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 patternings 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, Roeper 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-

Linguistics 28 (1990), 1135–1166 0024–3949/90/0028–1135 $2.00
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guages 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-phrase 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 inflectional agreement and (ii) interclause licensing by anaphora, as in the following Hebrew examples.

(1) a. ani axal-ti tapuax ~ axal-ti tapuax
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. Dalya baxta ki /kshe hi nafla ~ Dalya baxta
Dalia cried because/when she fell Dalya cried
ki /kshe nafla
because/when fell

Italian, like Hebrew, allows null subjects in both the lone 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 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 but 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 I have termed 'pregrammatical' (Berman 1986a, 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 pronoun subjects pattern in their mother tongue. In this, they are aided by a confluence of cues — perceptual, situation, 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 1986b) 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).

2. Hebrew as an (S)VO language[1]

Modern Hebrew is SVO in basic clause structure, and the language addressed to young children is like ordinary Hebrew discourse in being predominantly SVO (Berman 1985), while simple sentences with OSV or OVS order are pragmatically marked. Hebrew does, however, allow two

classes of predicate-initial constructions: (i) VS sentences in which the predicate precedes the subject; and (ii) sentences which have no surface subject, and so will not start with one (Berman 1980). The present discussion concerns constructions which are verb-initial since they have no surface subject.

Null subjects are syntactically licensed in Hebrew in impersonal constructions (section 2.1); with agreement-marking verbs (section 2.2); and through anaphoric ellipsis (section 2.3).[2] Possible contexts for subjectless constructions are charted in (5), ranked from the most obligatory (*obl*) to most optional (*opt*) contexts for subject pro-drop.

(5)

Construction type	Verb morphology	Null sbj	Type of licensing	Domain
1. Impersonals	ms pl	obl	syntactic	lone clause
2. a. Impersonal circumstantials	ms sg = neut	obl	syntactic	lone clause
b. Modal predicate	ms sg = neut	(~*ze* 'it')	syntactic	matrix + comp clause
c. Impers passive	ms sg = neut	(~*ze*)	syntactic	matrix + comp clause
d. Nonmodal predicate	ms sg = neut	~*ze*	syntactic	matrix + comp clause
3. Past tense 1st, 2nd person	Suffix *-ti*, *-nu* *-ta*, *-t*, *-tem*	opt	syntactic	lone clause inflection
4. Future tense 1st, 2nd person	Prefix *e-*, *ni-* *ti-*, *yi-*	opt	syntactic	lone clause inflection
5. Present tense 1st, 2nd person	fm & pl suffixes	opt	deictic	speech-event situational
6. a. 3rd person all tenses	fm & pl affixes	obl	syntactic	conjoined predicates anaphoric
b. 3rd person all tenses	fm & pl affixes	opt	syntactic	subordinate clauses anaphoric
c. 3rd person all tenses	fm & pl affixes	opt	discourse	adjacent utterances narrow topic
d. 3rd person all tenses	fm & pl affixes	opt	discourse	connected text thematic topic

2.1. *Impersonal constructions*

The paradigmatic instances of an impersonal construction (as in languages like Roumanian, Russian, and Turkish) are strictly subjectless sentences with a third-person masculine plural predicate (Berman 1980); for example,

(6) a. lo ovd-im be-shabat ba-arets
not work-Pl on-Saturday in-Israel
'They/you/people don't/one doesn't work on a Saturday in Israel.'

b. ya'avd-u sham be-mishmarot
will-work-Pl there in-shifts
'They'll work on shifts there.'

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-efshar 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?'

CHI: *ze* lo yafe.
it not nice
'It's not nice.'

b. MOT: al ma, al ma hi tsiyra, ha-buba?
on what on what she drew the doll
'What did she draw on, the dolly?'
ma ze? nyar? lo, ze ha-kir.
'What's that? Paper? No, it's the-wall.'
0 mutar le-tsayer al ha-kir?
(is-it) allowed to-draw on the-wall?
'Are you allowed to draw on walls?'
mi tsiyer al ha-kir shelanu
'Who drew on our wall?'
Sivani tsiyra. ve *ze* yafe?
'Sivani drew. and (is) *it* (=that) nice?'

CHI: 0 lo yafe bixlal!
'Not nice at all.'[3]

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.[4] The reference of deictic *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.[5]

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.[6]

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 distinctness in person-marking:

	Singular			*Plural*		
a.	Past tense, 1st and 2nd person: person-marking suffix resembles pronoun:					
	1st	(an*i*)	gamar*ti*	'I finished'	(anax*nu*)	gamar*nu* 'we finished'
	2nd ms	(a*ta*)	gamar*ta*	'you finished'	(a*tem*)	gamar*tem* 'you finished'
	fm	(a*t*)	gamar*t*		(a*ten*)	gamar*ten*[7]
b.	Future tense, 1st and 2nd person:person-marking prefix partly echoes pronoun:					
	1st	(*a*ni)	*eg*mor	'I'll finish'	(anax*n*u)	*nig*mor 'we'll finish'
	2nd ms	(a*ta*)	*tig*mor	'you'll finish'	(a*t*em)	*tig*mer-u 'you'll finish'
	fm	(a*t*)	*tig*mer-i	'you'll finish'	(a*t*en)	*tig*mer-u 'you'll finish'
c.	3rd person: number- and gender-marking affix distinct from 1st and 2nd person:					
	Past: ms	hu	gamar	'he finished'	hem	gamr*u* 'they finished'
	fm	hi	gamr*a*	'she finished'	hen	gamr*u* 'they finished'
	Fut: ms	hu	*yig*mor	'he'll finish'	hem	*yig*mer*u* 'they'll finish'
	fm	hi	*tig*mor	'she'll finish'	hen	yigmer*u* 'they'll finish'
d.	Present tense: number- and gender-marking affix same for all persons:					
	ms	ani/ata	/hu gomer		anaxnu/atem/hem	gomr*im*
	'I	/you/he	finish(es)'		'we /you /they	finish'
	fm	ani/at	/hi gomer*et*		anaxnu/aten /hen	gomr*ot*
	'I	/you/she	finish(es)'		'we /you /they	finish'

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.[8] This is consistent with more general properties of Hebrew present-tense forms: traditionally labeled *benoni* '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: anaxnu yots'im le'exol pitsa. 0 rotse / rotsa
we're going-out to-eat pizza. Want-Ms / Want-Fm
lavo?
to-come?
B: 0 lo yaxol / yexola, 0 muxrax / muxraxa kodem
not can-Ms / can-Fm, must-Ms / must-Fem first
ligmor et ha'avoda
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 *rotse*, *rotsa* 'want Ms, Fm'.[9] Other yes/no queries addressed to small children include infinitives functioning as suggestions for help, such as *le-xasot otax* 'to-cover you?' = 'shall I cover you?' *le-tsayer 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 *rotse* '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).[10]

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 lexa et ze!
'No, Sivani didn't do that to you.'
ASA: ani!
'I' = 'me!'
MOT: ata asi-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*, *-nu* and *-t*, *-ta*, or *-tem* 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 categories 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*, *ata* and plural *atem* were rare, used as for the past tense, in a contrastive context, as in *ve ata, Asaf, ma ata tiyhe?* '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 tesaxaki be mashehu axer* '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 yigmor* 'he will-finish' and *ani yigmor* 'I will-finish' (compare normative *[ani] egmor*), both *hu ye-saper* 'he will-tell' and *ani ye-saper* '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 (Bolozky 1979). For instance, the following future-tense forms with the 2nd-person feminine stressed *-i* suffix were used as requests or suggestions in the input to Naama between ages 2;0 and 2;3 *tavi-i* 'bring!', *tish'ali* 'ask!', *ta'asi* 'make!', *tir'i* 'look!', *tashiri* 'sing!', *tisgeri* 'shut!'; and to Asaf between ages 1;11 and 2;2 *tizaher* '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'u*) 'come' = 'let's'; for example, to Naama aged 2;0 *bo'i neshev ba-sir* 'come 1Pl-will-sit on-potty' = 'come let's [sic] sit on the potty'; to Asaf aged 2;3 *bo nir'e* 'come 1Pl-will-see' = 'let's look'; to Sivan aged 3;3 and Asaf aged 2;1 *az bo'u nishma* '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 syncretic: 2nd masculine and 3rd feminine have the same form (compare *ata ti-gmor* 'you-Ms will-finish' and *hi ti-gmor* '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 intraclause and syntactic interclause, 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.[11]

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-tsfardea kam *ve* 0 yatsa mitox ha-tsintsenet
the-frog got-up *and* went out-of the jar

(13) b. *To Sharon, 3;2:*
hu [=ha-yeled] lakax ota [=ha-tsfardea]me-ha-bitsa
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 mekamet 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. A: le'an ne'elma Dalya?
'Where did Dalya disappear?'
B: 0 halxa la-super.
went-Fm to-the-store

b. A: ma ya'asu ha-yeladim?
'What will the-kids do?'
B: 0 yisha'aru ba-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-tsfardea.
the frog ran away.
0 hit'oreru baboker ve gilu she ha-tsardea
0 woke-up-Pl in-the-morning and found that the-frog
enena.
was-gone.
0 xipsu ba-magaf, 0 xipsu ba-tsintsenet, aval ...
0 searched-Pl in-boots, 0 searched-Pl in-the-jar, but ...

(18) ... az *hu* shilem ve 0 nixnas la-oto. pitom *hu* ro'e she
ha-meyxal mar'e al rek legamrey ve ha-sxum haya shel meyxal male.
0 hitxil lehitvakeax ito, 0 amar lo she hu loh yeshalem et ze, aval
ha-hu amar lo ...
'... So he paid and 0 got into the-car. Suddenly *he* sees
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 interclause 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 compared with adults.[12]. The conversational data consist of recordings made every 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 protagonists 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, lo ani* 'you-Fem, not I' = 'me' [age 2;2], and *hine ata* 'here you-Masc (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 *yodat* '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 lokexet kol* — compare normative *ani lokaxat 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* 'Acc these shoes']). At the same time, she also used past-tense verbs in the 1st singular with the stressed suffix *-ti*, mostly without and occasionally with a pronoun, for example, *kibalti*

'got + 1st', *samti* 'put + 1st'. *yashanti* 'slept + 1st', *lakaxti* 'took + 1st' and also *ani shabarti* 'I broke + 1st', *ani gamarti litsayer kan* 'I finished to-draw = drawing here'. She also used two verbs in the future, one without and one with a pronoun: *ixabe* '1st ~ 3rd will-hide' (compare normative *etxabe* '1st + will-hide'), *ani isader* 'I 1st-will-arrange'. That is, by age two years, Naama uses *ani* consistently with present-tense verbs and either uses or drops it, as grammatically licensed, with past and future verbs. (iii) By age 2;0:10, she uses a wider range of present-tense verbs always with a surface *ani*; and out of some 25 verb types used in present tense with first-person reference in her transcripts for age 2;1 and 2;2, the only verb which occasionally occurs without an overt pronoun subject is *rotsa* 'want + Fem'. As for past and future tense, at age 2;0, she continues to use 1st-person past-tense verbs that have a person-marking suffix *-ti* both with and without a pronoun. (iv) *By age 2;2*, she typically omits the pronoun *ani* in this context (of 48 past-tense tokens, only six were used with overt *ani*), and she also used several plural verbs without overt *anaxnu* 'we' (for example, *bani-nu* 'built-1Pl', *ra'i-nu* 'saw-1Pl', *sixak-nu* 'played-1Pl'). This is exactly in line what was noted for adult usage in section 2.2. By now, Naama also uses occasional future-tense verbs, in the plural without a surface pronoun, but in singular with a surface *ani*, again in accord with adult usage. In sum, by age 2;3 there is inverse reliance on an overt subject *ani* 'I' (or plural *anaxnu* where relevant): across the board in present tense, most of the time in future tense, rarely in past tense.

A similar pattern emerges for Asaf, but with differences of detail. (i) Between *ages 1;9 and 1;10*, he also omits *ani* in the obligatory context of present tense (for example, 0 *lo motse et ze* 'not find it = [I] can't find it'). (ii) By age 1;11:16 and consistently *from age 2;0:11*, he uses *ani* across a wide range of present-tense verbs, with the single exception of formulaic *lo rotse* 'not want' = 'I don't want to'. By 2;1 he also uses a second-person pronoun consistently in present tense — for example, *ad mdaberet* 'you talk', *lama at kotevet?* 'why (are) you writing?', and to his father, *ata ose oxel?* '(are) you making food?' At this phase, he also starts using *ani* with future-tense verbs, although the required vowel prefix is often elided or nonnormative — for example, *ani ase* ... 'I will-do, make' (compare usual adult *a'ase*, more normative *e'ese*), *ani gam yisaper* 'I also will-tell' (compare required *asaper*), *ani (e)kax* 'I will-take'. This blurring of the future-tense prefix, and the concomitant reliance on a surface pronoun *ani*, continues through to age 2;3 and even 2;4 (for example, *yase* 'will-make' for required *a'ase*, *kabel* for *a-kabel* '1st-will-get', or *ani xabe ve ani tse* for *ani e-txabe ve e-tse* 'I 1st-will-hide' and [I] 1st-will-leave').

Asaf differs from Naama in the long time it takes him to gain command

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 *shaxaxti*), *ani tsiyer* '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 mefarek-et* 'you break-up + Fem', *at nosa-t* 'you drive + Fem', as well as the 1st-person plural past-tense suffix *-nu* — for example, *irkavnu* 'put-together + 1Pl' = 'we put together (the puzzle)', *lo yatsa-nu* 'not went-out + 1Pl' 'we didn't go (to the store)', *sam-nu* '(we) put + 1Pl'. 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 context 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 conditionals (for example, in her admonitions to her brother: *im ata ti-shbor et ze, ima nora ti-x'as* '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,

with different time schedules for different children, future tense is used increasingly, typically with an overt pronoun in 1st-person singular and without one elsewhere.

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* 'teddy sleeps', *oto nosea* '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's 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* [= *melakeket*] 'lick + Fm' = 'is licking (ice-cream)'; *ma osa Keren?* 'What's Keren doing?' yields *inanede* [= *mitnadnedet*] 'swinging + Fm'; and *ma aba ve ima osim*? 'What (are) Daddy and Mommy doing?' — *ixakim* [= *mitxabkim*] 'hugging = Pl'. With nonpresent verbs, she omits the 3rd-person pronoun in the unlicensed context of lone 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 *ipol* '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', *lesaper 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', *kafats* '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-sefer?* 'What happened to-the-book?' — *O nikra* 'tore-Intr.', *ma Uri asa* '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 mitriya.
'He takes an umbrella.'
hu yasim al harosh.
'He will-put (it) on his head.'

I: tistakli al ha'ish.
'Look at the man' (in picture).

N: efo *hu* holex?
'Where's he going?'
hu lo lakax mitriya.
'He didn't take an umbrella.'

I: ma yikre?
'What will-happen?'

N: yarad geshen
fell rain
'It rained.'
(compare *yered geshem* 'it will rain')

I: ma yikre le-aba?
'What will-happen to Daddy?'

N: *hu* yiratev.
'He will-get-wet.'

These findings for Naama are confirmed by Asaf, between 1;11 to nearly 2;3 (2;2:26). At age 1;11, he either omits a 3rd-person subject or else uses deictic *ze* 'it' — for example, *ze mekulkal* '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 axshav?* 'Where (did) he go now?', Asaf answers *(la)makolet 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, mekulkal* '(is) dirty, broken', pre-

sent tense *mafria li, lo nosea* '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, *rotsa* 'wants', *mefareket* 'takes apart', *nosa'at* 'goes' (said of a truck = feminine *masa'it*) and past-tense *baxta* 'cried, was crying'. And he also uses it in a future-tense embedded clause *ani lo rotse she hi tir'e oti* 'I not 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 data base 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 single 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.'
ve ha-kelev *hu* ra'a et ha-sakik [4;2]
and the dog he saw Acc the-bag
ve kan ha-tsipor *hi* afa alav [4;6]
and here the-bird + Fem she flies on(to)-him
ve ha-yeled *hu* ala al ets [4;9]
and the-boy he went up (a) tree
ve ha-kelev *hu* 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,

(22) ve axarey ze hu [=ha-yeled] kam ve *hu* ra'a keresh
and after that he [=the boy] got-up and he saw a plank
ve *hu* amar sheket [4;10]
and he said 'quiet!'
ha-kelev raca le-hikanes letox ze ve *hu* nafal
the-dog wanted to-go inside it [=a jar] and he fell
me-ha-xalon [4;11]
out-the-window

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-axat haya yeled she hu haya 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 *tsiporim she hem afim baya'ar* [4;7] 'birds that they fly in-forests', *ganenet she hi melamedet dardasim* [5;2] '(a) teacher that she teaches smerfs' (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 rull range of subject-pronoun 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 yorim ba-shodedim ve 0 tok'im cilcalim* 'they [=the whalers] shoot-Pl at-the-pirates and 0 stick-Pl (them with) harpoons' [Tom 4;8]; and in the narratives: *ha-yeled yatsa haxuca 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 halx-u ve halx-u, ad she 0 higi-u le-makom* ... [5;3] 'they walked-Pl and walked-Pl until (that) 0 came-Pl to (a) place ...'; *ba-boker hu kam ve me'od da'ag la, ki 0 ra'a she hi ne'elma* [9;4] 'in-the-morning he got-up and was-very worried about-her [= the frog], because 0 saw that she = it [had] disappeared').[14] 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
ve ha-kelev yashan al yado.
and the-dog slept next-to him.
0 hit'orer-u,
0 woke-up + Pl,
ve lo 0 ra'u et ha-cfardea
and 0 (did) not saw-Pl Acc the-frog

(24) ha-yeled ve ha-kelev hit'oreru.
the-boy and the-dog awoke-Pl.
ma hem ra'u? en tsfardea! ha-cfardea ne'elma!
what they saw-Pl? no frog! the-frog (had) disappeared!
0 hitxilu le-xapes ba-xeder.
began-Pl to-search in-the-room.
0 herimu et ha-mita,
picked-up-Pl Acc the-bed,
0 herimu et ha-mnora,
picked-up-Pl Acc the-lamp,
0 hezizu et haxalon,
moved-Pl Acc the window,

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-xalon,
opened-Pl Acc the window,
0 ca'aku baxuc,
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.[15] 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, J]; (b) others use a matter-of-fact, prosaic style with full SVO structures and little coordination [texts A, L]; (c) some achieve a tightly cohesive style by liberal use of subordination [text K] or of grammatically free null-subject clauses as in (24) above [texts E, F, H, and I]; 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-

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.

(25) 1. *Pregrammatical*: zero pronoun subjects across the board.
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-

straints, acquiring inflectional agreement markers, a system of person pronouns — first deictic, then anaphoric — and the notion of subject as a grammatical relation; only afterward will their early item-based knowledge and their later structure-dependent knowledge become integrated to meet the requirements of organized connected discourse. They will then have reached the stage where, as argued by Karmiloff-Smith (1984, 1986), they are linguistically and cognitively able to modulate the interaction between the data-driven and top-down processes of the earlier phases of acquisition.

The findings of the present study suggest that there is not necessarily one particular setting for a given linguistic parameter, in this instance the null-subject phenomenon, that is less marked or more natural for children across the board. There seems no need for such a strong version of the parameter-setting view of acquisition as formulated in Hyams (1986), in papers in the collection of Roeper and Williams (1987), or in other attempts to resolve the logical problem of language acquisition defined as the vastly undetermined nature of its input (Lightfoot 1982). First, the input to young children is neither so depleted nor so uniform as some have suggested. Adults addressed the two- and three-year-olds studied here with a rich variety of options: a single recording session might contain modal predicates both with and without expletive *ze* (section 2.1); verbs in all three tenses and in all three persons both with and without a surface pronoun subject (2.2); and in addition both SV and VS order in the same surface contexts (a topic under separate study).

Nor does it seem to be the case that some grammars of some languages, or parts of them, are more 'natural' and hence easier to acquire than others (as has been suggested, for instance, by Schlesinger 1981). Rather than starting out with a single unmarked setting provided by universal grammar, children will at first entertain any of the possible construction types attested to in natural languages — analogously to the unrestricted phonemic inventory of young infants. Studies in different languages have shown young children capable of mastering grammatical constructions which run counter to what might be viewed as 'natural' or unmarked from an anglocentric or Romance-based bias. Two-year-olds do not necessarily pay attention to word order rather than to inflectional cues (Hakuta 1982; Weist and Witkowska-Stadnik 1986); they do not find one type of word order harder to attend to than another (Slobin 1982); nor do they prefer active to passive constructions across the board (Demuth 1988; Pye and Poz 1988). Instead, they early on become attuned to what is preferred, or natural, or right for their own particular mother tongue — however unlikely this might seem in terms of the grammar of some abstract archetypal L.

This means that children will not in principle take a long time or find it particularly difficult to master the apparent inconsistencies of zero-subject patterning in Hebrew (section 2). Two sets of factors which characterize the acquisitional process in general will account for this: recourse to 'typological imperatives' (Berman 1986b) on the one hand and to 'multiple bootstrapping' (Shatz 1987), on the other.

With respect to the first factor, the impact of language typology asserts itself as soon as children begin to master the language-particular morpho-syntactic properties of their native tongue — typically around age two. They start to focus on the way things happen in their own input language and become increasingly attuned to its specific structuring. This is revealed by the very different ways in which three-year-olds encode exactly parallel temporal, causative, and locative concepts in five different native tongues (Berman and Slobin 1987). And it explains, for instance, why Hebrew speakers can master the intricacies of number and gender marking before age three: the system is totally pervasive across the grammar and lexicon of their language. Children soon realize that they must pay attention to the form of words and divide them up as singular or plural, as masculine or feminine, with verbs marked for 1st, 2nd, or 3rd person. Attentiveness to the overall typology of the native tongue also explains why Hebrew-speaking children will find it natural to distinguish so-called present-tense verbs from those in past and future with respect to whether a subject pronoun is or is not required. They will notice the special status of present-tense verbs in the *benoni* 'intermediate' category across the grammar of Hebrew — one expression of which is that, unlike past and future tense, it is not marked for person and so requires an overt pronoun subject (section 2.2). Similarly, in impersonal constructions (section 2.1), children will never encounter a 3rd-person pronoun with possibly human reference, but they will have numerous cues to suggest they can extend deictic *ze* 'it' to expletive propositional contexts (section 2.1).

Such typological sensitivity is one facet of how children crack the linguistic code of their native tongue. Another is the fact that there is more than one single or favored means available to children for bootstrapping into linguistic knowledge (Berman 1984). Young children do not rely mainly on semantic underpinnings (Pinker 1984), nor are these aided solely by syntactic information (Naigles et al. i.p.) or perceptual cues (Gleitman and Wanner 1982). Rather, children make use of a confluence of all kinds of information en route to end-state command — in acquiring language as in other domains. These include internal sources such as universal grammar and the human language-making capacity (Slobin 1986) in interaction with cues supplied by the environment and by language input — situational, perceptual, and semantic as well as morpho-

syntactic structural. For instance, for children to learn where subject pro-drop is allowed in Hebrew they can project from the universal, cross-linguistic distinction between deictic 1st and 2nd person compared with anaphoric 3rd person to the particular implications of this distinction in their native tongue. But in figuring out that the pronoun is usually retained in future tense compared with past, they will attend to cues of both perceptual salience (past-tense suffixes compared with future prefixes) and semantic distinctiveness (leveling of 1st- and 3rd-person singular, and of 2nd-person future versus imperative).

These different cues need not function in the same way across the board for all aspects of language acquisition. Some systems or parts of systems may rely critically on attention to linear order, others on hierarchical phrase structure, on surface perceptual cues, on discourse-topic reference, or on extralinguistic situations. Moreover, the various factors may have a differential impact at different developmental phases. For instance, initially the universal 1st- and 2nd-person deictics will be favored in Hebrew as in any language; subsequently deictic *ze* will take precedence over anaphoric *hu* in 3rd person; eventually 3rd-person anaphora will be accompanied by recognition of the formal criterion of zero morphology as uniquely identifying 3rd-person verbs in Hebrew. Relatedly, young children in the here-and-now stage of language use will be particularly prone to deictic or situational licensing of null subjects and to narrow discourse licensing across adjacent utterances (see, too, Bloom et al. 1976); only later will they learn to use the discourse-licensed thematic type of null subjects in constructing cohesive stretches of text, when they are ready to take account of different levels of text connectivity in extended discourse, and to evolve an individual style of expression.

Received 8 December 1988
Revised version received
10 April 1989

Tel Aviv University

Notes

* Transcription of the longitudinal data used for the study was made possible by funding from the Child Language Data Exchange System, Carnegie-Mellon University, Pittsburgh, Pennsylvania, and from the Max Planck Institute for Psycholinguistics, Nijmegen, Holland. The narrative data base forms part of a cross-linguistic project conducted with Dan I. Slobin, University of California, Berkeley; collection of the Hebrew data was supported by a grant from the United States–Israel Binational Science Foundation (BSF), Jerusalem, Israel. I am indebted to Jürgen Weissenborn for lengthy discussion and clarification of the issues and to Melissa Bowerman for her

detailed reading of a first draft, as well as to Mira Ariel, Eve Clark, and Katherine Demuth for helpful comments on an earlier version. Correspondence address: Department of Linguistics, Tel Aviv University, Ramat Aviv 69978, Israel.

1. For a characterization of Hebrew as (S)VO, see Berman (1980).
2. Descriptions of these and related phenomena in Modern Hebrew are given from different perspectives by Borer (1984, 1985, 1986) and Ariel (1985, i.p.). Borer deals with syntactically licensed null subjects in Hebrew and other languages in the framework of government and binding theory. Ariel analyzes Hebrew null subjects in terms of her theory of accessibility, going beyond Borer's analyses (relevant to written rather than colloquial Hebrew) to demonstrate difficulties which arise from restricting analysis to sentence-level considerations. Ariel's account is more compatible with the point of view in this study, since the input for acquisition is obviously colloquial everyday usage rather than a formal or official style, and also because the context for situational and discourse licensing requires recoverability of referents beyond the single sentence.
3. A similar alternation occurs in the mother's speech recorded a year later, when Sivan is 3;4 and her little brother Asaf is 2;3; thus,

   MOT: 0 lo batuax she *ze* naxon.
   not sure that IT (is) right.
   lama 0 iy-efshar la-sim batariyot la-masa'it ha-zot?
   why not-possible to-put batteries into that truck?
   'Why can't you/one put batteries in that truck?'
   ASA: asur! asur
   'Forbidden, forbidden!'
   MOT: *ze* lo she asur, 0 iy efshar
   IT not that forbidden, not possible
   'It's not that you mustn't, you can't!'

4. Recoverability varies with different types of null subjects: it is (i) morphosyntactic in the case of person-marked agreement as in (2) of the text; it is (ii) discourse-based in the case of 'continuative' clauses as in the examples in (3), and in the mother's reply to the child's question about what the boy in the picture is doing in example (8); and it is (iii) situational in the case of deictic *ze* as well as in 1st-person speaker and 2nd-person addressee omissions as in (4) above. More detailed analysis of recoverability of reference and its effect on language acquisition is beyond the scope of the present study. A relevant framework is provided by Ariel (i.p.) in terms of a general hierarchy of accessibility and informativeness.
5. For instance, *ze* can refer forward to a sentential complement that is in subject position — for example, *ze she Ron diber haya mat'im 'it that Ron spoke* was right' — or extraposed — for example, *ze haya mat'im she Ron diber* 'it was right *that Ron spoke*' or the mother's *ze lo yafe la-riv* 'it's not nice *to-fight*' in (8).
6. Impersonal subjectless sentences as listed in (1) and (2) of this chart were noted because one such class of expressions allows pleonastic *ze* 'it'. These constructions warrant separate research concerning the nature and acquisition of impersonals in general. The present study focuses on structures (3) through (6) in the chart in (5).
7. This is the ordinary colloquial form of 2nd-person plural marking on past-tense verbs (hence the source of input to children). It is regularized to the rest of the past-tense paradigm with the full CaCaC stem and stem-final stress, by comparison with the normative form *gmartem/ten*, with penultimate stem-vowel reduction and word-final (suffixal) stress.
8. The ranking in (9) is on the whole compatible with Ariel's (i.p.) independently moti-

vated hierarchy of accessibility to referential markers, as follows: full pronouns > cliticized pronouns > 1st and 2nd person past-tense AGR > 1st and 2nd person future-tense AGR > 3rd person past future-tense AGR > present-tense AGR.

9. For example, protocols of Ninio and Snow (1988) of adult input to three 18-month-old Hebrew speakers include ten questions asking whether the child wants something, with the present-tense verb masculine *rotse* or feminine *rotsa*; only one included the 2nd-person pronoun *ata* or *at* (feminine) 'you' — when a mother says to her daughter *ah, at rotsa zetim?* 'oh, *you* want olives?' And my data base contains numerous such examples in speech addressed to children aged 1;10 to 2;3; for example, when Naama is aged 2;0:24 her mother asks her 'Want [*rotsa*] (to do) pipi in the toilet?', and the investigator, a friend of the family, asks Naama in the same session 'Want [= *rotsa*] to-carry the-doll?'.
10. Ariel's Hebrew conversational corpus revealed that 'surprisingly enough, no prop drop occurs with a future tense inflection (except where future inflections function as imperatives). Although one can certainly not claim that such pro drops are ungrammatical, it seems significant that this option was never employed in this corpus, while the unmarked past tense 1st and 2nd persons used zero subjects (82.5%)' (Ariel i.p.: ms. 195).
11. Independent pronouns are phonologically required as the locus of contrastive stress.
12. The conversational data base consists of recordings made available to me by Dafna Kaplan (for Naama) and Dorit Ravid (for Asaf and Sivan), supplemented by interviews conducted by Inbal Gozes and Ziva Wijler, graduate students at Tel Aviv University. The narrative texts are part of the cross-linguistic data base described in Berman and Slobin (1987) and constitute a subset of 112 Hebrew picture-based narratives analyzed in Berman (1988b).
13. The general deictic pronoun *ze* 'this, that' may alternate with the more canonic, gender-marked personal pronoun *hu* as well as feminine *hi*, as a kind of gender-neutral marker. This represents a juvenile option unless used in a deictic rather than anaphoric sense; for example,

    (i) ma kara la-*kise*?
    what happened to-the-chair + Ms?
    hu nishbar ~ ze nishbar
    he broke it broke
    'It broke.'

    (ii) ma kara la-*mita*?
    what happened to-the-bed + Fm?
    hu nishbar ~ ze nishbar
    she broke + Fm it broke
    'It broke.'

14. Other data for four- and five-year-olds show they omit a 3rd-person pronoun in subordinate clauses coreferential to an antecedent in the main clause in the same way as adults, as in the following account of a quarrel by Michal, aged 5;2:

    ve axarkax ani rava ito [= im axi]
    and then I quarrel with-him [= my brother]
    ve omeret lo she 0 yafsik
    and tell him that 0 should-stop.

15. Subjectless clauses account for around one-third of all clauses in the 12 adult narratives (241 out of a total 714).

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