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Yonata Levy & Anne Vainikka

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The Development of a Mixed Null Subject System: A Cross-Linguistic Perspective With Data on the Acquisition of Hebrew

Yonata Levy

The Hebrew University, Jerusalem

Anne Vainikka

Johns Hopkins University

Hebrew has a mixed pattern of subject omission: Although subject pronouns may be freely omitted in first- and second-persons past and future tense, they are obligatory in the third-person past and future as well as in the present tense, in which person is not marked at all. In this article, we present longitudinal data from 3 children, ages 1;9 to 2;3, mean length of utterance (MLU) 1.5 to 3.2, whose first and only language is Hebrew. Findings show very early acquisition of the null subject system. Omission patterns approximate the adult even before age 2, with MLU around 2.5.

We propose that the observed acquisitional pattern can best be accounted for by Vainikka and Levy's (1995; 1999) recently proposed syntactic model of null subject patterns that accounts for uniform as well as for mixed systems of subject omission.

1. INTRODUCTION

Cross-linguistic studies of the early stages of language acquisition consistently show children's preponderance to omit overt subjects over and above omission of other noun phrase (NP) constituents such as direct objects. This has been attested in languages with a uniform pattern of subject omission—for example, English, which typically does not allow omission of overt subjects, and Italian, which uniformly allows such omissions. Subject omission in early child language has been reported for languages with a mixed pattern as well (Berman (1990), Elisha

(1997)). In these languages, of which Hebrew is one, grammatical omissions are restricted to certain persons and tenses.

Grammatical explanations of the phenomenon of subject omission in child language have generally espoused the principles and parameters (P&P) approach to null subjects. The focus has been on the distinction between licensing and identification of null subjects (Rizzi (1986)) and the relation between omission of overt subjects, the nature of agreement, and the developmental status of the inflectional phrase. This account concerned mostly languages with uniform patterns of subject omission. In this article, we argue that when languages with a mixed pattern of subject omission are taken into consideration along with the uniform null subject and non-null-subject languages, the grammar underlying children's productions has to be different from the traditional P&P model.

Our work adopts Vainikka and Levy's (henceforth V and L's) (1995; 1999) model of subject omission. Although staying within the general P&P framework and the more recent Minimalist approach (Chomsky (1993)), V and L's (1999) model gives syntactic expression to the pragmatic distinction between participants in the discourse and a third, nonpresent, party. A mechanism is proposed to account for subject omission in terms of the varying syntactic position of agreement features. This enables a statement of omission patterns in reference to different persons and makes predictions as to the acquisition of mixed languages. In this article, we examine data from three children acquiring Hebrew as their first language in light of the proposed account.

This article is organized in the following way: The next section describes the pattern of subject omission seen in mixed languages of which Hebrew is one. In section 3, we summarize V and L's (1995; 1999) model that accounts for subject omission in uniform as well as in mixed languages. In section 4, we briefly summarize previous accounts of subject omission in child Hebrew and lay out the predictions of V and L's (1999) model with respect to the acquisition of mixed systems of null subjects. In section 5, we present longitudinal data from three children, ages 1;10 to 2;3, mean length of utterance (MLU) 1.5 to 3.2, acquiring Hebrew as their first language. Section 6 is a discussion of the data in light of V and L's (1999) model.

2. SOME FACTS ABOUT HEBREW SUBJECT OMISSION PATTERN

In Hebrew, subject pronouns in first and second past and future are optional, whereas in the third person, overt subjects are normally required. Thus, (1a), in which a first-person singular pronoun has been omitted, is grammatical, whereas (1b), in which a third-person singular pronoun has been omitted, is not. When the

verb is in present tense—in which there is no person marking on the verb—subject pronouns are obligatory throughout, as in (1c).

- (1) a. Aliti al ha-rakevet.
stepped/1sg on the-train
'(I) stepped on the train.'
- b. *Ala al ha-rakevet.
stepped/3sgm on the-train
'*(He) stepped on the train.'
- c. Ani ole al ha-rakevet.
I step/1sg on the-train
'I am stepping on the train.'

Unlike simple declarative clauses, third-person subject pronouns can be omitted in expletive, generic, and embedded constructions, as demonstrated in (2a–c):

- (2) a. Nire she-Nurit tenaceax.
seem/sgm that-Nurit win-fut/3sg
'(It) seems that Nurit will win.'
- b. Oxlim harbe ba-xoref
eat/prespl much in-winter
'(One) eats a lot in winter.'
- c. Hivtaxti lo she-yedaber kama she-yrce
promised/1sg him that-speak/fut3sgm as-much that-want/fut3sgm
'(I) promised him that (he) will speak as much as (he) wants.'

Although in this article we are concerned with the development of Hebrew, it is interesting to note that exactly the same pattern of mixed omission obtains in Finnish, which, like Hebrew, is inflected for person and number. In other words, Finnish and Hebrew past and future tense are *pro*-drop languages with respect to first and second persons and non-*pro*-drop with respect to third persons. Unlike Hebrew, however, Finnish marks person in the present tense, and consequently subject omission is allowed in first and second persons (yet not in third person) in the present tense as well.

Table 1 gives the distribution of obligatory and optional overt subjects in Hebrew. Table 2 gives the forms of Hebrew pronouns and verb inflections in the past, future, and present tenses. Recall that present-tense verbs in Hebrew are marked for number and gender but not for person. In the past tense, the second-person agreement affixes are strongly related to the pronoun forms (as noted by Ariel (1996), Berman (1990), Ritter (1995) as well as many traditional grammarians): *ata* 'you-mas' versus /-ta/, *at* 'you-fem' versus /-t/, and *atem* 'you-pl' versus

TABLE 1
Obligatory S Versus Optional (S) in Hebrew

<i>Verb Forms</i>	<i>1Sg</i>	<i>2Sg</i>	<i>3Sg</i>	<i>1Pl</i>	<i>2Pl</i>	<i>3Pl</i>
Hebrew past/future	(S)	(S)	S	(S)	(S)	S
Hebrew present	S	S	S	S	S	S

Note. S = subject; 1Sg = first-person singular; 2Sg = second-person singular; 3Sg = third-person singular; 1Pl = first-person plural; 2Pl = second-person plural; 3Pl = third-person plural.

TABLE 2
Hebrew Pronouns and Verb Inflections in the Past, Future, and Present Tense

<i>Pronoun</i>	<i>Past</i>	<i>Future</i>	<i>Present</i>	<i>Example</i>
Singular				
ani	halax ti	elex	holex-hole xet	'I went/will go/(am) going-mas-fem'
ata	halax ta	telex	holex	'you-mas-sg went/will go/(are) going'
at	halax t	tel xi	hole xet	'you-fem-sg went/will go/(are) going'
hu	halax	yelex	holex	'he went/will go/(is) going'
hi	halxa	telex	hole xet	'she went/will go/(is) going'
Plural				
anaxnu	halax nu	nelex	holxim-hol xot	'we went/will go/(are) going-mas-fem'
atem	halax tem	tel xu	holxim	'you-mas-pl went/will go/(are) going'
aten	halax ten	tel xu	hol xot	'you-fem-pl went/will go/(are) going'
hem	halxu	yelxu	holxim	'they-mas went/will go/(are) going'
hen	halxu	yelxu	hol xot	'they-fem went/will go/(are) going'

Note. Bold indicates shared phonological resemblance between pronouns and verb inflections.

/-tem/. A similar correspondence is found in the first-person plural (*anaxnu* 'we' vs. /-nu/).

Although the singular pronoun and past affix, *ani* 'I' versus /-ti/, both containing an alveolar stop plus the vowel [i], may seem slightly less connected than second-person forms, when the first-person forms across paradigms are considered the phonological connection becomes extremely salient. Thus, the [i] ending that characterizes both the first-person Sg pronoun and the first-person past-tense form also marks first-person Sg possessive, the inflected form of the accusative marker *et*, as well as many other prepositions. For example, *shel-i* 'mine', *it-i* 'with me', *li* 'to me', and *ot-i* 'me-acc'. Note that these forms are extremely prevalent in early child language. In the third person, there is no phonological correspondence between pronouns and verb affixes—*hu* 'he' versus zero suffix, *hi* 'she' versus /-a/, and *hem* 'they' versus /-u/.

In the first- and second-person future tense, there may be a similar yet weaker relation, in that the consonant [t] is found both in the second-person pronouns and affixes, whereas [n] occurs in the first-person pronouns and in the 1Pl affix. The third-person pronouns and affixes do not share a consonant. A similar phonological relatedness is seen between Finnish verb inflections and personal pronouns.

3. SUMMARY OF V AND L's (1995; 1999) PROPOSAL FOR THE SYNTAX OF SUBJECT OMISSION

The motivation for the approach to subject omission proposed in V and L (1995; 1999) was twofold. The primary aim was to encode in the syntax the intuition that, for certain languages, instances of agreement morphology in fact function as pronominal subjects and this fact is related to null subject patterns seen across languages. This intuition was evident in much of the previous work on the distribution of null subjects (and was most explicitly expressed in McCloskey and Hale (1984, 468)), yet it has not been directly reflected in syntactic models of subject omission.¹ From the point of view of acquisition, this fact underscores an important distinction, hitherto unaccounted for, between children's subject omissions in languages in which such omissions result in grammatical utterances (i.e., the Italian-type languages) and subject omissions that are ungrammatical (i.e., in the English-type languages). A second motivation for the development of V and L's (1995; 1999) model was to account for the mixed systems of Hebrew and Finnish, in which conditions on subject omission differ among tenses, persons, and even different syntactic constructions.

In line with traditional approaches, V and L's (1995; 1999) proposal made crucial use of person agreement features in modeling the null subject phenomenon. A consideration of the mixed pattern of omission seen in Hebrew and Finnish makes it clear, however, that one cannot talk about person as a unified notion. V and L (1995; 1999) stressed the particular mixed combination of omission and none other that is seen in these languages, and they placed the pragmatic distinction between the speaker-hearer (i.e., first and second persons) and all others (i.e., third persons) at the focus of their analysis of these languages.

According to V and L's (1995; 1999) proposal, languages vary parametrically in terms of the (base-generated) syntactic position of the verb's agreement features, with two options:

- (i) The standard position of such features (i.e., the functional head agreement [Agr]).
- (ii) The (deep) subject position (i.e., specifier verb phrase [Spec VP]).

In the Italian-type languages the verb's agreement features (or more technically, Chomsky's (1986) *N*-features) fill the subject position (although they end up as clitics on the verb). Given the assumption that the subject position must be filled, subject pronouns can be omitted in Italian because the agreement features fill the subject position. In the English-type languages, the features do not fill the subject position; rather, all of the agreement features are base generated in Agr, and subject pronouns are therefore obligatory.

¹Based on her work in Walpiri, Jelinek (1984) proposed that agreement morphemes are equivalent to pronouns, but her work has not been extended to account for null subject patterns.

A similar mechanism accounts for the two patterns found within a language in the Hebrew–Finnish mixed-type languages. In Hebrew and Finnish, subject pronouns can be omitted when the corresponding agreement features are base generated in the subject position. That is, first- and second-person features occur in the subject position and such subjects can be omitted, whereas in the third person the agreement features occur in Agr and an overt subject is therefore required. (For independent evidence for the position of *N*-features in Hebrew and Finnish, see V and L (1999).)

The particular tree configuration seen in mixed system, and hence the particular pattern of omission—first or second pronouns optional, whereas third is obligatory—is not accidental; rather, it reflects the differential pragmatic status of the different persons. Thus, if a language chooses to express syntactically the pragmatic distinction between first, second, and third, then it is the first and second person that will be associated with a subject position or a related syntactic topic position and, as a consequence, may be omitted.

This particular constellation cannot be reversed because it is a reflection of the pragmatics of conversation. That is, it cannot be the case in the world's languages that only third-person features will be associated with subject position and hence third subject pronouns may be omitted, whereas first or second pronouns will have to be retained.² This is indeed the case for Finnish and Hebrew, which, to the best of our knowledge, are the only languages with a mixed pattern of subject omission that have been described in the literature. Yet clearly this hypothesis is open for further research.³

The distinction between person features in terms of syntactic position requires certain assumptions about syntactic derivation. These involve a variant of Chomsky's (1993) Checking theory, allowing for the possibility that the Agr position does not always carry *N*-features but that these can be base generated in the subject position (Spec VP), along with the principle of obligatory occupant licensing (POOL; Vainikka (1996), V and L (1995; 1999)).

(iii) Principle of Obligatory Occupant Licensing

To be licensed, both the head and the specifier of a syntactic position must be filled by syntactic material at some level of representation.

²Using a discourse-oriented approach that posits differential strength of accessibility of various referential markers, Ariel (1990) came to a similar conclusion—namely, that if a language has *pro*-drop it cannot be the case that third-person NP subjects are omitted and first- or second-person NP subjects are retained.

³Note that it is hardly surprising that, despite the universality of the conversational situation with respect to person, not all languages express the pragmatic distinction between first, second, and third persons in their syntax. The cross-linguistic generality resides in the need to address these pragmatic concerns and not in the ways that these concerns are resolved. The latter need not be uniform across languages any more than one might expect other syntactic principles to have invariant manifestations cross-linguistically.

POOL is a modification of Speas (1994) Principle of Licensing, which states that to be licensed, either the head or the specifier of a syntactic position must be filled at some level of representation. Most crucial for our proposal, POOL applies to the Agr phrase (AgrP) projection: To be projected, both the head and the specifier position of AgrP need to be filled. Given the hypothesized position of the subject features on the tree, POOL also motivates movement of those syntactic elements to higher positions in the syntactic tree.⁴

A consideration of Hebrew verb forms and pronouns appearing in Table 2 reveals a strong phonological resemblance between affixes and pronouns in first and second persons. A similar phonological resemblance between first and second verb forms and pronouns exists in Finnish. Given the approach developed in V and L (1995; 1999), this is not a coincidence. The affixes on the verbs are phonologically related to the subject pronouns in just those cases in which the verb in its base-generated position (V) is co-indexed with the base-generated person features in Spec VP, suggesting that the phonological relation between the verb affix and the pronoun may reveal an instance of Spec-Head agreement at an early level of derivation.⁵ Together with the ungrammaticality of omission of third-person subject in matrix clauses, this pronoun-affix connection is a fact about mixed systems that serves as an important trigger for the acquisition of the mixed null subject system. We discuss this further in section 4.

Finally, note that the classical description of Hebrew subject omission pattern makes crucial use of Tns. However, the appeal to Tns does not seem necessary and an account of the Hebrew system can be based solely on person distinctions. Thus, one might refer to the fact that Hebrew has two types of finite verbs: those that do not agree in person (i.e., present-tense verbs) and those that do agree (past- and future-tense verbs). The null subject system of Hebrew could then be restated as follows: For verbs that do not mark person agreement, an overt subject is required. For agreeing verbs, a subject is *not* required when the agreement affix is phonologically related to the pronoun (first or second person), but a subject *is* required in the absence of such a relation (third person). This way of conceptualizing the null subject system is more appealing in terms of Universal Grammar because person marking is associated cross-linguistically with null subject sys-

⁴See V and L (1999) for more details and Vainikka (1996) for arguments that POOL applies at the complementizer phrase level as well, accounting for various types of movement.

⁵Ariel (1996) also emphasized the morphophonological connectedness between pronouns and verbal inflection in the first and second persons in the Hebrew past and future tense, and the lack of such connectedness in third person. She suggested that due to the accessibility of the first- and second-person reference, their linguistic expression has become shortened and reduced resulting in a cliticization of the pronoun onto the verb (i.e., *halax + ata* 'went/mSg + you/2mSg' → *halaxta* 'went/2mSg').

Pursuing Ariel's (1990) discourse-oriented approach, Gutman (1999) likewise suggested that the morphological relation that exists between pronouns and Agr in Hebrew and Finnish may account for NP subject omission.

tems, whereas the variability of subject omission across tenses is, so far, unique to Hebrew and is not even shared by Finnish.

The following are the theoretical advantages of V and L's (1999) approach over more traditional approaches. POOL, listed previously under (iii), allows the replacement of the requirement that all clauses must have subjects—that is, the Extended Projection Principle—by the more general principle of licensing syntactic positions. This is clearly a desirable theoretical consequence that is already evident in Speas's (1994) Principle of Licensing. Furthermore, under the approach proposed in V and L (1995; 1999), licensing and identification (Rizzi (1986)) are accounted for by a single syntactic mechanism—the varying location of the subject–verb agreement features—which subsumes both of Rizzi's (1986) notions.⁶

4. APPROACHES TO THE ACQUISITION OF NULL SUBJECTS IN HEBREW

4.1. Previous Accounts

Research on the development of subject omission in Hebrew has generally adopted the P&P approach to null subjects (e.g., Berman (1990), Elisha (1997)). Berman accepted the P&P model that views Hebrew as a *pro*-drop language, yet she suggested that in addition to syntactic developments, subject omission involves different types of licensing: syntactic interclause licensing, and discourse and situational licensing resulting in the nonuniform pattern of the language. Although Berman correctly pointed to the importance of the various pragmatic and discourse-related factors that are involved in the null subject phenomenon, we believe that some of those concerns were addressed in the syntactic model proposed in V and L (1999).

Elisha (1997) did a cross-sectional study of the acquisition of subject omission in Hebrew. Her data are in full accord with the data presented in this article. Her interpretation of these data, however, was very different from ours. Elisha's model for Hebrew is based on the assumption that preservation of overt subjects in third person in the two tenses—past and future—in modern Hebrew should be considered as two separate phenomena resulting from distinct pragmatic and morphophonological factors. In her view, only present tense overt subjects de-

⁶ The current approach is an improvement over Speas (1994) as well, in that POOL does not allow totally empty syntactic positions to be posited, whereas Speas's principle allows either the head or the specifier to remain empty. This restriction over the projection of empty syntactic positions is in the spirit of the Minimalist architecture (Marantz (1995, 367)). Speas (1994) was aware of the problem posed for her approach by the mixed null subject system in Hebrew past and future tense (Speas (1994, 198–199)). She tentatively suggested that the affixes in the first and second person might really be incorporated pronouns and that Hebrew is non-*pro*-drop. However, this proposal fails to account for the obligatoriness of these so-called pronouns in the first and second person.

serve a grammatical explanation. Recall that Hebrew present tense lacks person distinction; it is therefore not surprising, given traditional P&P approach (with its recent modification in Speas (1994)), that overt subjects are required.

Rather surprisingly, Elisha (1997) believed that Hebrew was a uniform *pro*-drop language until recently. She quoted from letters and notes written in the beginning of the 20th century and argued that the omissions of overt third-person subjects that appear in those letters demonstrate that subject omission in third person was a grammatical option less than 100 years ago. Based on this evidence, Elisha did not consider the syntax of Hebrew to be that of a mixed null subject language with respect to grammatical person in third-person past and future.

Unfortunately, Elisha's (1997) intuitions are not shared by other native speakers of Hebrew. In fact, very different interpretation of the examples that she quoted to support her contention with respect to the nature of subject omission in third past and future tense were proposed.⁷ Furthermore, the view of Hebrew as a language with a mixed pattern of pronoun omission diachronically as well as synchronically—a view that we hold—has been and still is acceptable among Hebrew linguists of all persuasions (G. Goldenberg, personal communication (February 26, 1999), and see Glinert (1989)).⁸

Borer (1986; 1989) represented the most comprehensive account so far of the mixed null subject system of Hebrew under the general licensing and identification approach of Rizzi (1986) and Hyams (1986). We are not familiar with a specific attempt to extend Borer's (1989) account to child Hebrew and therefore do not discuss her model in detail here (but see V and L (1999)).⁹

⁷Elisha (1997) quoted from Milshtein (1985), which is a biography of Rachel, one of the national Hebrew poets. Excerpts from letters and commentaries written by and to Rachel during the years from 1910 to 1930 indeed contain instances of third-person omissions that would not be acceptable to speakers of present day Hebrew. However, all of these examples appear in writing and in rather specific linguistic contexts. Thus, in examples (10a,b,d) in Elisha (1997, 126), omission of overt subject is done within a paragraph following an overt mention of the third-person referent. Although such an option still exists in Modern Hebrew (as it does even in some non-*pro*-drop languages), it is, nevertheless, probably true that present day speakers would have been more reluctant to omit under the exact same discourse conditions. Example 10c (Elisha (1997, 126)) illustrates what used to be, for a short while, a politeness way of address. This could have been a reflection of the European languages spoken by many of the new immigrants coming to Israel at that time. This way of address never caught up in spoken Hebrew, and shortly thereafter disappeared from written forms as well (G. Goldenberg, personal communication (February 26, 1999)).

⁸Recently, Rhee and Wexler (1995) discussed the Optional Infinitive stage (OI) in connection to the mixed pattern of NP subject omission in Hebrew. However, the focus of their work is OI for which the mixed pattern of omission seen in Hebrew provides an interesting test case.

⁹An extension of Borer's (1986; 1989) account to acquisition entails the child's sensitivity to the "weakness" of the third singular masculine inflection as well as to Agr-binding, which is most clearly revealed in the embedded clause construction in which omission of third-person subjects is exceptionally possible in Hebrew. We believe that both stipulations would be problematic. Within the agreement paradigm of both past and future, third person clearly contrasts with the other persons. This is true of third-person singular masculine despite the fact that the inflection lacks a distinct suffix, and it

4.2. Acquisition of Subject Omission Based on V and L (1999)

Recall that under the V and L (1999) approach, the crucial feature distinguishing a consistent null subject language (e.g., Italian) from both a non-null-subject language (e.g., English) or from a mixed language (e.g., Hebrew) is the consistent occurrence of agreement features in the subject position, even in the third person. Such consistent null subject languages are the only type languages in which omission of third-person subject pronouns is a grammatical option. We propose that omission of subjects in the third person under canonical conditions of referentiality will serve as a trigger for the learner of a uniform null subject pattern (i.e., Italian). The requirement that the trigger for the learner be found in canonical constructions is not surprising given the arguments in Fodor (1992). Fodor showed that had this not been so, much misanalysis would be expected in child language based on idiomatic constructions and constructions that are peripheral to the grammar.

Thus, it is sufficient for the learner of an Italian-type language to be able to identify a third-person finite context. If the language allows null subjects in this context, then it is a uniform null subject language. Note that neither omission of imperative second-person subjects nor omission of first- and second-person subjects of the kind that is found in the “diary-drop” style will trigger a consistent null subject language.¹⁰ As for languages that do not allow null subjects in the third person, they can be of two types. Either they are consistent non-null-subject languages, such as English, or they are of the mixed type—that is, Hebrew and Finnish. A further trigger is required to distinguish these two types because in both cases overt third-person subjects are obligatorily preserved.

V and L (1999) proposed that the phonological resemblance between the verbal paradigm and the pronouns in first and second persons, and the lack of such relatedness in third person, is a trigger for the child for establishing the distinction between non-*pro*-drop languages and languages of the mixed type. Where such a phonological relation does not exist, the child will assume that her language is a

is even clearer in the third-person feminine singular (see Table 2). Furthermore, the weakness of inflection in the third person cannot be a universally valid cue of a mixed system, given the facts of the two Finnish dialects. Whereas both Colloquial Finnish and Standard Finnish share the same weak third-person suffix, Standard Finnish has a mixed Hebrew-like null subject, and Colloquial Finnish uniformly requires overt subjects (V and L (1999)). Thus, if the child’s parametric choices were based on the strength of the person agreement affixes, the child who is acquiring Colloquial Finnish would end up with the wrong null subject system. As for the need to attend to the embedded clause to acquire the null subject system, this too seems problematic in view of the fact that the null subject system in Hebrew is acquired very early, when MLU is around 2.5 and embedded clauses are still extremely rare, at least in production.

¹⁰In line with the arguments in Fodor (1992), omission of third topics as in German presents no problem to the learner because those are not canonical matrix clauses.

uniform non-null-subject language of the English type. Where one can observe phonological relatedness between first and second pronouns and verb affixes, the language will have a mixed system of subject omission.¹¹

Can one assume that once the child has differentiated between *pro*-drop and non-*pro*-drop languages by identifying potential omissions or obligatory preservation of subjects in third persons, omission of first and second person will be trigger for a mixed system? Is it crucial that the phonological relatedness between agreement and pronouns be noticed? As a rule, second-person pronouns are omitted in imperatives, and colloquial English has occasional omissions of second person in questions as well (e.g., “want pizza?”). On the other hand, both Hebrew and Finnish often preserve first- and second-person subject pronouns. The phonological resemblance between pronouns and verb affixes therefore becomes very important in cueing the child as to which system she is exposed to.

In sum, the parametric option for the child is the following:

- (i) Third-person pronouns are omitted.
- (ii) First- or second-person agreement is phonologically similar to pronouns, whereas such similarity is not seen between third-person agreement and pronouns.

A positive answer to (i) results in the Italian-type pattern, a positive answer to (ii) results in the Hebrew or Finnish type, and a negative answer to both results in the English-type languages.¹²

Based on this model, it is expected that the acquisitional course of a Hebrew-type mixed system will be as follows: A distinction between third-person singular pronoun and at least one other pronoun, as well as knowledge of the verbal paradigm in a tense in which person distinctions are marked, are required for mastering the adult pattern of subject omission. Once these developments have occurred, the null subject system and the person agreement paradigm will be in place.

5. EARLY DATA FROM CHILD HEBREW

5.1. Subjects, Procedure, and Coding

In this section, we present data from three Hebrew-speaking children: two girls (R and N) and a boy (A). The data are longitudinal and have been audiorecorded and

¹¹The proposed analysis does not imply that there is necessarily a time span between the point at which the child determines that subjects cannot be omitted in the third person and the point at which she distinguishes a Hebrew-type language from an English-type language based on the inflectional paradigm.

¹²We thank an anonymous reviewer for suggesting this way of summarizing our hypothesis.

later transcribed by the children's parents. R's data were collected in a play and book-reading situation in the presence of her father and occasionally her mother. A and N's data were collected in various home situations in the presence of other members of the family.

In an attempt to present the developmental data as they unfold in time, the naturalistic, ongoing recordings were divided, post hoc, into four phases according to proximity of time between recordings and MLU. MLU was calculated based on Dromi and Berman (1982) that takes into consideration the rich morphological structure of Hebrew. Although we use a revised system of counting morphemes (Levy (1996)), the counts remain somewhat higher than the norms seen in English-speaking children of equivalent ages. Increase in verb usage was taken into consideration as well. The latter is generally considered as reflecting developmental progress (Dromi and Berman (1986)).

R's data were collected between the ages 1;10;3 and 2;2;7 when her MLU was between 1.5 and 3.05. The analyzable data from A begin at the age of 1;11;7 and end at 2;3;2, with an MLU between 1.65 and 3.2. Unfortunately, though not atypical of naturalistic data, following Phase 2 there is a 2-month gap in the recordings of A. During these months, there is only one session with a total of 20 utterances for A. In the recordings of the following month, however, A seemed already at Phase 4. N's data were collected between the ages 1;9;2 and 2;4;14 (MLU = 1.6 to 3.2).

Sessions were coded using the CHILDES conventions (MacWhinney (1995)) along with a special coding system devised for Hebrew (Levy, Amir, and Shalev (1992)). The sessions were coded by two different coders. We did not participate in the coding. Unintelligible utterances, hesitations, repetitions, and imitations were excluded. Utterances for which agreement could not be reached were excluded.

The development of the following elements was investigated: the inflectional paradigm for the various tenses and persons, the distribution of NP subjects in the different persons and tenses, and grammatical person in the pronominal system. All of these elements turn out to be relevant for the different theoretical accounts that have been proposed for the acquisition of null subjects.

Subject omission was categorized as follows. Overt subjects refer to pronominal subjects, in all persons and tenses. Lexical subjects, which were very few, do not appear in the analyses although they form part of the sum total of subjects presented in the tables. An example of an overt pronominal subject is given in (3a). An example of grammatical subject omission in the first-person past tense is given in (3b). Ungrammatical subject omission in third-person past tense is exemplified in (3c). Omission of subjects was considered acceptable if it was pragmatically licensed—for example, in cases of elliptical replies to questions. An example of such a question–answer exchange is provided in (3d). Such discourse-licensed omissions do not appear as part of the counts in Tables 3 to 5. The examples in (3) come from A's first file, at age 1;11.

- (3) a. Overt subject:
 hi amra li.
 she said/3femsg to-me
 'She said to me.'
- b. Grammatical subject omission:
 lakax-ti uga'.
 took/1sg cake
 'I took (a piece of) cake.'
- c. Ungrammatical subject omission:
 *shata et ze.
 drank/3msg DirObj this
 '*Drank this.'
- d. Pragmatically licensed omission of subject:
 M: ma ose kelev?
 'what does the doggie do?'
 A: coek.
 scream/msg
 'screams.'

Note that it is quite common for second-person future forms in Hebrew to be used in an imperative context. However, unlike verbs in the imperative that force omission of second-person pronoun subjects, future-tense verbs that are used in an imperative sense allow an overt subject.¹³ This suggests that with respect to subject omission, morphological form rather than function takes priority. The second-person future forms, whether used to refer to future events or in an imperative context, are thus included in the analysis.

To evaluate the child's knowledge of person distinctions we performed a count of all pronouns appearing in all syntactic contexts. A major coding decision concerned the third-person pronoun *ze* 'it, that'. Although *ze* may be used as an expletive as well as be anaphoric, children do not use *ze* in its expletive sense until later, whereas anaphoric uses are frequent from early on and, in fact, precede personal pronouns such as *hu* 'he' or *hi* 'she' (Berman and Armon-Lotem (1996)). Coding of *ze* was done conservatively, counting occurrences for which the context clearly showed that *ze* was used as a third-person pronoun. Consequently, set phrases such as *ma ze?* 'what's this?' and *et ze* 'this-acc' were excluded from the count, as were all the isolated, single word utterances of *ze* 'this' that could have been some kind of an exclamation rather than contrastive person pronoun.

The data are given separately for each child (Tables 3–5) and then summarized in Table 6. Details are given concerning the children's ages, MLU, and distribution of verb usage for the four phases. Sample sizes are the number of nonimita-

¹³Compare, in English, "Finish your food!" and "You will finish your food now!"

tive, analyzable utterances per child, of which percentage of utterances with verbs and percentage of finite verbs has been calculated. Percentage omissions in first- and second-person past and future were calculated relative to the number of verb forms in these persons and tenses. Similarly, percentage of omissions in present tense and third persons was calculated out of the total of verbs in this person and tenses. Absolute numbers of verbs are given in parentheses. The count of pronouns appearing in the tables gives the raw numbers of all personal pronouns found in the child's data.

Our interpretation of the data follows the practice in previous research on related topics. Specifically, we followed Meisel's (1994) proposal according to which two separate forms need to be attested before one can refer to the child as having a paradigm. We also adopted Valian's (1991) suggestion that children's productions be considered as approximating the adult pattern when 70% or more of the utterances with finite verbs followed the adult grammar. These criteria are used to refer to presence or absence of certain phenomena in the data, as described in the next sections.

5.2. Developmental Phases

5.2.1. *Data From R*

5.2.1.1. *Phase 1: R, age 1;10;3 to 2;0;16 (MLU = 1.5).* This phase covers the first four recordings made of R (see Table 3). Overall only two of R's sentences at this phase are attested instances of first- or second-person verb forms. Forty-five percent of the present-tense and third-person forms had unacceptable omission, whereas 55% had overt subjects, as required. In other words, R's subject omissions appear basically random. Although the third-person pronoun *ze* is very common, there is no evidence for a person distinction because neither first- nor second-person forms appear to be productive.

5.2.1.2. *Phase 2: R, age 2;0;25 to 2;0;28 (MLU = 2.34).* At Phase 2, various components of the grammar begin to emerge. In fact, the mixed null subject system of adult Hebrew is already evident at this stage. Subjects are omitted in 50% of the first- or second-person past- and future-tense forms. As for third-person present tense, there is a strong tendency to retain the subjects resulting in overt subjects in 85% of the cases. In addition to the null subject system, R shows evidence of a person distinction in the pronominal system (between first and third person), and there is some evidence for tense marking beyond the present tense. Some person agreement errors are found at this phase, and only a few correct instances of pronoun-verb agreement.

5.2.1.3. *Phase 3: R, age 2;1;3 to 2;1;10 (MLU = 2.85).* At Phase 3, only future forms occur in first person. Although the grammar allows omission of subject in the first-person future, R retains the pronoun with all four verbs that she

TABLE 3
Subject Omission Pattern in R, Ages 1;10.3 to 2;2.7 (MLU = 1.5–3.4)

<i>R</i>	<i>Recording</i>			
	<i>1</i> <i>Age 1;10;3</i> <i>to 2;0;16</i>	<i>2</i> <i>Age 2;0;25</i> <i>to 2;0;28</i>	<i>3</i> <i>Age 2;1;3</i> <i>to 2;1;10</i>	<i>4</i> <i>Age 2;1;19</i> <i>to 2;2;7</i>
MLU	1.5	2.34	2.85	3.05
No. utterances	284	144	235	358
Utterances with verbs (%)	6.7 (19)	20.8 (30)	29.7 (70)	44.9 (161)
Finite verbs (%)	6 (17)	20.1 (29)	28 (66)	39.7 (142)
Subject in I, II pas/fut (%)	0	50 (4)	22 (4)	48 (33)
Omission in I, II pas/fut (%)	100 (2)	50 (4)	78 (14)	52 (36)
Subject in III pas/fut and in the present (%)	55 (5)	85 (17)	86 (31)	93 (51)
Omission in III pas/fut and in the present (%)	45 (4)	15 (3)	14 (5)	7 (4)
Pronoun I	1	11	17	78
Pronoun II	2	2	1	2
Pronoun III	40	44	34	57

Note. Numbers in parentheses are absolute number of verbs. MLU = mean length of utterance; I = 1st person; II = 2nd person; III = 3rd person; pas = past; fut = future.

produces. This conforms to the tendency in colloquial Hebrew to preserve the first-person singular pronoun in the future tense (Borer (1989, 95), Elisha (1997)). As for second-person forms, the nature of early child language is such that production of second-person forms is relatively rare, and the current data are no exception. Unacceptable subject omission still occurs in 14% of the sentences containing an inflected verb in either the present tense or third-person past. At this phase, however, the agreement paradigm is clearly emerging, with first Sg and Pl in the past and future as well as in the present attested. Errors of agreement do not occur. A distinction between first- and third-person pronoun exists, but R is still not producing second-person pronouns.

5.2.1.4. Phase 4: R, age 2;1;19 to 2;2;7 (MLU = 3.05). The data at this point reveal that the child is using many first- and second-person verb forms in the future and past tenses with the expected subject omission pattern. The proportion of unacceptable subject omission has been reduced to 7%. As for personal pronouns, there is still a scarcity of second-person pronouns, although the distinction between first and third has been established.

5.2.2. *Data From A*

5.2.2.1. *Phase 1: A, age 1;11;7 to 1;11;14 (MLU = 1.65).* As is evident from Table 4, at Phase 1, A produced more verb forms than R, yet his utterances contain not a single instance of a first-person verb form and just one instance of a second-person past-tense form. As for present-tense forms, A's data look somewhat more advanced than R's, with relatively fewer unacceptable subject omissions and overall more verb usage. In view of the paucity of past- and future-tense forms, it seems that a productive Tns is not yet available. As for pronouns, third-person forms are contrasted with first-person pronouns, revealing some knowledge of grammatical person. However, this person distinction is not yet realized in the verb paradigm because in the same recording that contains the 42 instances of *I* as single word utterances or in verbless clauses. A produced no instances of a first-person verb form.

5.2.2.2. *Phase 2: A, age 1;11;16 to 2;0;11 (MLU = 2.75).* An examination of A's verbs at Phase 2 reveals that tense and agreement are emerging. There are verbs in the first- or second-person future or past tenses, with which subject omission is grammatical. A omits overt subjects in 38% of these instances. Unac-

TABLE 4
Subject Omission Pattern in A, Ages 1;11;7 to 2;3;2 (MLU = 1.65–3.2)

	Recording			
	1 <i>Age 1;11;7 to 1;11;14</i>	2 <i>Age 1;11;16 to 2;0;11</i>	3	4 <i>Age 2;2;24 to 2;3;2</i>
<i>A</i>				
MLU	1.65	2.75	—	3.2
No. utterances	233	125	—	391
Utterances with verbs (%)	12.4 (29)	19.2 (24)	—	39.6 (155)
Finite verbs (%)	9.4 (22)	18.4 (23)	—	36.8 (144)
Subjects in I, II pas/fut (%)	0	63 (5)	—	29 (9)
Omission in I, II pas/fut (%)	1	38 (3)	—	71 (23)
Subject in III pas/fut and in the present (%)	86 (12)	82 (14)	—	91 (66)
Omission in III pas/fut and in the present (%)	14 (2)	18 (3)	—	9 (6)
Pronoun I	42	35	—	56
Pronoun II	2	1	—	6
Pronoun III	11	8	—	40

Note. Numbers in parentheses are absolute numbers of verbs. MLU = mean length of utterance; I = 1st person; II = 2nd person; III = 3rd person; pas = past; fut = future.

ceptable subject omissions comprise 18% of the total of sentences with present tense and third-person future or past forms. One can conclude that A's grammar approximates the adult language in terms of the requirement to have overt subjects with certain persons and tenses, although errors of unacceptable omissions still occur. As for pronouns, although person distinctions between first and third are clearly observable, there is only one instance of second-person pronoun. In view of the time that elapsed and the increase in MLU and in verb usage, the next set of recordings reported for A are considered as Phase 4 rather than Phase 3.

5.2.2.3. Phase 4: A, age 2;2;24 to 2;3;2 (MLU = 3.2). The pattern of omission seen in first- and second-person past and future tense in this phase is perfectly grammatical. As for third-person and present-tense verbs, the proportion of unacceptable subject omission has been reduced to 9%. This proportion is close to the amount of unacceptable omissions seen in R. Unlike R, however, A does use second-person pronouns to some extent, although first- and third-person pronouns are more frequent.

5.2.3. *Data From N*

5.2.3.1. Phase 1: N, age 1;9;2 to 1;10;0 (MLU = 1.6). Relative to the two other children, N's use of verbs is high already at Phase 1. However, most verbs are in the imperative with only few instances of past- and future-tense verbs. N tends to omit subjects in all persons and tenses. She omits subjects in 60% of first- and second-person past and future tense and in 75% of third persons and present tense. Thus, her pattern of omission does not seem to reflect the grammatical options of the language. Furthermore, N's data at this phase do not yet show clear evidence of person in the verb paradigm. Of the five forms appearing in rows 5 to 6 in Table 5, one was a first-person form, whereas the other four forms were second-person future used in an imperative sense. As for pronouns, there seems to be some differentiation between first-person pronouns and third-person pronouns.

5.2.3.2. Phase 2: N, age 1;11;0 to 2;0;10 (MLU = 2.67). N's data at this phase has 255 utterances, 112 with verbs. The mature pattern of subject omission can already be seen. N omits overt subjects in 70% of first and second persons in the past and the future but preserves subjects in 71% of third person and present-tense verbs. However, the rate of missing subjects in third and present tense is still high. First-person forms are used and an agreement pattern is emerging.

Second-person pronouns are not attested in the data, but the distinction between first and third person is very clearly expressed in N's use of pronouns.

5.2.3.3. Phase 3: N, age 2;0;24 to 2;1;12 (MLU = 2.76). Although N has many first- and second-person verb forms at this phase, all of them are without overt subjects. Although grammatical, this pattern of omission is unlike the

TABLE 5
Subject Omission Pattern in N, Ages 1;9;2 to 2;4;14 (MLU = 1.6–3.6)

	Recording			
	1 Age 1;9;2 to 1;10;0	2 Age 1;11;0 to 2;0;10	3 Age 2;0;24 to 2;1;12	4 Age 2;2;12 to 2;3;2
MLU	1.6	2.67	2.9	3.2
No. utterances	206	255	242	349
Utterances with verbs (%)	23.3 (48)	44 (112)	45.8 (111)	55 (192)
Finite verbs (%)	17.5 (36)	36.8 (94)	41 (100)	50.4 (176)
Subjects in I, II pas/fut (%)	40 (2)	30 (9)	0	13 (7)
Omission in I, II pas/fut (%)	60 (3)	70 (21)	100 (46)	87 (48)
Subjects in III pas/fut and in the present (%)	25 (1)	71 (10)	83 (14)	92 (22)
Omission in III pas/fut and in the present (%)	75 (3)	29 (4)	17 (3)	8 (2)
Pronoun I	6	22	13	65
Pronoun II	0	0	0	3
Pronoun III	24	80	54	98

Note. Numbers in parentheses are absolute numbers of verbs. MLU = mean length of utterance; I = 1st person; II = 2nd person; III = 3rd person; pas = past; fut = future.

pattern seen in the other children (see also Elisha (1997)). With respect to third-person and present-tense verb forms, in 17% of the cases omission still occurs. Second-person pronouns are not yet produced.

5.2.3.4. *Phase 4: N, age 2;2;12 to 2;3;2 (MLU = 3.2).* Thirteen percent of the first- and second-person past- and future-tense verbs seen in this phase for N appear with overt subjects, whereas in all other cases subjects are omitted. The reverse pattern is seen with third-person and present-tense verbs: Although overt subjects are erroneously omitted in 8% of the cases, the remaining 92% have overt subjects as required. Interestingly, N has many morphological errors involving inflections as well as derivations, resulting in semantic as well as grammatical errors. Errors of this kind are not attested in either R's or A's data. Many of N's errors reveal an underlying systematicity that although erroneous from the point of view of the adult grammar, it nevertheless stays within the structural properties of Hebrew derivational and inflectional system. These errors are irrelevant for the present discussion because they neither involve person distinctions nor implicate subject omission patterns.

TABLE 6
 Summary of the Data for R, A, and N: Phases at Which
 Production Approximates the Adult Grammar for Each Child

<i>Child</i>	<i>1st Versus 3rd Pronoun Distinction</i>	<i>Tense Distinction</i>	<i>Person Agreement (1st Versus 3rd)</i>	<i>Mixed Null Subject System Approximated</i>
R	2	2	3	2
A	1	2	2	2
N	1 or 2	1 or 2	2	2

5.3. Summary of the Findings

The distribution of the grammatical elements that have been investigated is summarized in Table 6. Following the criteria that were set in section 5.1 for each phenomenon, the phase by which it is attested has been indicated.

As summarized in Table 6, the complicated mixed null subject system of Hebrew is already approximated in the data by Phase 2. Given the ages (before or around the second birthday) and MLU levels of these children at Phase 2, this is a striking feat. By the same stage we also find evidence for the other grammatical phenomena—tense and agreement as well as person distinction in the pronominal system for all three children, with the exception of R, whose acquisition of person agreement is attested at Phase 3.

These data are in accord with the recent cross-sectional study of the acquisition of null subject in Hebrew by Elisha (1997). In Elisha's study too, the pattern of subject omission seen in the youngest subjects—whose ages and MLU values are similar to R, A, and N in Phase 1—is immature, with ungrammatical subject omission around 40% on average. Children with higher MLU values gradually approximate the adult pattern of subject omission (see Appendix in Elisha (1997)).

6. APPLICATION OF V AND L (1995; 1999) TO HEBREW CHILD DATA

The acquisitional course outlined in section 4.2 for the development of a mixed null subject language (summarized in Table 6) can now be tested against our child Hebrew data. The most striking findings with respect to null subjects is the earliness of the system. The mixed null subject system is already evident for all three children at Phase 2 (age 1;11–2;1). The apparent ease with which the complex mixed system is acquired suggests that the mechanisms involved are very basic. V and L (1995; 1999) indeed made use of elementary syntactic constructs such as position of features and the person paradigm. According to this approach, to master the mixed null subject system of Hebrew, the child must recognize the

morphophonological similarity between person agreement affixes and the corresponding pronouns. The data show that the pronoun distinction occurs in production at either Phase 1 or 2 for all three children. Past- or future-tense forms are found by Phase 2 as well for each of the children. All children show the null subject system at Phase 2. In other words, the distinction between first and third person in the pronominal system exists in production by the time that the null subject system is in place.

The proposed syntactic mechanism in fact suggests that the person agreement affixes and the distribution of null subjects reflect the same phenomenon—namely, the varying position of the agreement features. Consequently, the expectation is that person agreement on the verb and the mixed null subject system is acquired concurrently. This holds for two of the children, A and N, but it does not directly hold for the third child, R. For R the evidence for agreement is attested only immediately after the point at which the mixed null subject system is evident.

The following factors may be responsible for the discrepancy found between R and the other two children. First, Phase 3 was recorded only about 1 week later than Phase 2. Second, R's data were collected in book reading situations, which are known to be contextually restricted and limited in the kind of linguistic interchanges that they encourage.

A general problem that arises with respect to all three children is the paucity of second-person forms, both pronouns and verb forms. Recall that V and L (1995; 1999) predicted that a crucial trigger for the mixed systems is determining that first- and second-person verb affixes and pronouns are phonologically related, whereas there is no such relation in the third person. Given the scarcity of second-person forms, how could the child possibly use the information from first or second versus third as a trigger for the mixed null subject system, as she apparently does by Phase 2? Although we do not have evidence that relates specifically to comprehension, it seems that even though the children do not produce second-person forms, they must understand them because second-person forms are consistently used to address children and adults alike.

A related problem concerns the need of the child, according to V and L (1999), to notice that third-person pronouns and third-person agreement marking are morphologically unrelated in either the singular or the plural. The inclusion of the plural is necessary to account for the different pattern of subject omission in the two Finnish dialects whose verb inflections differ most clearly in the first-person plural. Because cross-linguistically, plural forms do not appear in children's language early, it is to be expected that acquisition of the null subject pattern in Finnish will not be as early as it is in Hebrew. Alternatively, children may recognize and comprehend plural verbs and pronouns before they actually produce them. These questions remain for future research into the acquisition of Finnish.

Finally, under V and L (1995; 1999), the null subject phenomenon derives directly from the position of features rather than being controlled by the traditional *pro*-drop parameter. However, one can state this in reference to parametric

choices relating to the options described at the end of section 4.3. The fact that children acquire this system very early in their development accords with Wexler's (1996) claim of Very Early Parameter Setting, which states that from the earliest observable stage children have correctly set the basic inflectional or clause structure parameters. Although we did not find evidence for correct null subject pattern at Phase 1, we believe that Phase 2 can still be considered very early in Wexler's terms.

It is likewise possible, however, that our earliest data from Phase 1, in which approximation to the adult language was not yet evident, reveal either default setting or no setting of the parameter. On the whole, however, as one moves through the phases, our findings support other cross-linguistic data in which children's earliest productions of subject omissions differed in a manner predicted by the target language (Valian (1991), Valian and Eisenberg (1996)).

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REFERENCES

- Ariel, M. (1990) *Accessing NP Antecedents*, Routledge, London.
- Ariel, M. (1996) "The Changes of Tomorrow Are the Consequences of Our Acts of Communication Today: The Development of Verbal Person Agreement," talk delivered at the Hebrew University of Jerusalem, Israel.
- Berman, R. A. (1990) "On Acquiring an (S)V(O) Language: Subjectless Sentences in Children's Hebrew," *Linguistics* 28, 1135–1166.
- Berman, R. and S. Armon-Lotem (1996) "How Grammatical Are Early Verbs," in C. Martinot, ed., *Annales Littéraires de l'Université de Franche-Comté: Actes du Colloque International sur l'Acquisition de la Syntaxe*.
- Borer, H. (1986) "I-subjects," *Linguistic Inquiry* 17, 375–416.
- Borer, H. (1989) "Anaphoric Agr," in O. Jaeggli and K. Safir, eds., *The Null Subject Parameter*, Kluwer, Dordrecht, The Netherlands.
- Chomsky, N. (1986) *Barriers*, MIT Press, Cambridge, Massachusetts.
- Chomsky, N. (1993) "A Minimalist Program for Linguistic Theory," in K. Haleand and S. J. Keyser, eds., *The View from Building 20: Essays in Linguistics in Honor of Sylvain Bromberger*, MIT Press, Cambridge, Massachusetts.
- Dromi, E. and R. A. Berman (1982) "A Morphemic Measure of Early Language Development: Data From Modern Hebrew," *Journal of Child Language* 9, 403–424.

- Dromi, E. and R. A. Berman (1986) "Language-General and Language-Specific in Developing Syntax," *Journal of Child Language* 14, 371–387.
- Elisha, I. (1997) *Functional Categories and Null Subjects in Hebrew and Child Hebrew*, Doctoral dissertation, Graduate Center, City University of New York, New York.
- Fodor, J. (1992) "How to Obey the Subset Principle: Binding and Locality," ms., Graduate Center, City University of New York, New York.
- Glinert, L. (1989) *The Grammar of Modern Hebrew*, Cambridge University Press, New York.
- Guttman, E. (1999) *Null Subjects: A Theory of Syntactic and Discourse Identification*, Doctoral dissertation, University of Delaware.
- Hyams, N. M. (1986) *Language Acquisition and the Theory of Parameters*, Reidel, Dordrecht, The Netherlands.
- Jelinek, E. (1984) "Empty Categories, Case and Configurationality," *Natural Language and Linguistic Theory* 2, 39–76.
- Levy, Y. (1996) *Coding Manual for Hebrew Texts*, The Hebrew University, Jerusalem.
- Levy, Y., N. Amir, and R. Shalev (1992) "Language Development in a Child With a Congenital LH Lesion," *Cognitive Neuropsychology* 9, 1–32.
- MacWhinney, B. (1995) *The CHILDES Project*, Lawrence Erlbaum Associates, Inc., Publishers, Hillsdale, New Jersey.
- Marantz, A. (1995) "The Minimalist Program," in G. Webelhuth, ed., *Government and Binding Theory and the Minimalist Program*, Basil Blackwell, Oxford, England.
- McCloskey, J. and K. Hale (1984) "On the Syntax of Person-Number Inflection in Modern Irish," *Natural Language and Linguistic Theory* 1, 442–487.
- Meisel, A. (1994) "Getting FAT: Finiteness, Agreement and Tense in Early Grammars," in A. Meisel, ed., *Bilingual First Language Acquisition: French and German Grammatical Development*, Benjamins, Amsterdam, The Netherlands.
- Milshtein, U. (1985) *Rachel: Shirin, Mixtavin, Reshimot, Verbibliographia* [Rachel: Songs, Letters, Notes, Bibliography], Zmora Bitan Publishers, Israel.
- Rhee, J. and K. Wexler (1995) "Optional Infinitives in Hebrew," *Massachusetts Institute of Technology Working Papers in Linguistics* 26, 383–402.
- Ritter, E. (1995) "On the Syntactic Category of Pronouns and Agreement," *Natural Language and Linguistic Theory* 13, 405–443.
- Rizzi, L. (1986) "Null Subjects in Italian and the Theory of Pro Drop" *Linguistic Inquiry* 17, 501–557.
- Speas, M. (1994) "Null Arguments in a Theory of Economy of Projection," *University of Massachusetts Occasional Papers in Linguistics* 17, 179–209.
- Vainikka, A. (1996) "What Causes Syntactic Movement?," ms., University of Pennsylvania, Philadelphia.
- Vainikka, A. and Y. Levy (1995) "Empty Subjects in Hebrew and Finnish," IRCS Rep. No. 95–31, University of Pennsylvania, Philadelphia.
- Vainikka, A. and Y. Levy (1999) "Empty Subjects in Hebrew and Finnish," *Natural Language and Linguistic Theory* 17, 613–671.
- Valian, V. (1991) "Syntactic Subjects in the Early Speech of American and Italian Children," *Cognition* 40, 21–81.
- Valian, V. and Z. Eisenberg (1996) "The Development of Syntactic Subjects in Portuguese-Speaking Children," *Journal of Child Language* 23, 103–128.
- Wexler, K. (1996) "The Development of Inflection in a Biologically Based Theory of Language Acquisition," in M. L. Rice, ed., *Towards a Genetics of Language*, Lawrence Erlbaum Associates, Inc., Mahwah, New Jersey.