On acquiring an (S)VO language: subjectless sentences in children’s Hebrew*

RUTH A. BERMAN

Abstract

The study considers children’s acquisition of Hebrew, as a language which exhibits several asymmetries with respect to where zero subjects are required, optional, or disallowed. It aims to throw light on the more general issue of linguistic variability, by suggesting ways in which the notion of ‘licensing’ of a phenomenon such as null subjects might be extended (section 1). Modern Hebrew is analyzed as variable in the patterning of its subjectless clauses in impersonal constructions, with verbs marked for person agreement, and in subordinate-clause ellipsis (section 2). Findings from the conversational and narrative usage of Hebrew-speaking children at different ages (section 3) are consistent with claims concerning children’s progression from pregrammatical to thematic organization of linguistic material, the role of language-particular structural patterns in acquisition, and the confluence of factors impinging on the acquisition process (section 4). The particular case of Hebrew is suggestive for how children in general are able to accommodate structural asymmetries in the course of acquisition.

1. Structural asymmetries

The parameter-setting model of language acquisition, like the theory of parametric syntax in general, is based on the premise that the properties of a language cluster on certain typological parameters (see, for example, Roever and Williams 1987). For instance, a so-called ‘null-subject language’ typically displays morphological uniformity — that is, it has either rich verb-agreement inflection or none at all; it allows null pronoun subjects in simple clauses and deletion of coreferential pronouns in subordinate clauses; and it will have subject–verb inversion, whereas subject–aux inversion will play no special part in its grammar (Hyams 1986; Weissenborn 1989). Similarly, on the ‘head-direction’ parameter, in head-initial lan-

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languages the verb as head of the verb phrase precedes its object complements, prepositions precede their object complements, and the head noun of a noun phrase precedes its adjectival and relative-clause modifiers. The claim is that such clusterings provide a facilitating explanation for language acquisition, since once a child sets a particular parameter in the mother tongue, a whole range of properties will fall together for the learner.

Yet these clusterings do not necessarily apply uniformly across or within languages. For instance, French and English are head-initial languages in most respects, yet in French some common adjectives precede the head noun, while in English adjectives always do. Relatedly, Hebrew allows an expletive subject like French ce or English it in some environments (section 2.1), yet this property is not predicted for a null-subject language, as Hebrew seems to be.

The question is how a child copes with cases where a language is not fully consistent with respect to a particular parameter. There are several alternative solutions in principle. One is that the idea of parameters in general is misconceived, and a child learns each language-particular property in turn, without interrelating this to other facets of the native-language structure. But then some other explanation would need to account for how children cope with such a great learning burden. A second alternative would be to assume that languages with incomplete or mixed clusterings of properties take longer to acquire or involve a higher error rate than languages with no asymmetries. But this does not seem to be the case — as I shall try to show below for Hebrew. Nor is there evidence that English-acquiring children make more errors in ordering of noun modifiers than do Hebrew speakers acquiring a language which has uniformly head-initial noun-phase structure.

As a third alternative, I suggest that lack of parametric uniformity is not necessarily exceptional, marked, or in any way unnatural. Hence children are able to cope with languages which are not fully consistent with respect to a particular property or set of properties. They do so by recourse to different types of evidence available to them for deciding what is licensed in their language. With respect to the null-subject parameter, for instance, there are two levels of syntactic licensing: (i) clause-internal licensing by reflexional agreement and (ii) interclause licensing by anaphors, as in the following Hebrew examples:

(1) a. ani axal-ti tapax ~ axal-ti tapax
   I ate-1st apple ate-1st apple
   'I ate an apple.'
 b. anaxnu n-oxal tapuxim ~ n-oxal tapuxim
   we 1P1-will-eat apples 1P1-will-eat apples
   'We'll eat apples.'

(2) a. Ron amar she hu yavo ~ Ron amar she yavo
   Ron said that he will-come Ron said that will-come
 b. Dalia baxta ki /kshe hi naffa ~ Dalia baxta
   Dalia cried because/when she fell Dalia cried
   ki /kshe naffa
   because/when fell

Italian, like Hebrew, allows null subjects in both the tone clauses in (1) and the subordinate clauses in (2), whereas English and French do not allow them in either. From this we might conclude — as has generally been suggested in the literature — that Italian and Hebrew are uniformly null-subject languages, English and French uniform in disallowing null subjects. This is, however, only partially correct for Hebrew (see section 2 below). And even English allows null subjects in some contexts, as shown below.

(3) a. I wonder why John's frowning like that. Must be worried.
 b. Mother [pointing to a picture]: What did the man do?
   Child: Hit the dog.

I shall refer to cases like those in (3) as discourse-licensed null subjects, in the following sense: the referent of the missing subject (or object for that matter) is recoverable as coreferential to a noun phrase antecedent in the same discourse, but in a different utterance of the same or of a different speaker ([3a] and [3b] respectively). This is in line with Reinhart's (1986) characterization of bound anaphora as syntactically governed compared with free, pragmatically controlled anaphora, and the distinction drawn by Lillo-Martin (1986) between two types of null arguments: (i) pro null arguments that are identified with verb agreement, as in (1) and (2) above, and (ii) null topic constituents like those in (3) above. And it accords with the licensing of null subjects and objects in a language like Chinese, which lacks verb agreement with subject or with object (Huang 1984). To these one can add a third level of null-subject licensing, as illustrated for English in all the first clauses of (4).

(4) A: We're going out for a pizza. Want to come with?
   B: Can't, gotta finish my assignment first.

This type of licensing is situational: there is nothing in the preceding linguistic context from which the reference of the null subject is recoverable, but general knowledge of the speech-event situation makes it clear that A is omitting the 2nd-person pronoun as the default case for addressee, while B is omitting the 1st-person pronoun, as the default case for speaker. Such licensing is confined to the deictically anchored 1st and 2nd person and so may play an important role in early child language.
These types of licensing — syntactic intraclause and interclause, discourse, and situational — could define an implicational hierarchy, as follows: if a language allows syntactic intraclause (agreement-marked) null subjects, it allows all the rest, but the converse is not true. For instance, English allows situationally-based null subjects as in (4), and a restricted set of discourse-licensed null subjects as in (3), but no higher on the continuum. As described below, Hebrew allows all four types, but it is restricted at the top level of the continuum — namely, not all simple clauses allow null subjects. It is thus less uniform in this respect than a language like Italian, on the one hand, or English, on the other. In other words, within the different types of null-subject licensing available to languages, the specific ways in which these are fixed tend to be highly language-particular.

This has quite general consequences for the language-acquiring child. Factors anchoring speech to an immediate situational context play a major role in initial acquisition, at the phase have termed ‘pregrammatical’ (Berman 1985a, 1988a), akin to Slobin’s (1986) ‘basic child grammar’. Early word combinations tend to be structurally quite similar across children learning different languages, while early pronoun use is deictic rather than anaphoric. Then, with the onset of structure-bound production in the third year (including grammatical inflection, agreement marking, and simple-clause structure), children become attuned to the particular ways in which they pronounce subjects patterns in their mother tongue. In this, they are aided by a confluence of cues — perceptual, situational, and semantic, as well as morphological and syntactic. In time, what I have termed the ‘typological imperative’ asserted by the language-particular internal structuring of the native tongue (Berman 1985b) supercedes considerations of markedness, categorial harmony, or parametric uniformity. These factors combine to guide the Hebrew-acquiring child in efficiently and quite rapidly resolving the requirement of a zero subject in some but not other impersonal constructions (section 2.1), or the licensing of zero subjects with Hebrew past-tense verbs compared with future or present tense (section 2.2). And cognitive and linguistic maturation yield eventual command of thematically organized null topics across extended discourse (section 2.3).
Constructions like these are common at all levels of usage, from highly literary to everyday colloquial; they abound in adult input to children, and they are used by children as early as age two. Other impersonals occur in contexts where some languages require a pleonastic subject, for example with experiential predicates as in (7i) or with epistemic modals as in (7ii). In these contexts, formal Hebrew behaves like a canonically null-subject language, thus:

(7) (i) a. haya nora kar sham
    was very cold there
b. haya li mesha'amem ito
    was to-me boring with-him
    'I was bored in his company.'

(ii) a. i-eshar le-daber ito
    impossible to-talk to-him
    'One can't talk to him.'

b. yitaxen she avo
    likely that will-come-1st
    'I may come.'

But colloquial Hebrew allows a pleonastic or expletive ze 'it, this, that' as subject in such environments. Parental input also includes both possibilities, as shown in the following excerpts from a mother with her daughter Sivan aged 2;4. Null-subject positions are indicated below by 0 = zero.

(8) a. (looking at a picture storybook)
    CHI: ma hu ose la?
    what he does to-her
    'What's he doing?'
    MOT: 0 marbits la makot.
    gives her hits
    'Hitting her.'

    0 moshex la base'arot.
    pulls to-her at-hair
    'Pulling her hair.'
    ze yafe kaxa lariv?
    it nice so to-fight
    'Is it nice to fight like that?'

The optionality of expletive ze in some contexts is in line with the fact that in general, pronominal subjects may but need not be deleted when their reference is recoverable. The reference of doetic ze in the sense of 'this, that' depends on extralinguistic, situational factors. But ze also functions as an impersonal anaphoric pronoun, with a propositional or situational, rather than a referential, NP as its antecedent. Pleonastic ze can be analyzed as an extension of this property in terms consistent with a range of other facts of the language, but which are outside the scope of the present study.

Hebrew thus appears mixed with regard to the null-subject parameter. Like Russian, it disallows a 3rd-person impersonal pronoun comparable with English they or one, French on, or German Man in plural impersonals like (6); but it may have a pleonastic it subject in nonreferential impersonal constructions like (7) and (8). If a language tolerates both expletive and null subjects, expletives will occur in the prosentential function noted here for Hebrew rather than in existential contexts like English there. A strictly subject-requiring language like English will demand a pleonastic subject in both environments; a language like Hebrew that is mixed with respect to zero subjects will allow pleonastics that are syntactically anaphoric (like Hebrew ze); and a uniformly null-subject language like Italian will disallow any kind of pleonastic subject.
2.2. Agreement marking in simple clauses

This area has received most attention in recent analyses (such as those mentioned in note 2). First, in tensed verbs, independent subject pronouns are grammatically optional in past and future, but obligatory in present tense. Second, agreement markers of person — suffixal in past tense or prefixal in future tense — are confined to 1st and 2nd person; 3rd-person verbs require an independent subject pronoun. The array of agreement markers on simple-clause verbs can be ranked from most to least distinct, as shown in (9) for the verb root g-m-r ‘finish’.

(9) Four levels of inflectional distinctiveness in person-marking:

<table>
<thead>
<tr>
<th>Singular</th>
<th>Plural</th>
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<tbody>
<tr>
<td>I past tense, 1st and 2nd: person-marking suffix resembles pronoun:</td>
<td></td>
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<tr>
<td>1st (an) gnam†r ‘I finished’ (ananxu) gnam†ru ‘we finished’</td>
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<tr>
<td>2nd ms (m) gnam†ra ‘you finished’ (sien) gnam†raen ‘you finished’</td>
<td></td>
</tr>
<tr>
<td>fm (at) gnam†ra</td>
<td>(sien) gnam†raen</td>
</tr>
<tr>
<td>Future tense, 1st and 2nd: person-person-marking prefix partly echoes pronoun:</td>
<td></td>
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<tr>
<td>1st (om) egm† or ‘I’ll finish’ (anaxu) egm†or ‘we’ll finish’</td>
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</tr>
<tr>
<td>2nd ms (m) egm†or ‘you’ll finish’ (sien) egm†or ‘you’ll finish’</td>
<td></td>
</tr>
<tr>
<td>fm (at) egm†or ‘you’ll finish’ (sien) egm†or ‘you’ll finish’</td>
<td></td>
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<tr>
<td>3rd person: number- and gender-marking suffix distinct from 1st and 2nd:</td>
<td></td>
</tr>
<tr>
<td>Past: ms h xam †or ‘he finished’ h en gnam †ru ‘they finished’</td>
<td></td>
</tr>
<tr>
<td>fm h gnam †ra ‘she finished’ h en gnam †ru ‘they finished’</td>
<td></td>
</tr>
<tr>
<td>Fut: ms h ygm†or ‘he’ll finish’ h en ygm†t en ‘they’ll finish’</td>
<td></td>
</tr>
<tr>
<td>fm h ygm†or ‘he’ll finish’ h en ygm†t en ‘they’ll finish’</td>
<td></td>
</tr>
<tr>
<td>Present tense: number- and gender-marking suffix same for all persons:</td>
<td></td>
</tr>
<tr>
<td>ms an</td>
<td>at/ha gnam† or anaxu</td>
</tr>
<tr>
<td>fm an</td>
<td>at/ha gnam† or anaxu</td>
</tr>
</tbody>
</table>

Null subjects are grammatically licensed with verbs that have rich agreement marking, for person as well as number and gender — (9a) and (9b) but not (9c) or (9d). The past-tense suffixal agreement markers in (9a) are more salient and distinctive than the future-tense prefixes in (9b); the 3rd-person forms in (9c), although zero-marked for person, are still morphologically distinct from 1st and 2nd-person-marked forms in past and future; but the present tense forms in (9d) require overt pronouns in order to be distinct within a given value of number or gender. This is consistent with more general properties of Hebrew present-tense forms: traditionally labeled benn† ‘intermediate’, they are not strictly finite; they function as adjectival and complement participials; and they pattern like nouns and adjectives in being inflected for genitive case, for number, and for gender, but not for person (see, further, Berman 1978: chapter 5).

Hebrew-acquiring children thus need to attend to a multiplicity of structural cues to learn that only some inflections license agreement-marked null subjects. They must also take into account facts of usage not reflected in the grammatical constraints listed in (9). Thus, even in present tense, 1st and 2nd person pronouns can be omitted under ‘situational’ licensing — violating (9d). This is illustrated in (10) below, translated from the English example given earlier in (4).

(10) A: anaxu yots’im le’exol pita. 0 rotse / rotse we’re going-out to-eat pizza. Want-Ms / Want-Fm lavo?
to-come?
B: 0 lo yaxol / yaxola, 0 muxra / muxraa kodem not can-Ms / can-Fm, must-Ms / must-Fm first ligmor et ha’asvoda
finish my work
‘Can’t. Gotta finish the job first.’

Situationally licensed, deictic pro-drop is common in input to young children. For instance, a surface pronoun is typically omitted in adult requests to children meaning ‘Do you want ...?’, starting with the bare verb rotsa, rotsa ‘want Ms, Fm’.

Other yes/no queries addressed to small children include infinitives functioning as suggestions for help, such as le-xaxot atox ‘to-cover you?’ = shall I cover you? le-tsaier lax dag? ‘to-draw for you fish?’ = should I draw you a fish?. The tendency to omit 1st and 2nd person subjects in present tense seems most pronounced in everyday conversational usage with modal predicates such as rotsa ‘want’, yaxol ‘can’, be able-to, yodea ‘know (how to)’ — typically used in present tense. Yet syntactically, Hebrew present-tense verbs require an overt pronoun subject, just as does English want.

Current usage also differentiates between pro-drop in past as against future tense, although this is not clear from the parallelism of the examples in (9a) compared with (9b). Traditionally, an independent pronoun in past and future (non-3rd person) is said to express special emphasis and so is ruled out in neutral or noncontrastive contexts. But an asymmetry has been noted between pro-drop in past compared with future tense in conversational usage: past-tense verbs occur without and future-tense verbs with an overt pronoun most of the time (Ariel i.p.; Ravid 1988).

Analysis of adult input to young children reveals a somewhat different asymmetry between pronoun use in past and future tense respectively. In the past tense, overt 1st and 2nd person pronouns are indeed the exception rather than the rule. In their speech to two children, a boy, Asaf, and a girl, Naama, recorded once or twice a month between the ages of 1;11 and 2;5 (see section 3 below), out of more than 50 different past-tense
verbs (and at least double that number of tokens) that the adults used, there were only five instances of independent pronouns. These were all clearly emphatic or contrastive — as in the following examples when each child was aged 1;11.

(11) a. MOT: lo, Sivani lo asta lexi et zel
   'No, Sivani didn't do that to you.'
   ASA: ani!
   'I' am 'me!'
   MOT: ata as-ta??
   'You did-2Ms (it)?'

b. NAA: ani shabar-ti.
   'I broke (the ball).'
   INV: lo at shavar-t, Uri shavar.
   'Not you broke-2Fm, Uri broke (it).'

That is, parents and other adults rely solely on the suffixes -ti, -mu and -t, -ta, or -ten when addressing children in the past tense 1st and 2nd person — except for contrast as in (11). This reflects the general preference for pro-drop in 1st and 2nd person past tense, singular or plural.

A more complex picture emerged for adult input in future tense. Here, pro-drop varied across the number of number and person as follows. (i) In the 1st-person singular, the independent pronoun ani 'I' was never once omitted in over 20 instances — for example, those meaning 'I'll close,' 'I'll put,' 'I'll take,' 'I'll do.' (ii) In the 2nd person, the independent pronouns singular at, atu and plural aiti were rare, used as for the past tense, in a contrastive context, as in ve ata, Asaf, ma atu tylhe? 'and you, Asaf, what you 2nd-will-be?' when Asaf's older sister has been talking about her plans for the future; and to Naama lo, at tesaxak be mashehu azer 'No, you 2nd-will-play with something else,' when she wants a ball another child is playing with. (iii) Elsewhere, future-form verbs occurred alone with nonindicative functions: as imperatives in 2nd person or optatives in 1st-person plural (akin to English let's).

This lack of uniformity in future-tense pro-drop can be attributed to a variety of factors. Pronouns are retained in 1ST PERSON SINGULAR for the purpose of referential distinctiveness. All children, and many older speakers, neutralize the distinction between 1st and 3rd person masculine singular in future tense; they say, for example, both hu vignor 'he will-finish' and ani vignor 'I will-finish' (compare normative ani egor, both hu ye-seaper 'he will-tell' and ani ye-seaper 'I will-tell' (compare normative ani asaper). A separate pronoun is then necessary to make up for the fact that the verb form alone does not distinguish between the two (compare English I will finish vs. he will finish). In the 2nd PERSON, overt pronouns are rare because 2nd-person future forms are quite typically used as imperatives (Bolozy 1979). For instance, the following future-tense forms with the 2nd-person feminine stressed -t suffix were used as requests or suggestions in the input to Naama between ages 2;0 and 2;3 tavi-t 'bring!', tish'ali 'ask!', ta'asi 'make!', tir'li 'look!', tashe 'sing!', ti'ser 'shout!'; and to Asaf between ages 1;11 and 2;2 tseher 'be careful!', tedaber 'talk!', tagid 'tell!', tesaxek 'play!', tiheye 'be (a good boy). And in the 1ST PERSON PLURAL, future forms were used mainly not as indicative future tense but in the optative mood, often preceded by an overt lexical marker bo (fem bo'i, pl bo'i) 'come' = 'let's'; for example, to Naama aged 2;0 bo'i neshon ba-sir 'come 1PL-will-sit on-potty' = 'come let's [sic] sit on the potty'; to Asaf aged 2;3 bo nire 'come 1PL-will-see' = 'let's look'; to Sivan aged 3;3 and Asaf aged 2;1 az bo'i nishna 'so come 1PL-will-hear' = 'let's hear'.

The asymmetries found between use of overt pronouns in past compared with future tense are due to a variety of factors. Phonologically, future-tense prefixes are less salient than the past-tense suffixes, and the latter more clearly recapitulate part of the independent pronoun form — see (9a) compared with (9b). Morphologically, future tense is more syncratic: 2nd masculine and 3rd feminine have the same form (compare ata ti-gnor 'you-Ms will-finish' and hi ti-gnor 'she will-finish'); and as noted, 1st and 3rd (masculine) singular are often leveled to the same 3rd-person prefix. Semantically, future forms are used to express irrealis moods which lack distinct inflections in Modern Hebrew — including imperative, optative, and subjunctive. In general, then, future prefixes manifest considerable morphophonological and semantic opacity, whereas the past-tense suffixes are quite transparent and distinct. As a result, the grammatical options specified in (9a) and (9b) underlie a rather different range of usage preferences in actual usage, as summed up in (12).

(12)     Past         Future
1st singular  —  +
1st plural    —  + or [= optative mood]
2nd sing and plural  —  + or [= imperative mood]

Null-subject licensing with verbs marked for person thus differs from the kinds of licensing discussed earlier. Situational, syntactic intraclausal and syntactic interclausal, or discourse-adjacent and discourse-thematic zero subjects (represented under headings 5 and 6 charted in [5] above) all rely on referential recoverability — deictic in 1st and 2nd person, and anaphoric elsewhere. In contrast, grammatical licensing of past- and future-tense null subjects (3 and 4 of the chart in [5] above) interacts with
variables of morphophonological, semantic, and pragmatic distinctiveness, as well as distinguishing neutral from contrastive statements.  

2.3. Anaphoric ellipsis

3rd-person pronouns as in (9c) and (9d) allow syntactic ellipsis under interclausal anaphoric reference. This is usually obligatory under coordination (although subject to some constraints which require separate study). The examples given in (13) of 3rd-person pro-drop are from picture-book narratives told by mothers to their three-year-old children (see further section 3 below).

(13) a. To Noa, aged 3:0,
    ve balayla balayla, she af exad lo sam lev,
    and late at-night, when nobody was looking,
    ha-tsfradea kam ve 0 yatsa mitox ha-tsintsnet
    the-frog got-up and went out-of the jar

(13) b. To Sharon, 3:2:
    hu [=ha-yeled] lakax ota [=ha-tsfradea]me-ha-bitisa
    he [=the boy] took it [=the frog] from a swamp
    ve 0 hevi ota habayta
    and brought it home

3rd-person pronouns can also be elided in subordinate clauses, as in the following excerpt from the story told by Noa’s mother (and see also the examples in [2] above).

(14) ha-yeled mesamen la-kelev she 0 yihye besheket ve she 0
    the-boy signs to-the-dog that will-be quiet and that
    lo yinvax
    not will-bark
    ‘The boy signals to his dog that (he) must be quiet and that (he)
    mustn’t bark.’

3rd-person pro-drop is thus syntactically licensed by coordinate and subordinate anaphoric reference. But it is also discourse-licensed as topic pro-drop. One kind was illustrated in (3) above as possible for English, too, where the reference of the null-subject topic can be derived from an immediately adjacent utterance. Examples for all three tenses are given in (15).

(15) a. lama Ron mekmnet kax et ha-metsax?
    ‘Why’s Ron frowning like that?’
    0 betax do’eg.
    must-be worried.

b. A: ma ose ha-yeled?
    ‘What’s the kid doing?’
    B: 0 bone armonot.
    builds [=building] castles

(16) a. le’an ne’e’ima Dalya?
    ‘Where did Dalya disappear?’
    B: 0 halxa la-super.
    went-Fm to-the-store

b. A: ma ya’asu ha-yeledim?
    ‘What will the-kids do?’
    B: 0 yisha’aru ha-bayit.
    will-stay-Pl at-home

Such narrow topic licensing of null subjects is common in the speech addressed to very young children. A less local 3rd-person topic elision is found in noninteractive discourse, where thematic pro-drop is licensed by continued reference to a single topic in extended discourse, typically the same protagonist in a narrative. The following examples are from a mother telling the picture-book story to her three-year old (17), and a man telling his family a story about a friend’s being cheated at a gas station.

(17) balayla kshe ha-kelev ve ha-yeled halxu lishon
    at night when the-dog and the-boy went to-sleep
    barxa la ha-tsfradea.
    the frog ran away.
    0 hit’oruru baboker ve gilu she ha-tsfradea
    0 woke-up-Pl in-the-morning and found that the-frog
    was-gone.
    0 xipso ba-magaf, 0 xipso ba-tsintsnet, aval ...
    searched-Pl in-boots, searched-Pl in-the-jar, but ...

(18) ... az hu shilem ve 0 nixnas la-o’to, pitom hu ro’e she
    had-mexal mar’e al rek legamrey ve ha-sxum haya shel meyxl male.
    0 hitxil lehivakeax ito, 0 amar lo she hu loh yeshalam et ze, aval
    ha-hu amar lo ...
    ‘... So he paid and 0 got into the-car. Suddenly he saw
    that the-tank shows completely empty and the-sum (he’d paid) was
    for a full tank.
    0 began to argue with-him, 0 told him that he wouldn’t pay it, but
    the-other told him ...’
Such 3rd-person pronoun elision is not syntactically licensed either by coordination as in (13) above (and also the first zero in example [18]) or by subordination as in (2) and (14). The clauses where this occurs are separated from the preceding clause by a period, indicating an utterance-final intonation contour. They are instances of pro-drop with topic constituents, motivated by topic maintenance across extended stretches of discourse. And they closely resemble findings for German narratives, where 'omission of maintained referent in subject position ... is quite frequent' (von Stutterheim and Klein 1989).

In sum, the Hebrew-acquiring child encounters a wide range of options with respect to zero subjects. They occur in different structural environments: impersonal constructions which do or do not allow pleonastic ze 'it' as subject (section 2.1); simple clauses with or without an overt pronoun subject corresponding to I or we, you, he, or she (section 2.2); and across-clause elision of anaphorically recoverable third-person pronouns (section 2.3). These structural configurations interact with the different bases for licensing of zero subjects noted earlier: (i) situational — in deictic 1st and 2nd person present tense; (ii) morphological — through person-marking agreement on the single-clause level in 1st and 2nd person, past and future tense; (iii) syntactic — through inter-clause anaphora in 3rd person under predicate coordination and in subordinate clauses; (iv) discourse-based — in thematic pro-drop across adjacent pairs of utterances; and (v) for topic maintenance in extended discourse.

3. Analysis of data

Transcripts were examined from conversational interaction and picture-based narrative texts of Hebrew-speaking children aged three or four weeks of two girls: (i) Naama aged 1;7 to 2;6, at home with her mother, the investigator, and the investigator's little boy; and (ii) Sivan aged 3;0 to 3;6 at home with both or one of her parents, in interaction with her brother Asaf, aged 13 months younger, for whom data were available between ages 1;11 and 2;5. These are supplemented by transcripts from two four-year-old boys: (iii) Tom aged 4;3 to 4;6 and (iv) Yuval, aged 4;6. The narrative data base consists of 12 texts from each of four groups of children (ages 3–4, 4–5, 5–6, and 9–10), compared with 12 adult narratives, all based on the same picture booklet depicting the adventures of a boy and his dog in search of their missing frog. The unit of analysis for the children's speech was the declarative clause, with a clause defined as any unit which constitutes a syntactically analyzable predication. This analysis focuses on pro-drop in agreement-marking contexts (section 3.1) and in 3rd-person contexts (sections 3.2 and 3.3).

The two discourse modes — conversational interaction and picture-based narrative — differed as follows. First, since person-marking inflections are confined to 1st and 2nd person, they occurred in the conversations rather than in the narratives; the former are dominated by reference to interlocutors in the speech event, the latter by reference to the protagonist(s) depicted in the pictures. Second, discourse licensing of null topics is more likely to be of the narrow, adjacent-utterance type in an interactional context, and of the broader, thematic type of reference to protagonists in an extended narrative.

There is little evidence of quantitative change in the proportion of null-subject constructions across children, once they start using pronouns as well as lexical subjects. They constitute around 20% of the declarative-clause utterances recorded in this data base: Naama, aged 2;1–2;6 — 18%, Sivan aged 3;0–3;6 — 22%, Tom and Yuval, 4;5–4;9 — 19%. This is in accord with findings from an earlier, cross-sectional survey of clause types used by large numbers of Hebrew-speaking children aged between two and five years in conversational interaction with an adult, revealing a consistent distribution of approximately 70% SV order, around 20% null-subject clauses, and around 10% VS clauses across the population (Dromi and Berman 1986). The current analysis reveals, however, that, as predicted, subjectless constructions differ in content and function at different developmental phases.

3.1. 1st and 2nd person pronouns in agreement-marking contexts

Use of a personal pronoun was first recorded for Naama at age 1;7 (ani 'I'). Second-person pronouns were first recorded at 2;2, without an overt verb (for example, at, wo ani 'you-Fem, not I' = 'me' [age 2;2], and hine ani 'here you-Direct (are), ani msaderet, ata lo 'I arrange, not you' [both at 2;3]). Naama's use of agreement-marked verbs in the 1st person shows the following development. (i) At age 1;10 she first uses present tense with the modal verbs rotsa and yodar 'want', 'know' in feminine, without any subject pronoun. (ii) By age 1;11, she typically adds ani with most present-tense verbs [for example, nI lokoxet kol — compare normative ani lokoxat et hakol `I take = am taking everything', ani holexet 'I'm going', ani lo rotsa naalayim ze 'I do not want shoes this' [compare normative et ha-naalayim ha'ele 'Ace these shoes']). At the same time, she also used past-tense verbs in the 1st singular with the stressed suffix -ni, mostly without and occasionally with a pronoun, for example, kibalti
of the 1st-person past-tense suffix -ti. In the next phase, (iii) as late as age 2;3, he typically uses the past-tense stem with no suffix, for example, ani nasa ‘I drove’ (compare nasa-ti), ani shaxax ‘I forgot’ (compare shaxax-ti), ani tiyver ‘I drew’ (compare ciyar-ti). The only exceptions are a few rote-learned forms like gamarti ‘finished-1st=’all done’. This is unusual, since at this age, Asaf has many other inflections, including feminine-gender marking on verbs, for example, at meferek-et ‘you break-up=Fem’, at nasa-t ‘you drive+Fem’, as well as the 1st-person plural past-tense suffix -nu — for example, irkanu ‘put-together+1PI=’we put together (the puzzle)’, lo yasa-nu ‘not went-out+1PI’ ‘we didn’t go (to the store)’, sam-nu ‘we put+1PI’. The picture for Asaf’s pronoun usage at his phase (iii), through age 2;4, is thus as follows: overt ani ‘I’ is used across the board in the absence of clear inflectional markers of person — in present tense, where there is no person marking in the end-state grammar either; in past tense, in the absence of the obligatory person-marking suffix -ti; and in future tense, where the person-marking vowel prefix is nondistinct or elided. In contrast, anaxnu ‘we’ is not used in 1st-person plural past tense but is marked uniquely by the suffix -nu. (iv) Pro-drop in singular past tense, typical of adult usage, is recorded for Asaf only from age 2;5, once he starts marking the singular suffix -ti consistently on all past-tense verbs with first-person reference. By age three years, children’s distribution of pro-drop in 1st and 2nd person closely mirrors what was observed for adult usage. Thus, three-year-old Sivan nearly always omits the pronouns in past-tense 1st and 2nd person; her future-tense verbs almost always have an overt pronoun in the 1st-person singular, but not in 1st-person plural, and they almost never have one in 2nd-person future, except when needed to distinguish imperatives from future predictions or conditions (for example, in her admonitions to her brother: im ati shbor et ze, ima nora ti’ax ‘if you (will) break it, Mommy terribly will-be-mad’ aged 3;1). Inflectional marking and subject-pronoun usage interact to yield the following developmental pattern. (i) Verbs are used across the board without any surface subject — in a way which conflicts with both grammar and (end-state) usage. (ii) Once a pronoun is acquired, it is used increasingly in all present-tense contexts — with 1st, then 2nd, and subsequently 3rd person reference (as detailed in section 3.2 below). (iii) Soon after the first present-tense verbs become established, children start using past tense productively; this may fluctuate between mention or omission of an overt pronoun in 1st and 2nd person for some time, until the reliance on suffixal marking is fully established as the unmarked, noncontrastive usage. (iv) As verb-tense marking becomes established,
3.2. Pregrammatical 3rd person ellipsis

Occurrence of the 3rd-person pronoun *hu* 'he, it' shows a clear and consistent development in Naama's usage between ages 1:11 and 2;3.13

(i) At age 1:10 — she uses several present-tense verbs, including some with a lexical subject (for example, *dubi yoshen* ' toddy sleeps', *dio nosen* 'car goes'); but there is no occurrence of a 3rd-person pronoun with a verb in any tense. (ii) At age 1;11 — she uses both *ze* 'he, it' (see note 13) and *hu* 'he' in present tense, as grammatically required; for example, *hine ze omed see it stands/is standing* of a building of blocks; *hu lo boxe he not cries* = 'he's not crying' of a horse in a picturebook; *hine od dag katan, hu shote* 'Here's another little fish. He = it = its drinking'. In present tense, she omits the 3rd-person pronoun when it is recoverable under narrow discourse licensing, for instance when answering the investigator's questions; for example, *ma ima osa? What's Mommy doing?' is answered by *lakeke [=melakeker] 'lick-Fm' = 'is licking (ice-cream)'; ma osa Keren? 'What's Keren doing?' yields *inade [mitinadheer] swinging-Fm'; and *ma aba ve ima osim? What (are) Daddy and Mommy doing? — *ixakim [=mitixabkim] 'hugging = Pl'. With nonpresent verbs, she omits the 3rd-person pronoun in the unlicensed context of long clauses; for example, the only two past-tense verbs she uses, *nafal* 'fell' and *lakax* 'took', are both subjectless, as is the possibly future form *pol* 'will-fall', said of a building made of blocks. (iii) By age 2;0, she uses a third-person pronoun in a full range of simple clause contexts — for example, *hu lo noten he not gives* = 'he won't give it to me', *tesaper li gamad, hu axal bana* 'to-tell me dwarf, he ate banana' = 'tell me about the dwarf who ate a banana'; and these include several different verbs in past tense, for example, *nafal* 'fell', *ka fals* 'jumped', *nasa* 'went, rode'. The only instances where she omits the 3rd-person pronoun in past or present tense are like 'narrowly licensed' adult usage, where the pronoun is locally recoverable from the surrounding discourse — for example, in answer to the question *ma kara la-sofer? What happened to-the-book? — O nikra 'tore-Intr.' ma Uri aza 'What Uri did' = 'What did Uri do?' — O lakax li 'took from me' = 'he took it away from me'.

By age two and a half, when her command of pronouns and inflections in 1st and 2nd person are well established (section 3.1), and at a point where she is already using some coordinated and complement construc-

tions, Naama shows full control of third-person masculine *hu* in a variety of contexts; for example,

(19) I = Investigator; N = Naama (aged 2;6)
I: ma yesh ba-xalon?
   'What's at the window?'
N: geshem.
   'Rain.'
I: ma hayeled ose?
   'What's the boy doing?'
N: *hu* lokeax mitiyya.
   'He takes an umbrella.'
   *hu* yasin al barosh.
   'He will-put (it) on his head.'
I: tistakli al ha'sh.
   'Look at the man' (in picture).
N: *cfo* *hu* holex?
   'Where's he going?'
   *hu* lo lakax mitiyya.
   'He didn't take an umbrella.'
I: ma yikre?
   'What will-happen?'
N: yarad geshen
   fell rain
   'It rained.'
   (compare *yered geshen* 'it will rain')
   I: ma yikre le-aba?
   'What will-happen to Daddy?'
N: *hu* yirtev.
   'He will-get-wet.'

These findings for Naama are confirmed by Asaf, between 1;11 to nearly 2;3 (2;226). At age 1;11, he either omits a 3rd-person subject or else uses deictic *ze* 'it' — for example, *ze mekuklat* 'it (is) broken'. By age 2;0, he quite often uses masculine *hu* where the context requires it; for example, in answer to his sister's question about an imaginary playmate le' an *hu* halax asxhav? 'Where (did) he go now?'. Asaf answers *la* *mekolet hu* halax 'to-the store he went'; but there are still instances where he omits a third-person pronoun where there is no supporting context to provide the reference, for example, *pit om 0 nafal li* 'suddenly 0 fell me' = 'suddenly it went and fell'. By close to 2;3, Asaf uses both masculine *hu* and feminine *hi* with a variety of predicate types, for example, *hu* plus adjectival *meluxlax, mekuklat* 'is dirty, broken', pre-
tent tense mafria li, lo noxen 'bothers me, doesn't go', and past tense hevi 'brought', as well as feminine hi (not as yet recorded for Naama) with a present-tense verb, for example, rosta 'wants', nefareket 'takes apart', nosa'at 'goes' (said of a truck = feminine masa'il) and past tense daxta 'cried, was crying'. And he also uses it in a future-tense embedded clause ani lo roise she hi tir'e oti 'I don't want that she will-see me' = 'I don't want her to see me'.

These two children at the phase of early morphosyntax thus shared the following developmental route in use of subject pronouns in 3rd-person contexts.

(20) a. zero subject for 3rd-person pronoun in all three tenses;
   b. lexical or deictic ze subject;
   c. present tense: hu alternates with locally recoverable zero;
      past tense: zero;
   d. present and past tense: hu and hi alternate with locally recoverable zero;
      use of hu and hi extended to future tense, embedded clauses.

Older children differ from two-year-olds in when they omit pronoun subjects. Around half of the subjectless declarative clauses recorded for Asaf and Naama relied on situational or narrow discourse licensing, where the unexpressed subject is recoverable from the context but pro-drop is not grammatically licensed in the clause in isolation. Such ellipsis accounts for only around 13% of the subjectless clauses used by both three-year-old Sivan and four-year-old Tom. The narrative database also reveals an increase in the different types of null-subject constructions which occur within and across simple clauses, as discussed below.

3.3. Repetition and elision of 3rd-person pronouns

Two opposite trends emerged in the use of 3rd-person pronoun subjects beyond the period of initial morphosyntax. Three- and four-year-old children tend to use them redundantly, whereas older speakers freely omit them as a device for achieving thematic connectivity in extended discourse.

3.3.1. Over-marking of 3rd-person subjects. Once children recognize that simple clauses with a 3rd-person verb must have an overt subject pronoun (that is, hu higia habayta 'he arrive home' and not *higia habayta, hi tagia maxar for 'she will-arrive tomorrow' and not *tagia maxar), they overextend this nonnormatively, in simple as well as in coordinated and subordinate clauses. In simple clauses, children overuse the 3rd-person pronoun as a pronominal copy of a lexical subject. The following examples are taken from the picture-book narratives, with speaker's age in square brackets.

(21) gam ha-kelev haze hu metapes [3;10]
   also this dog he climbs
   'This dog he also climbs.'
   we ha-kelev hu ra'a et ha-sakik [4;2]
   and the dog he saw Ace the-bag
   ve kan ha-talpor hv afa alav [4;5]
   and here the-bird + Fem she flies on(to)-him
   ve ha-yeled hv ala al ets [4;9]
   and the-boy he went up (a) tree
   ve ha-kelev hv holex lekaveret dvorim [5;3]
   and the-dog he goes to-the-bees' hive

Left dislocation with a pronominal copy of the topicalized nominal is a well-established device in Hebrew (for example, the equivalent of 'that boy, I know him well', or 'my dog, I don't go anywhere without it'). But it is rare with a lexical subject which itself establishes the first NP as topic, as in (21). Such examples were common in the preschool narratives of children aged 3 to 5 years, although they occurred hardly at all among the older children from age 7 up, and never among the adults. I suggest that this is due to the difficulty younger children encounter in thematic organization of information when processing their on-line output in an extended narrative. They first specify the topic by a lexical NP, then redundantly repeat the pronoun, once they have decided what they want to say about the topic. Difficulties in maintaining topic reference across a narrative have been recorded for children of late preschool age in different languages (for example, Bamberg 1987; Karmiloff-Smith 1981; as well as Berman 1988b). And the present observation is supported by earlier findings for Hebrew-speaking four- and five-year-olds in conversation and in other picture-description tasks (Berman 1985).

Children also overmarked 3rd-person subjects in coordinated constructions, where the shared subject is normally deleted in the conjunct clause. Again, the narratives revealed that 3rd-person subject pronouns were repeated instead of elided under same-subject coordination to a large extent in the three- and four-year-old narratives, less so among the five-year-olds, and almost never among the older children; for example.
This reliance on an overt pronoun in conjoined clauses can also be explained as due to the on-line processing difficulty of young children in planning ahead what they are going to say — even when, as in this case, the pictures are there to suggest the content of what is to follow.

Younger children also overextended pronominal copying in relative clauses. In Hebrew, a pronoun copy is obligatory when the relativized NP is an oblique object in the relative clause (equivalent to English ‘the boy that I played with him’) and it is optional when it is a direct object — for example, ‘the boy that I saw (him)’. But a pronoun copy is generally disallowed with a subject pronoun — for example, English ‘the boy that he played with me’. However, the few relative clauses in the younger children’s narratives also included constructions such as these, for example, pa'am-axai hayah yeled she hu hayah me'od xamud ‘once (there) was (a) boy that he was very cute’ [3;8]. This is supported by findings for children aged 3 to 5 years old in other studies which elicited relative clauses. For instance, in describing the meaning of innovative compounds, children said things like tsiyobim she hem afnim bagaytah [4;7] ‘birds that they fly in forests’, ganenet she hi melamedet dardasim [5;2] ‘(a) teacher that she teaches smiers’ (Berman 1987).

In sum, preschoolers may overuse subject pronouns as a means of clear and overt marking of the topic of a new predication. Only later will speakers take advantage of the full range of subject-clone elisions licensed by the language, as shown by the final set of findings presented below.

3.3.2. Anaphoric and thematic elision. Anaphoric elision is first observed in coordinated clauses, mainly from age four on, for instance, in the conversational data base: hem yoriin ba-shrededim ve 0 tok'im cicilelim ‘they [= the whalers] shoot-PL at the pirates and 0 stick-PI (them) with harpoons’ [Tom 4;8] and in the narratives: ha-yeled yatsa haxaeva ve 0 xibek et ha-kelev ‘the-boy went outside and 0 hugged Acc the-dog’ [4;2]. In the picture-book narratives, there is a marked rise in overall occurrence of null-subject clauses with age: they account for less than 10% of all three- and four-year-old clauses (8.9%), for under 20% in the five- and nine-year-old texts (16%), but for fully one-third of the clauses (34%) of the adults. But the null subjects perform different functions at different stages. The four-year-olds use null subjects predominantly in coordinated constructions (like the example just given); but among five- and nine-year-olds, only around half to two-thirds of the null subjects occur under coordination. This dip is not due to an increase of null subjects in subordinate clauses, since these narratives contained few constructions with coreferential subjects in both a matrix and a dependent clause (for example, hem halzu ve halzu, ad she 0 Aigku le-makam ... [5;3] ‘they walked-PL and walked-PL until (that) 0 came-PL to (a) place ...’; bo-hoker hu kam ve me'od da'aq la, ki 0 ra'a she hi ne'elmana [9;4] ‘in-the-morning he got-up and was very worried about her [= the frog], because 0 saw that she = it [had] disappeared’).

Rather, the shift in null subjects between preschool and older narratives is due to the mature reliance on 3rd-person subject deletion in grammatically separate but sequentially congruent clauses which share a single discourse topic. This is illustrated below from a five-year-old’s narrative in (23) and from an adult’s in (24) — and see too the gas-station story in (18).

(23) ve ha-yeled yashan and-the-boy slept
and ha-kelev yashan al yado,
and-the-dog slept next-to him.
0 hit'orer- u,
0 woke-up + PI,
ve lo 0 ra'ut et ha-cfardea
and 0 (did) not saw-PI Acc the-frog
ha-yeled ve ha-kelev hit'oreru.
the-boy and the-dog woke-PI.
ma hem ra'ut? en tafardeal ha-cfardea ne'elmana!
what they saw-PI? no frog! the-frog (had) disappeared!
0 hitxilu le-xapes ba-xeder.
began-PI to-search in-the-room.
0 herimu et ha-mita,
picked-up-PI Acc the-head,
0 herimu et ha-mnora,
picked-up-PI Acc the-lamp,
0 heziz et haxalon,
moved-PI Acc the window,
trolled free anaphora (Reinhart 1986), or between null arguments versus null topics (Huang 1984; Lillo-Martin 1986). I have tried to extend this to a developmentally relevant set of distinctions which include situational licensing and narrow discourse licensing of null subjects as having a particularly strong impact in early acquisition; this is followed by grammatical learning of structure-dependent licensing of agreement-marked null subjects within the simple clause, and subsequently by syntactically governed anaphora in coordinate and subordinate clauses; only later will children make felicitous use of broad discourse licensing of null topics to achieve thematic connectivity.

The overall developmental patterning of subjectless sentences in Hebrew can be summed up as follows.

2. Early grammar: rich agreement marking allows null subjects, contrast with 3rd person and present-tense nonlicensing.
3. Later syntax: following initial redundant marking of 3rd person, 3rd person elided in coordinate, later subordinate clauses.
4. Thematic structure: null subjects used as a device for distinguishing topic maintenance from topic shift.

Lack of overt subject pronouns in early speech accords with what has been documented for very young children in subject-requiring languages, too (Hyams 1986; Weissenborn 1989). Subsequent mastery of grammatically licensed subject pro-drop in past and, to a lesser extent, future-tense clauses coincides with acquisition of grammatical inflection in general and of agreement marking in particular. There follows a period of overmarking of a newly acquired grammatical category, and this gives way to discourse norms that specify where double marking by both a personal pronoun and an affixal person marker, or by a lexical and a pronoun subject, is mandatory, favored, or ruled out by constraints of grammar and discourse appropriateness. That is, language-particular distinctions which make the grammar of Hebrew nonuniform with respect to zero-subject licensing are established early on; but it takes longer for children acquiring such a language to learn precisely when an overt pronoun must or may be used for purposes of referential clarity or discourse connectivity.

These findings accord with a more general view I have outlined for the developmental route taken by children in acquiring different aspects of the morphosyntax and lexicon of their native tongue (Berman 1986a, 1986b, 1987, 1988a, 1988b). Early word combinations are ‘pregrammatical’ in the sense that they are not governed by rules of clause structure; subsequently, children become attentive to structure-dependent con-

| 0 xipsu mitaxat ha-na’alayim, betox ha-garbayim, searched-Pl under the-shoes, inside the-socks, 0 lo mac’u shum davar. (did) not found-Pl a thing. 0 patxu et ha-xlaron, opened-Pl Acc the window, 0 ca’aku baxue, shouted-Pl outside, ha-kelev navax ... the-dog barked ... |

Thematic connectivity by elision of shared subject topic is common in the adult texts and accounts for nearly half (46.9%) of all the null-subject constructions in their 12 narratives. But it is rare in the 3- and 4-year-old narratives (11 out of a total of over 800 clauses), and only occasional among the 5s and 9s (15% of their null-subject constructions). Even among the 9-year-old (fourth-grader) narratives, they occur only in single adjacent pairs of clauses as in (23), not across strings of clauses as in (24).

Moreover, not all adults rely equally on subject deletion as a means of achieving text connectivity. The device is a stylistic option favored by four of the 12 adult narrators (and none of the children) we examined. A quarter or more of their total clauses had these thematically conditioned zero subjects (22%, 26%, 39%, and 66% respectively), compared with an average of under one-tenth of the other narrators’ clauses. Different profiles emerge for the 12 adult narratives: (a) some adopt a chaining style similar to that of school-age children; they repeat overt pronoun subjects and use null subjects mainly in coordination [texts G, I]; (b) others use a matter-of-fact, proasis style with full SVO structures and little coordination [texts A, J]; (c) some achieve a tightly cohesive style by liberal use of subordinating [text K] or of grammatically free null-subject clauses as in (24) above [texts E, F, H, and J]; and (d) others adopt either a general ‘narrative’ mode that combines these various linking devices [texts B, C] or a self-consciously ‘literary’ style with rich use of VS order [text D]. Of these, as noted, only types (a) and (b) characterize the preadolescent narratives, in line with other research suggesting that age 10–12 is the time when narrative skills become fully established.

4. Summary and discussion

Distinctions have been made in syntactic characterizations of null subjects between syntactically governed (bound) anaphora and pragmatically con-

Acquiring an (S)V0 language