Kansas Working Papers in Linguistics
volume 3
1978

Anthony Staiano and Feryal Yavas
Editors

Funded by Student Activity Fees
University of Kansas
Lawrence, Kansas
1978
Introduction

This third volume of the Kansas Working Papers in Linguistics covers a diversity of topics which range from general Linguistic Theory to child language. To provide coherency, we have, therefore, grouped the papers into a number of major sections as reflected in the Table of Contents. What follows is our attempt to capture the major point of each paper, organized according to those sections.

The first paper is Ken Miner's "On the Notion "Restricted Linguistic Theory": Toward Error Free Data in Linguistics." Miner maintains that linguistic theories must be more firmly grounded on secure data bases. He contends that the attempt to construct theories based on limited data from a few languages leads to serious errors. Rather than seeking to construct general theories, Miner advocates that we should limit ourselves to "restricted theories" which may be confined to one language family.

The Phonetics-Phonology section contains four very different papers. Geoff Sathercole's research demonstrates that instrumental evidence can play a crucial role in phonological analysis. His instrumental research on strong and weak stops in Kansas Potawatomi clearly indicates that the underlying contrast between these series is preserved even in initial positions, not neutralized as heretofore supposed. In addition, the paper provides evidence for the interaction between stress and the syntactic structure of Potawatomi.

Mohammad Yavas' paper on the implications of borrowing for Turkish phonology provides a modus operandi for the analysis of languages which have lexicons replete with loan words. In the case of Turkish, previous analyses, though recognizing the importance of loan words, have neglected to incorporate them into their descriptions. Drawing evidence from borrowing, Yavas proposes that current treatments of vowel and consonant harmony should be drastically revised: consonant harmony plays the pivotal role in determining the vowel choice, not conversely. In so anglicizing Turkish, he is able to account for a wide range of data unaccounted for by treatments which assume the primacy of vowel harmony.

Robert Rankin's study of Quispaw as a dying language supports the evidence from child language acquisition, aphasia, and comparative linguistics that there exists a universal hierarchy of sound-type complexity. As Quispaw functioned less and less as a native language, principal changes occurred in its phonology: the types of series lost and the order in which they were lost were determined by their relative complexity, with the most marked being lost first.

Code-mixing is the topic of Maria Doboz's paper. Taking a letter written by a bilingual American-Hungarian as her data, Doboz describes the phonological rules that are operating in such a code-mixing, with special emphasis on vowel harmony. She demonstrates that vowel harmony is an important process in the system and plays a central role in the rendition of English words by such speakers.

The first paper in the Syntax-Semantics section is Gerald Denny's, "Meaning and Placement of Spanish Adjectives." Denny attempts to clarify the problems of the differences in the meaning and treatment.
of restrictive adjectives in three dialects of Spanish. He argues that a strict generative semantic approach will not handle the data and suggests an analysis within the framework of pragmatics.

Virginia Gathercole provides a cross-linguistic study of the use of the deictic verbs "come" and "go." She formulates the uses of "come" and "go" in eleven languages by extending Taliy's (1975) model for verbs of motion to include a presuppositional component. Gathercole divides the contexts in which "come" and "go" are used into (a) immediate deixis and (b) extended deixis. Her goal is to characterize the use of deictic verbs of motion in the eleven languages studied by a limited number of assertional and presuppositional components and thus suggest a possible universal framework for such verbs.

Whereas Denning and Gathercole focus on language related issues, Juan Abugastas takes a more general, philosophical approach in his discussion of speech acts. He claims that previous speech act analyses used the sentence as the basic unit. Abugastas believes, however, that we must go beyond the sentence: "social reality" dictates that we categorize sets of sentences into speech acts, which he calls "complex acts."

Kurt Godden's paper, "Problems in Machine Translation Between Thai and English Using Montague Grammar," brings us to a specific language oriented concern: how to mechanically translate sentences, in particular those containing restrictive relative clauses, from one language to the other. He enumerates the problems related to such a task and proposes a solution involving meaning postulates and context within a Montague framework.

Historical and Comparative Linguistics is represented by Karen Booker's "On the Origin of Number Marking in Muskogean." Booker re-constructs two proto-Muskogean number markers, one dualizer and one pluralizer which were first used with intransitive verbs of location and then generalized to locative transitive. Later, these markers spread to intransitive non-locatives. Booker maintains that the highly complex suppletive verb system of Muskogean arose when these markers lost their original meaning.

Three papers, Esther (Etli) Dromi's analysis of the acquisition of locative prepositions by Hebrew children, Gregory Simpson's study of children's categorization processes, and John More's review of relative clause research, constitute the Child Language Acquisition section of the working papers. Dromi's study, which is one of the few published works in the acquisition of Hebrew, compares the order of acquisition of Hebrew locatives with Brown's (1973) order for English and also with Stubin's (1973) universals. Among her findings, Hebrew of "(to)" is acquired later than English on. Her findings for Hebrew locatives are particularly interesting in that they allow a comparison of the acquisition of prefixes with that of full prepositions. Her conclusions point to the pivotal role that morphological complexity plays in the order of acquisition of locatives in Hebrew.

Gregory Simpson's major concern has to do with the process by which children form conceptual categories. He argues, on the basis of experimental data, that overextensions should not be taken as evidence
for category formation. His data suggest a distinction between concept formation and object naming, a distinction not made in previous studies. "Function," what objects can do or what can be done to them, determines how that object is conceptualized, but an object's perceptual properties may determine the name given to it. Therefore, "the child may know that two objects don't really belong together, but gives them the same name until he has more evidence."

The acquisition of relative clauses has been a topic of great interest among psycholinguists. John More presents a valuable critical review of the recent literature with special emphasis on the debate between Dan Slobin (1971), Amy Sheldon (1974), Michael Smith (1975), Tavakolian (1977), and de Villiers et al. (1976). The Minimal Distance Principle, the Noun-Verb-Noun Strategy, the Parallel Function Hypothesis, and Slobin's operating principles are compared, along with the formulations of de Villiers and Tavakolian.

Five major topics are represented in this third volume of the Kansas Working Papers in Linguistics. Each paper in its own way is a contribution to linguistic scholarship: some provide evidence in new areas of inquiry, others bring new evidence to bear on old questions, while still others suggest future courses of research.

Anthony Stalano and Feryal Yawas
Editors
CONTENTS
Volume 3, 1978

Linguistic Theory

On the Notion "Restricted Linguistic Theory": Toward Error Free Data in Linguistics.
Kenneth L. Miner

Phonetics-Phonology

Instrumental Phonetic Studies and Linguistic Analysis: The Case of Kansas Potawatomi
Geoff Gathercole

Borrowing and Its Implications for Turkish Phonology
Mehmet Yavaş

The Unmarking of Quapaw Phonology: A Study of Language Death.
Robert L. Rankin

Maria Dobozy

Syntax-Semantics

Meaning and Placement of Spanish Adjectives.
Gerald L. Denning

Towards a Universal for Deictic Verbs of Motion
Virginia C. Gathercole

Speech Acts, Functions and Presuppositions
Juan Abujattas A.

Problems in Machine Translation Between Thai and English Using Montague Grammar
Kurt Godden

Historical-Comparative Linguistics

On the Origin of Number Marking in Muskogean
Karen M. Booker
Language Acquisition

The Use of Locative Prepositions by Hebrew Speaking Children 2:0 - 3:0 Years Old
Esther (Etti) Dromi
113

Static and Dynamic Properties as Bases for Children's Categorization
Greg Simpson
131

The Relative Clause in Child Language: A Review
John Blake More
143
THE USE OF LOCATIVE PREPOSITIONS
BY HEBREW SPEAKING CHILDREN
2:0 - 3:0 YEARS OLD

Esther (Etti) Orni

Introduction

Cross-linguistic data suggest that children begin to express locative notions at the beginning of the multi-word level with no overt linguistic markers. Only later when they reach Stage II as described by Brown (1973) or at the age of 2:0 - 3:0 do they begin to use explicit marker systems for mapping the underlying notions of location onto surface utterances (Brown, 1973; Slobin, 1973; Clark and Clark, 1977).

Languages differ in the grammatical means of mapping underlying notions. For this reason researchers expect to find differences in the order and rate of acquisition of terms that are used to express a specific content domain (Slobin, 1973; Johnston and Slobin, 1977).

The goal of the present inquiry is to look at the use of locative adpositions among 30 Hebrew speaking children aged 2:0-3:0. An attempt is made to determine the order of acquisition of these terms and to draw tentative conclusions as to the role of cognitive complexity and linguistic complexity in determining this order.

Theoretical Background

In the last few years several studies consider the question of the acquisition or use of locative expressions by young children. In most of these studies the way children treat locative terms provide the researchers with clues as to the processes involved in the acquisition of natural languages. These studies can be classified according to different general concerns or hypotheses about the predominant variables which determine the language development course.

The relation between the cognitive complexity of locative terms and the order of acquisition has been studied by Antinucci and Parisi (1970), H. Clark (1973), and H. Grimm (1975). The main claim of these researchers is that the child acquires linguistic devices by learning how to apply them to the a priori knowledge he has previously learned about the world. Parisi and Antinucci (1970) showed that the accuracy of children's motor responses to instructions containing locatives depends on the complexity of the spatial relations that these terms represent. Thus the children deal much more accurately with topo-logical terms such as 'in' and 'on' than with locatives of dimensional space such as 'in front of,' 'below,' and 'beside,' or of complex spatial relations, such as 'through' or 'along.' In his paper, "Space, Time, Semantics, and the Child," H. Clark (1975) specified the cognitive complexity of locative expressions according to properties such as position in space (positive
direction unmarked, negative direction marked) directionality (location is unmarked, direction is marked) and the number of dimensions of the reference points (one-dimensional propositions are unmarked, two- and three-dimensional ones marked). (See H. Clark, 1973, Table 2, page 4)

Although it is difficult to examine empirically the application of the cognitive hypothesis to child language, Clark argues that the order of acquisition should be determined by the cognitive complexity. Grimm (1975) studied the spontaneously produced prepositional phrases of 137 German children aged 2;0-7;0. On the basis of her data on frequency of use, order of emergence, and types of substitutions, she concluded that "The development of spatial propositions coincides with the development of spatial-geometric properties shown by Piaget" (Grimm, 1975:97). Grimm suggested that spatial propositions are the first to emerge in child language and that these propositions are followed by temporal and purely syntactic prepositions.

The nature of non-linguistic strategies that are involved in the acquisitions of word meaning has been studied by using stimuli with spatial propositions such as 'in,' 'on,' and 'under' (E. Clark, 1973; Grieve, Hoogenraad and Murry, 1977:27). In these studies the child responds to the investigator's instructions provided as to the processes of acquisition of these terms as well as to the general role of non-linguistic strategies which the child uses before manifesting full linguistic competence. The order of acquisition of spatial forms by English-speaking children suggested by these studies is 'in,' 'on,' and 'under,' respectively. Grieve says that normally there is a period when the child understands 'in,' 'on' but not yet 'under' (Grieve, et al.).

A third group of studies provides data on the emergence of specific adpositions in child language. Brown (1975) discusses the acquisition curve of the propositions 'in' and 'on' of his three subjects and noted an abrupt rise to criterion at the beginning of Stage II when almost all uses of 'in' and 'on' were correct. He observed that these propositions seemed at this stage to be used for spatial and concrete purposes. Brown found that in the acquisition of the I4 grammatical morphemes by his English-speaking subjects the propositions 'in' and 'on' both fall second in the ranked order.

De Villiers and de Villiers (1973) confirmed Brown's findings. In a cross-sectional study, they examined the order of acquisition of the same 14 grammatical morphemes that were discussed by Brown (1975), with a group of 21 English-speaking children aged 2;4-3;4. They found a high correlation between their results and Brown's. In their rank order, the propositions 'in' and 'on' are acquired early and following each other (de Villiers and de Villiers, 1973).

The use of locative expressions in several languages was studied by Slobin (1975) and Johnston and Slobin (1977), who tested the role of the 'normal linguistic complexity' of these terms in the process of their acquisition. Slobin (1975) suggested that analyses of cross-linguistic discrepancies in the development of terms used to express identical underlying notions would provide evidence for specific operating principles.
That children use in the process of acquiring their first language. Such studies would enable one to examine the extent to which various phonetic, morphological and semantic properties facilitate or impede the acquisition process.

Johnston and Siobin (1977) used a wide range of tests in order to study the comprehension and productice of locative expression in four different languages: English, Turkish, Serbian-Croatian and Italian. The investigators found that in all four languages, children at the early age of 2:0-2:8 use no more than two or three different prepositions and that children in each successively older age group produced more locatives than those in the previous group. It was only subsequently, between the ages of 2:8-4:0, that a significant difference emerged in the number of locative expressions produced by children learning Turkish or Italian and those learning English or Serbian-Croatian. In all four languages the first four locative expressions to be produced were 'in,' 'on,' 'under,' and 'beside.' English, Turkish and Italian children acquired the locatives in the predictable order (in, on, under, beside) while Yugoslav children's performance was marginally predictable (on, in, beside, under). By applying six criteria to specify the formal linguistic complexity of locative expressions in the four languages, the investigators showed that wherever cognitive complexity fails to predict the order of acquisition, linguistic processing determines that order.

As different languages make different combinations of the possible determinants of order of acquisition, it was suggested by Brown (1973) and by Siobin (1975) that in order to work out the determinants of acquisition order, it is useful to look at comparative data. Since Brown (1973:294) wrote "not much information is now available on order in other languages and what there is seldom utilizes an explicit criterion of acquisition..." several studies on languages other than English have been published. For example, MacWhinney (1976) studied the acquisition of morphology and syntax in Hungarian. Lipp (1977) discussed the acquisition of Estonian inflections. In both studies Gazdan's (1968) criterion for determining the acquisition of new forms, i.e. 90% correct use in obligatory context was applied, and it proved to be generally applicable to other languages than English.

In the present study I will examine the use of locative prepositions in the spontaneous speech of Hebrew speaking children. The rank order of locative prepositions will be determined according to the correct use in obligatory contexts. Tentative conclusions will be drawn concerning the order of acquisition of these terms in Hebrew.

An attempt will be made to examine the role of cognitive complexity and formal linguistic complexity, in determining that order. Special reference will be made to the form of this expression in Hebrew, and will propose the following hypotheses: (1) prefixed locatives are more salient for children than whole word prepositional locatives, (2) morphological complexity is a determinant factor in the acquisition of new forms.
Locative Prepositions in Hebrew

The means for mapping underlying notions that specify a relation between an object and its location is the concern of this study. In Hebrew such relations are expressed with prepositions. Prepositions constitute a restricted set of items which perform a variety of functions. I shall not discuss prepositions that serve as purely syntactic markers or prepositions that serve only as markers for grammatical case relations. Rather, I shall discuss the use of prepositions that contain independent semantic content. All locative relations are marked in spoken Hebrew by prepositions. They always precede the reference point, but they differ in form. We can classify the prepositions into 3 groups according to form.

A. Enclitic Prefixes - bound morphemes attached directly to the noun.

(1) be' — 'in'
    oto — 'car, automobile'
    beeto — 'in a car'

These prefixes are attached enclitically to the following noun with which they form a single phonological unit (in terms of stress, vowel alterations on the prefix etc.). As bound morphemes they never occur in isolation. These prefixes incorporate the definite marker ba- as follows:

(2) beeto 'in (a) car'; be-neha-oto = boo to 'in the car'
    leyled - 'to (a) boy'; le-neha-leyled = le yeled 'to the boy.'

B. Separate Word Prepositions - Morphemes that are represented in the orthography as separate words, and which are not affected by the initial element or elements of the word which they precede.

(3) al 'on' al gav 'on (a) roof'; al hagaq 'on the roof'
    le 'with' le yeled 'with a boy'; le neha leled 'with the boy'

The contrast between (A) and (B) is manifested clearly in two propositions which under certain syntactic and semantic constraints, can take either an enclitic or separate word form, thus:

(4) le- (Prefix) alternates with al (Free Morpheme) in the sense of 'to'
    leyled — al yeled 'to a boy'
    leyled — al neha leled 'to the boy'

C. Fused forms - These occur whenever a preposition is followed by a pronoun rather than by a full noun or noun phrase. In such cases the combination of preposition + pronoun is fused into a single form. Thus:
In regard to the development of locative prepositions in Hebrew, I am especially interested in looking at the contrast between prefixes and separate word prepositions. The fact that children can use two forms with the same meaning interchangeably seems to facilitate the analysis of the data and to justify some arguments. The acquisition of the fused forms will also be discussed. It is necessary to find out whether the structural complexity of these forms has a crucial effect on the order of acquisition.

The Study

Speech samples from thirty Hebrew speaking children aged 2:0-3:0 were elicited, transcribed, and analyzed. These samples were obtained in the course of a larger study of Israeli children's speech production at this age (Dromi, 1977). The subjects had all been born on "kibbutz" (collective villages) and used Hebrew as their first and only language. These children have spent their lives mainly in a peer-group situation of the so-called "children's howg," spending two to three hours each day with their parents. After an initial pilot-study to test the effectiveness of various techniques of elicitation, a set of pictures and small plastic toys were used to elicit spontaneous utterances from the children. The researcher tried to avoid engaging in conversations with the subjects and talked mainly when she introduced a new set of stimuli, then she would say, "Oh! what a nice picture I have!..." Each stimulus was presented to the child for 30 seconds; if the child did not respond the stimulus was changed. Whenever the child produced an oral response, the experimenter would repeat it using an "echoic" type of imitation. This imitation included intonation, misarticulated sounds, and morphosyntactic errors. This procedure was followed in order to help the experimenter to interpret and then transcribe the utterances. It proved to be effective, especially with the younger subjects. The sessions, each of which lasted 30-50 minutes, were recorded by a portable cassette recorder, Sony T.C. 95. During the sessions, contextual information was
noted down as part of the written record. All utterances were transcribed following each session. Speech samples varied in size from 50 to 520 utterances for each child with a mean of 113 utterances and a total of 4,294 utterances. MLU values were calculated on the basis of an original model for calculating MLU in Hebrew, they ranged from 1.5 to 5.8.

For the purpose of the present study, I considered for analysis only the spontaneous utterances of each child. Neither imitative utterances (when a child reproduced the experimenter’s repetition) nor responses to question (those usually were rare and did not refer to the stimuli) were analyzed. The spontaneous utterances of each child were scored for the frequency with which the child supplied obligatory contexts for locative prepositions, and for the proportion of the contexts in which the prepositions were present where required. Obligatory contexts for each preposition were defined according to Brown’s (1973) suggestions. Because I was dealing with a restricted set of items, and as the procedure of elicitation did not allow linguistic prior contexts, I determined the obligatory contexts on the basis of two criteria:

(a) Linguistic Contexts – The child’s own utterance. Whenever the child omitted a preposition and it was clear that a specific preposition was needed, i.e.:

(7) "hayeled yavo al hašir selo
The child sit(s) on the Toilet his
‘The child is sitting in his toilet’

instead of:

hayeled yavo hašir selo
The child sit(s) the Toilet his
’The child is sitting in his toilet’

(b) Substituted

(8) "dubi nofel pans (a) water
A teddy is falling a water

instead of:

(dubi nofel) lamon
A teddy fall(s) in the water
’A teddy is falling into the water’

Whenever the child substituted an appropriate preposition with a different one which did not fit the meaning of the sentence.

(9) "hu megalon al ha telefon
He talk(s) on the phone
’He is talking on the phone’

instead of:

hu megalon ba telefon
He talk(s) at the phone
’He is talking at the phone’
(10) *nu nashke haaravin
  he gives water to the flowers
  'he is giving water to the flowers'
  Instead of:
  *nu nashke 67 haaravin
  he gives(s) water the flowers
  'he is giving water on the flowers'

b. Non-linguistic Contexts of the Speech Situation - Here I made the decision mainly on the basis of the stimuli that were presented to the child and the motor manipulations of the child concurrently with the utterance, i.e.,

When the child was talking about a specific picture that described a child approaching a dog, and he said:

(11) tine v'elef halel yakelev
  here (a) child goes) the dog
  'there is a child going the dog'
  Instead of:
  tine v'elef halel yakelev
  here (a) child goes) to the dog
  'there is a child going towards the dog'

Or when the child put a doll in a crib and said:

(12) t'na buba mita
  here (a) doll (a) bed
  'there is a doll a bed'
  Instead of:
  t'na buba bami'ta
  here (a) doll in the bed
  'there is a doll in the bed'.

It should be noted here that the 'rich interpretation' procedure was applied only for those utterances that included clear locative intension. Utterances such as buba again 'baby crib' or v'elef 'that boy' which could be interpreted in several ways were not identified as utterances which supplied obligatory contexts for prepositions.

Results

Out of a total of 4,294 spontaneous utterances studied (Dromi, 1977), only 439 utterances contained obligatory contexts for locative prepositions. The children supplied the expected prepositions in all but 49 of these.

Table 1 represents the Hebrew locative prepositions which were manifested in 439 spontaneous utterances of 30 2:0-3:0 year old Israelis, along with a simplified description of their means and examples for different correct uses.
<table>
<thead>
<tr>
<th>Preposition</th>
<th>Differential</th>
<th>examples</th>
</tr>
</thead>
</table>
| 1. in, at | internal | a. position within
| at, at the Def. | directions | b. end result of an action
| near | internal | c. presence with closeness to

| 2. before | internal | a. position within
| the Def. | directions | b. end result of an action
| the Def. | surrounded | c. position within and surrounded by
| the Def. | internal | d. movement towards

| 3. in | directions | a. movement towards
| to | goal | b. transfer to animate recipient
| at, into a Def. Marker | b. movement towards

| 4. in, into | directions | a. the same as if the rod was
| the Def. Marker | goal | b. move away from
| the Def. Marker | derived | c. the horse is near
| of | contiguously | d. the horse is near
| the Def. Marker | high | e. the horse is near

| 5. at | internal | a. position close to
| the Def. | directions | b. movement away from
| the Def. | contiguously | c. movement towards

| 6. at | internal | a. position close to
| the Def. | directions | b. movement away from
| the Def. | contiguously | c. movement towards

| 7. from | directions | a. position to the rear of
| all | goal | b. end result of an action

| 8. at, at the Def. | internal | a. position closer to
| the Def. | directions | b. end result of an action
| the Def. | contiguously | c. movement towards

| 9. measuring | internal | a. position closer to
| the Def. | directions | b. end result of an action
| the Def. | contiguously | c. movement towards

| 10. at, at the Def. | internal | a. position closer to
| the Def. | directions | b. end result of an action
| the Def. | contiguously | c. movement towards

Table 1: Hebrew locative prepositions in our sample.
I described the semantic properties of the prepositions in terms of the following binary markers: [+ internal] [- directional] or goal] [+ contiguous] [- high] [+ front]. (In this binary system [- directional] means [+ stationary], [- high] means [+ low], etc.

The system is not adapted from any other study and it includes only those features that would help the reader to grasp the meaning differences expressed by the prepositions.

Table 2 shows the number of obligatory contexts for each preposition supplied by each child. All values are presented in absolute numbers. Figures given without parentheses indicate the number of correct uses in obligatory contexts. Numbers in parentheses indicate the incorrect use of a preposition that is to say, all instances in which the child omitted this preposition or substituted another preposition for it.

Table 2 reveals the following trends:

1. The number of different locative prepositions seems related to the level of MLU. In the same stimuli conditions a greater variety of prepositions is used by children with higher MLUs. This correlation is independent of the sample size, as the overall correlation between the number of utterances for each child and his MLU is not significant (r = 0.297, p > 0.05).

Note that in general, children with low MLUs produced only a limited number of utterances with locative intentions. In view of the fact that such children in general failed to make overt reference to spatial relations, it was impossible to determine obligatory contexts for prepositions with these subjects. For example, when a low MLU child was presented with a picture of a baby in a crib, the child might say "A baby and a crib" or simply "A baby" and hence no obligatory context could be counted in such instances.

2. On the assumption that cross-sectional studies can predict the sequence of acquisition (de Villiers and de Villiers, 1973), I suggest that Table 2 represents the sequence of acquisition of locative prepositions in Hebrew. We can see that each preposition shows limited use in the early stages (i.e., when the child has a low MLU), and that only later Table 2 shows a rise in the frequency of use of each preposition. This trend is best shown by the increase in frequency of the prepositions at 'on' and 'direction to,' reading from left to right on the table.

In Table 3 prepositions are ranked according to the overall frequency of obligatory contexts for the group as a whole. The first column shows obligatory contexts, the second shows number of correct uses, the third shows the proportion of correct uses for each preposition, the fourth column shows the relative frequency within the locative prepositions.
<table>
<thead>
<tr>
<th>Proposition</th>
<th>Obligatory Contexts</th>
<th>Correct Uses</th>
<th>Correct Uses/ Oblig. Contexts</th>
<th>Relative Frequency of Oblig. Contexts (Percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. be- ba-</td>
<td>139</td>
<td>118</td>
<td>0.85</td>
<td>31.7</td>
</tr>
<tr>
<td></td>
<td>'im, of'</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. li lo la</td>
<td>111</td>
<td>111</td>
<td>1.00</td>
<td>25.3</td>
</tr>
<tr>
<td></td>
<td>'to + pronominal suffixes'</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. le- l-</td>
<td>60</td>
<td>49</td>
<td>0.82</td>
<td>13.7</td>
</tr>
<tr>
<td></td>
<td>'to' (Transfer to animate &amp; dative)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. al</td>
<td>54</td>
<td>50</td>
<td>0.93</td>
<td>12.3</td>
</tr>
<tr>
<td></td>
<td>'on'</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. le- l-</td>
<td>34</td>
<td>30</td>
<td>0.88</td>
<td>7.7</td>
</tr>
<tr>
<td></td>
<td>'to' (Movement towards)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. me- mi-</td>
<td>25</td>
<td>18</td>
<td>0.72</td>
<td>5.7</td>
</tr>
<tr>
<td></td>
<td>'to', off'</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. el</td>
<td>5</td>
<td>5</td>
<td>1.00</td>
<td>1.1</td>
</tr>
<tr>
<td></td>
<td>'to'</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. al yad</td>
<td>5</td>
<td>3</td>
<td>0.60</td>
<td>1.1</td>
</tr>
<tr>
<td></td>
<td>'beside, near'</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. betox</td>
<td>4</td>
<td>4</td>
<td>1.00</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>'inside'</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. me'mara</td>
<td>1</td>
<td>1</td>
<td>1.00</td>
<td>0.2</td>
</tr>
<tr>
<td></td>
<td>'behind, In back of'</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. mitakal</td>
<td>1</td>
<td>1</td>
<td>1.00</td>
<td>0.2</td>
</tr>
<tr>
<td></td>
<td>'under, below, beneath'</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>439</td>
<td>390</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 3: Use of locatives by the group as a whole (N = 30)
Tables 2 and 3 show that:

The prepositional le- 'ba-' in, at the' was used by all subjects, including those with the lowest MLU (1.6).

2. The fused forms with the dative marker le- were used by all children but one (subject no. 37) with an MLU of 2.0 or more. Almost all children used this form only with singular pronominal suffixes (e.g., li 'to me', lo 'to him' in 'to her'). Only subject No. 27 (MLU 4.0) who used this form more frequently than other subjects in our study, used it 3 times with plural pronominal suffixes (e.g., lehem 'to them', lema 'to us').

3. The use of the preposition le- 'to' combined with an animate noun is the third most frequent preposition. Most of the children used this preposition more than once in different contexts. In our sample (Subjects no. 9, 18, 4, 6, 16, 37, 15, 23, 3) used it only in that sense (e.g., lemo 'to money' leyale 'to the boy' leyadi 'to Danny') and never used it to express movement towards location (e.g., lebalt 'to a house' lehose 'to the field' lehoda 'to the work').

4. If we disregard the formal differences between the use of the preposition le- prefixed to a regular (animate) noun and the 'fused' with a pronominal suffix (i.e., le'dan 'to Danny' and le 'to him' respectively), then the preposition le- 'to' in its dative use is shown to have the highest frequency of occurrence.

5. The locative preposition al 'on' ranked the fourth in the order of acquisition. In our sample only when MLU values exceeded 2.0 (subject No. 7), or even 3.5 (subject No. 15) did the children begin to use this preposition more frequently. This suggests that in Hebrew the two prepositions be- 'in, at' and al 'on' do not appear at the same time and that al 'on' is acquired relatively late.

6. The locative preposition le- in the sense of direction toward a place is far more common than its synonymous full word form al. The full word preposition was used only by 4 of our subjects and 3 of those used it only in one instance. Table 2 does not represent a specific trend in the development of this preposition. The prefix le- (direction) is acquired relatively late. Children with MLU values of under 3.5 used it only rarely. Subject No. 23 (MLU 3.7) used the full word al when he referred to direction and the prefix le- only in the restricted sense with relation to an animate goal. This clear distinction between form and function is of interest and will be considered in the next section.

7. The preposition mi-me- 'from' does not seem to manifest a clear trend. Most of the children used it only once, so it is quite difficult to examine its productive use. It seems as though the use of this preposition has no predictive value as to the use of other prepositions by the child.

8. The remaining locative prepositions, all of which share a certain form or morphological complexity, were produced rarely and only by few children with relatively high MLU values. We can tentatively conclude that the locative prepositions that contain three distinct morphemes such as al'ta'at le- 'under' literally, 'from-bottom to', al-yad 'beside, next to' literally, 'on hand (at)'), le'man 'inside' literally, 'in
center of; are infrequently produced by Hebrew speaking children 2;0-3;0 and are probably acquired considerably late.

Discussion

It is important to note here that this study is based on the analysis of spontaneous speech samples and, hence, only the production, and not the comprehension of the children is considered. As this study is a cross-sectional study, all the assumptions regarding the order of acquisition and possible determinants of this order are tentative and should be re-examined in a longitudinal study as well.

The Hebrew data show that not only correct productions increase with MLU but so does the total number of obligatory contexts for locative prepositions. Brown (1973) noted that a short time before reaching criterion (i.e., 90% of correct use in obligatory contexts), Adam, Eve, and Sara omitted the prepositions 'in' and 'on' but supplied many utterances in which there were obligatory contexts for these prepositions. This suggests that the technique of determining obligatory contexts can be taken as a predictive measurement for the acquisition of new forms.

The Hebrew data do not seem to fully conform with Brown's findings concerning his three English speaking subjects. According to Brown (1973:330), "'in' and 'on' are always the first prepositions learned and always learned together." In Hebrew, the locatives ba- 'in/at' and and ha- 'to' (which precedes an animate goal) are the two earliest prepositions to be acquired; al 'on' is ranked fourth in the suggested order of acquisition. It is clear that 'in' and 'on' are not acquired concurrently in Hebrew. (see Tables 2 and 3) A very similar course of development for locative inflections was proposed by Lipp (1977) for Estonian, MacWhinney (1976), who studied the acquisition of cases in Hungarian, suggested that the first locative inflections in Hungarian that reach 90% criterion are those which express motion towards a goal.

The discrepancy between the acquisition of the earliest two prepositions in English and Hebrew might be explained on the basis of perceptual properties. I suggest that not only post-verbal particles facilitate acquisition as Siobin (1973) argued, but also prefixes are more salient for the child than full word prepositions. This assumption is supported by the data of this study in which locative directional le was far more common than its synonymous full word form el; be- 'in, at' was the common manner of expressing location internal to, while the children rarely used botze, the separate word for 'inside', and while several occurrences of the prefix mi-me 'from' are recorded not one instance of mi, the separate word of this preposition occurred.

The many factors that are involved here need to be investigated further. We must consider acoustical and phonological differences between prefixes and full word prepositions, differences in morphological complexity, differences in the semantic complexity (i.e., homonymity and synonymity), differences in the frequency in parental speech, as well as differences in the linguistic contexts in which adults use each form.

Siobin's (1973:159) principle: "Pay attention to the ends of words"
could be invoked to explain the early and frequent use of the "fused" forms. It is possible that although these forms are relatively more complex formally, they are more salient for the child, as they always appear in a fixed position at the end of the utterance.

Our data support the assumption that children require semantic coherence and that they try to look for a one-to-one mapping between ideas and linguistic units (Slobin, 1973). It is possible that in the process of acquisition of complex forms such as the "fused" forms and double meaning prepositions in Hebrew, children go into a stage in which the form is produced only in restricted function. For example, children who used fused forms of le-'to' only combined with singular pronoun suffixes, or other children who used le- only in its active function, Slobin's (1973:207) principle: "Errors in choice of functor are always within the given functor class" was found to be accurate for our data.

For example:

(iii) ex hu yošav barīqa?
   how he sits in the floor
   'How is he sitting in the floor?'
   The child used ba- 'in the' instead of al ha- 'on the' in an otherwise well-formed question.

(iii) hayeled medabar al hotelefon
    The boy talks on the phone
    'The boy's talking on the phone'
    The preposition al ha- 'on that' is used instead of the prepositional ba- 'in the' with the noun 'telephone' in Hebrew.

(iv) hem nosim belul
    They go travel in the chicken coop
    'They're going in the chicken coop'

Here the stationary locative ba- 'in the' was misused instead of the movement towards prepositional la- or al ha- 'to the',
This finding supports E. Clark's (1972) hypothesis that children are aware that words are related to each other as members of a particular semantic field.

I did not find any consistent preference for one preposition over another, that is children did not substitute simpler terms for more complex terms as was suggested by E. Clark (1972). Only one subject (No. 15 MLU 3.5) produced the locative preposition at 'on' instead of the preposition al yad 'beside, next to,' quite consistently.

(14) (I) yeṣona 'al hadubli
'sleeps (Fem) on the teddy bear'

Instead of:
al yad hadubli
'al yad 'beside the teddy'

(II) omedet 'al hadelet
'stands (Fem) on the door'

Instead of:
al yad hadelet
'al yad 'beside the door'

It could be that al yad is more complex than al not only in terms of morphological complexity but also in terms of 'transparency' as is indicated by Johnston and Siobin (1977). There the researchers judged locative expressions to be easier whenever the form of the word gives some indication of its meaning. The locative al yad is misleading for the child because its literal meaning is 'on the hand of', in fact there was in our sample one utterance that seems to clearly show this. In response to a picture of a bear and a child walking side by side the subject used al hayad 'on the hand' instead of al yad 'beside her.'

lama yis ḥadub al hayad?
'why has she a teddy on the hand'

why does she have a teddy on her hand?

In their relative formal linguistic scale Johnston and Siobin (1977) considered morphological complexity as a possible determinant of order of acquisition. The Hebrew data clearly indicate that Hebrew speaking children do acquire one-morpheme locatives earlier than two- or three-morpheme locatives. It is striking that all the locative prepositions that were produced rarely and only by a few subjects with higher MLU values (see results, par. 7) have three morphemes.

As far as cognitive complexity is concerned, our data do support two of H. Clark's (1973) assumptions. (1) ba- ba 'in' and al 'on' which are stationary locatives occur before al and in of 'direction towards.'
(ii) le- 'to' and al 'on,' which refer to positive direction, are acquired before ml 'from' and mitaxat le- 'under,' which refer to negative direction.

Johnston and Slobin's (1977) proposal that linguistic processing might explain order of acquisition whenever the cognitive complexity fails to predict this order, seems justified. It might be that whenever the linguistic complexity is superimposed on the cognitive complexity level of a term, the end result is a significant delay in acquisition. The term 'under' is considered by most investigators to be more complex than 'in' and 'on' (Clark, 1972; Grieve et al., 1977), but still was found among the earliest adpositions to be acquired in English, Turkish, Serbo-Croatian and Italian (Johnston and Slobin, 1977). Although some of the stimuli pictures in our study included the spatial relation of 'under,' only one child in our group produced the Hebrew term mitaxat le- 'under.' The child (subject No. 12 MLU 5.8) who had the highest NCU value in the group produced this proposition only once. It seems as though this finding manifests the significant role of morphological complexity in determining order of acquisition.

The present study suggests that the order of acquisition of locative propositions in Hebrew is: be- ba- 'in'; le- la and la- + pronominal suffixes 'to' (dative al 'to'; le- la- 'to' (dative); mitaxat 'from'; al ya 'beside'; mappiray 'behind'); mitaxat le- 'under.'

If seems as though enclitic prefixed propositions are acquired before full word prepositions that share the same locative notions. Our hypothesis that morphological complexity acts as a determinant in the acquisition of locative propositions in Hebrew might be accepted. For more comprehensive conclusions further investigation is needed. It is suggested that Johnston and Slobin's structured methodology be replicated with Israeli subjects to have comparative data from another language. We also need an evaluation of the semantic complexity of the terms in Hebrew (lexical diversity in that specific semantic field), and to try to eliminate the semantic morpho-syntactic contexted variables. It is necessary also to investigate children's comprehension of these terms and to compare the data with the findings of this inquiry. It would be interesting to extend the study to older children at a more advanced level of language acquisition, when it is assumed that they have been acquired fairly complete control of the "fused" system of inflected preposition and pronominal suffixes.

Footnotes

1. I am extremely grateful to Dr. Melissa Bowerman, the Bureau of Child Research, University of Kansas, and Dr. Ruth Berman, Department of Linguistics, Tel Aviv University, Israel, for their valuable criticisms of the earlier drafts of this paper.

2. Hebrew forms are given in broad phonemic transcription. All words have main stress on the final syllable, unless they are specially marked with an accent sign on the penultimate.
The method for calculating MLU in Hebrew was prepared under the guidance of Dr. Ruth Berman, Tel Aviv University. Although following the general lines for calculating MLU set out by Brown (1973), considerable modifications were necessary in view of the fact that Hebrew is much more highly inflected than English, and has a rich system of bound morphology. The MLU as stipulated in my earlier study was found to be a reliable indicator of overall language development, showing a high correlation with rate and stage of acquisition of various syntactic categories and markers (e.g., question-words, quantifiers, and adjectives).

Some differences between the use of locative prepositions in English and in Hebrew is manifested here. In Hebrew (not as in English) usually [-directional] prepositions would follow the verb sim 'put.' I considered the emphasis here on the end result of the action sim bakuris in the sense of 'cause it to be in the box.'

For the purpose of this study, I included 'dative' among the locative prepositions for the following reasons: (i) Sometimes it was too difficult to distinguish between the two functions as Hebrew uses identical surface structures (e.g., 'to') for both. (ii) It seemed interesting to examine whether children acquire these two 'uses' concurrently or whether they apply a certain strategy which indicates that they distinguish between those two functions. (iii) It was argued in Lyons (1967:592) that the case of the indirect object (the dative) and the directional of 'motion towards' fall together in many languages.

References


Grimm, H. 1975 On the child's acquisition of semantic structure underlying the world field of prepositions. Speech and Language, 18, 91-119.


