was taken from Bloom, Lifter and Hafitz (1980) and Bloom, Lightbown and Hood (1975).

[b]Only a few examples of the categories are given here; the appendix in Bloom, Lightbown, and Hood (1975) consists of an extensive sampling of all the categories of semantic-syntactic relations found in the time period reported in that study.

P:VII	(Peter trying to open box)	my open that
K:III	(Kathryn opening a drawer)	open drawer
G:III	(Gia going to her bike, and then getting on)	Gia bike Gia ride bike[c]
E:IV	(Eric has just reassembled train)	I made

2. LOCATIVE ACTION. Utterances in this category referred to movement where the goal of movement was a change in the location of a person or object. In the present study, the following three Locative Action relationships were identified in the data according to whether the Agent of the Action was also the Object that was affected by the Action.

a. AGENT-LOCATIVE ACTION. Utterances in this category specified a movement by an agent that caused another object to change place, and the preverbal constituent, whether or not expressed, was the Agent.

---

[c]Note that "Gia bike" might have alternative interpretations. In such cases, preceding and succeeding utterances were examined in an effort to determine the semantic-syntactic category to which the utterance would be assigned. If another utterance in the immediate context appeared to disambiguate the utterance in question, as in this instance, the utterance could be assigned to a semantic-syntactic category. If not, it was considered equivocal and was not included in subsequent analyses.

E:V	(Eric puts discs on bed)	I put ə up here
G:IV	(Gia bringing lambs to toy bag; then drops them into bag	Gia away ə lamb
P:VII	(Peter holding recording tape)	put this down

b. MOVER-LOCATIVE ACTION. Utterances specified a movement in which the agent of the action was also the object that changed place, and the preverbal constituent, whether or not expressed, was the Mover.

		I sit down there
K:IV	(then Kathryn sits on chair)	
G:V	(Gia stands up on large stuffed dog)	stand ə wow wow
E:III	(Eric getting up from chair)	I get down

c. PATIENT-LOCATIVE ACTION. Utterances in this category specified a movement by an agent that caused another object (patient) to change place, and the pre-verbal constituent, whether or not expressed, was the Patient. Patient-Locative Action utterances were semantically similar

to Agent-Locative Action utterances, but formally similar to Mover-Locative Action utterances.

E:IV	(fitting disc into block)	fits here
P:V	(Peter putting tiny car under finger puppet's skirt)	goes on there
K:II	(Kathryn pushing lamb through windows of doll house)	lamb go in there

3. STATE. State verbs named events that did not co-occur with movement. There were two types of State verbs: those that named internal states, and those that named perfective states. Internal states were not perceptible, phenomenological, or capable of being shared (see Allen 1966). Those that named perfective states were phenomenological or 'public' and capable of being observed or 'shared' by others (see Allen 1966). Bloom, Lightbown and Hood's (1975) definition-utterances in this category made reference to transitory states of affairs involving persons or other animate beings:

either 1) an internal state, usually with a verb form such as "like," "need," or "want:"

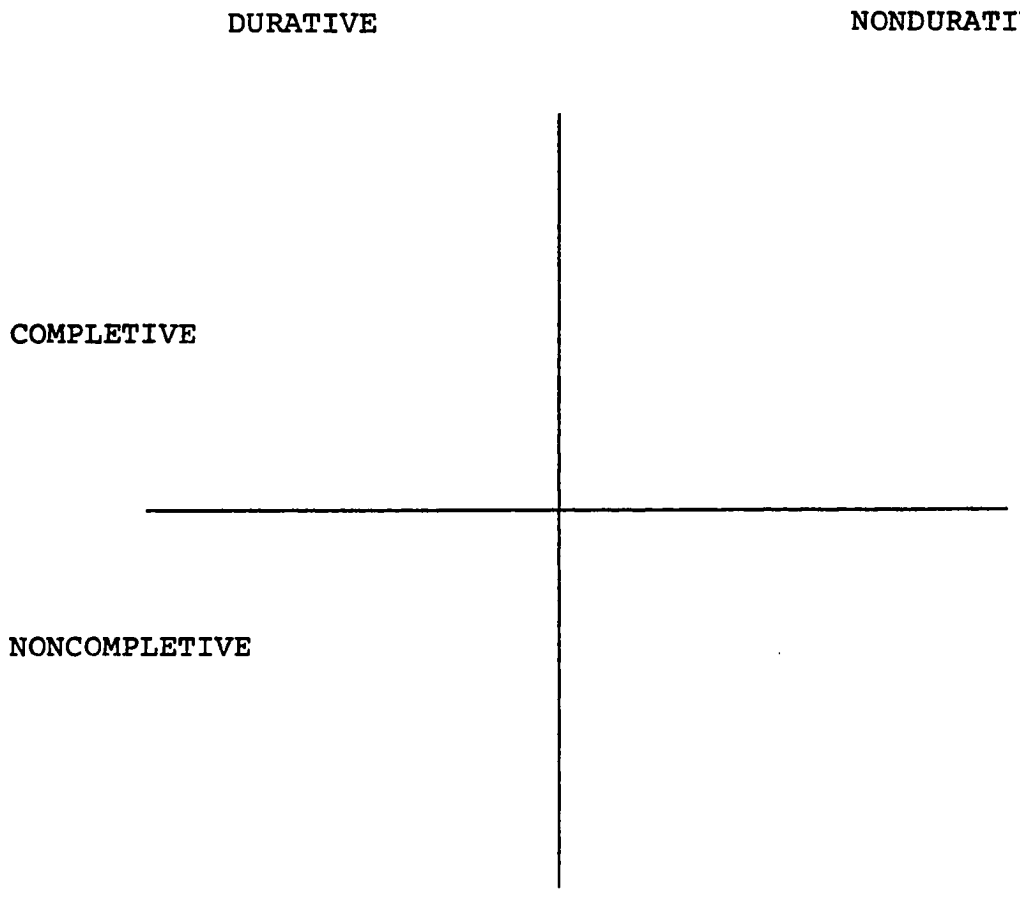
P:VI (Peter standing next to cabinet where pretzels are kept) I want pretzel

or (2) a temporary state of ownership or possession:

K:III (Kathryn taking train from Lois) I have it

Appendix K

Matrix of Aspectual Distinctions



Note. Taken directly from Bloom, Lifter, and Hafitz (1980) Figure 4a pg. 402

Appendix L

Coding Sheet for Task

DUR/NG	Target Verb Usage		Past Tense Usage				Inc Res/ No past
	Was target Verb Used	If not, what verb stem used	Past Tense used	Correct	What Past Tense ed	irreg	simple prog
1. Frog jump on floor (response)							
2. X swim in water (response)							
3. X push carriage around and around (response)							
4. X + X dance (response)							
5. X ride bicycle (response)							
6. X draw scribbling (response)							
7. X + X go up and down see-saw (response)							
8. X walk (response)							

Note. The same format was used for the other verb types (D/G; ND/NG; ND/G)

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