TEL-AVIV UNIVERSITY
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THE MINIMALIST CHILD:

PARAMETERS AND FUNCTIONAL HEADS IN THE ACQUISITION OF HEBREW

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by

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Preface and Acknowledgement

When I started working on my dissertation, I had one child, an MA in generative syntax and a most vague understanding of language acquisition. Now I have three children, and I hope to have shown in this work a deeper understanding of the process children undergo in acquiring their mother tongue. In this work, I have tried to link the acquisition of syntax with syntactic theory, showing what the acquisition data have to say about Minimalism, and what the Minimalist Program has to say about the data.

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Abstract

It has been argued that "the future success of GB ... will be determined in large part by its ability to constrain the language-particular parameterization of principles" (Newmeyer 1988, 27). With this claim in mind, this study aims to define and limit the set of syntactic parameters within Universal Grammar (UG), constraining them to a single type. The second goal of this work is to derive, rather than stipulate, the notion of “strong” feature, which has played a role in crosslinguistic accounts of parameterization as well as of the acquisition of parameters. The third and last goal is to account for the apparent gradualness of language acquisition, in particular, in setting parameters.

In this work I propose that lexical items have fully specified values for all their features, whereas features of functional items are neutral, i.e., unspecified for their values. For every functional head, a computing mechanism which applies in the course of the derivation compares the potential set of features determined by the maximal morphology of the particular language with the set of features specified on the corresponding lexical item. By PF, a PF-ban on fully specified functional heads which are not associated with a lexical item makes it possible to derive the distinction between strong and weak heads, rather than stipulating it. This PF-ban is extended to specifiers of these heads and this would make “checking” a unified process applying only after spell-out. Thus, checking can be seen as an LF-ban, which states that all features must be checked out by LF.

Deriving the effects of “strong” makes it possible to constrain parameters. Most of previously proposed parameters involving variation of verb-raising, subject-

raising, A-bar movements or the distribution of empty pronominal categories are reduced to variations in the set of features that the lexical head is morphologically endowed with and to the balance between those features and the underspecified (valueless) features on the functional heads. The first of the three goals mentioned at the beginning could be achieved if all syntactic variations were reduced to this form, but unless we adopt Kayne's (1994) view of "directionality," directionality parameters (Koopman 1984, Speas 1990) seem to be the exception to this idealized situation. However, directionality parameters, which are the first to be acquired by children, are not specific to syntax and seem to underlie all modules in which hierarchical trees are generated, e.g. morphology, phonology and prosody. Thus, attributing most parametric differences to morpho-lexical variations where the only "real" parameters which remain are directionality parameters achieves the first goal.

After applying the proposed theory of parameterization to phenomena of V2 and null-subject, I look at the early acquisition of Hebrew. The analysis will show that the theoretical model proposed above is able to derive the observed gradualness of acquisition. The analysis of the Hebrew data focuses on the production of children from their early word combinations, around age 1;06, to the first complex clauses, around age 2;06. The analysis of the acquisition data depends on a "minimalist" hypothesis for acquisition which assumes that UG provides children with full knowledge of phrase structure, but that at any point they make least possible use of it, given the evidence they have. It is argued that the minimalist child builds trees in a bottom-up fashion, which is the only way to build well-formed trees with limited knowledge.

A bottom-up acquisition of the tree is necessary in order to account for the order in which verbal morphology is acquired as well as several related phenomena, such as the use of null subjects, root infinitives and the use the CP system for questioning and subordination. One relevant example is the acquisition of verbal morphology, which children begin by distinguishing aspectually durative actions from perfective actions and later acquire gender and number morphology. Next they start to use tense and end with person morphology. This order reflects the tree, in which AspP extends the VP, AgrPrt extends AspP, TP extends AgrPrt, and AgrSP extends TP. Thus an extended projection is created which is further extended to its maximal size by a CP.

The bottom-up procedure is shown to play a role in the acquisition of the DP system, where the order in which the free genitive, determiners, and the accusative marker are acquired again suggests gradual bottom-up use of various functional heads within the nominal phrase marker. The hypothesis of a minimalist bottom-up acquisition and the parameterization model proposed in the dissertation achieve the third goal of explaining the gradualness of acquisition. Children set directionality parameters from their earliest word-combinations before checking or the PF-ban apply. Other parametric differences are gradually mastered using the proposed model and follow a bottom-up construction of the tree. In doing so, children first satisfy the universal LF requirements and subsequently satisfy PF requirements, employing language specific morphology and lexicon.

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Chapter One -- Theoretical Preliminaries: Parameters, Functional Heads and Acquisition

Language universals and language variation have been the subject of intensive study in linguistic theory dating back to Sapir's *Language* (1921), through Greenberg's *Universals of Language* (1963), and the typological studies which evolved from his work (Comrie 1981, Hawkins 1979, Keenan 1978), through current work within the generative framework (Baker 1995, Hyams 1994b, Speas 1994). Baker (1995) points out that the focus in these works has shifted from Sapir's interest in the "genius" characteristic peculiar to each language to Greenberg's concern with universals that capture characteristics shared by groups of languages. Moreover, since Chomsky's *Lectures on Government and Binding* (1981), the main concern for generative grammarians is with explaining the sources, that is the formal principles, underlying possible individual languages and the universal properties shown by all languages rather than with the characteristics themselves.

The Theory of Principles and Parameters (Chomsky & Lasnik, 1993) attempts to account for universal crosslinguistic characteristics of languages through the principles and account for the "genius", that is, the non-universal characteristics of each language through the parameters. These principles and parameters constitute Universal Grammar (UG). Parameters refer to a set of language-particular properties defined within Universal Grammar (UG), from which cross-linguistic variation is claimed to arise. The range of options provided by UG for each of these properties constitutes the parametric variation; thus, the possible settings, though not the specific value, of a parameter are determined by UG. Within the generative grammar, and particularly within the Minimalist framework, this issue has been approached with an attempt to minimize the

causes and maximize their effect. That is the goal is to minimize the number and type of principles and parameters and maximize the number of characteristics captured by them.

A second major issue in linguistic theory is how language universals and language particular properties are acquired by children. This question has been approached from many points of view: a socially oriented empiricist perspective (Bruner 1974-5, Ninio & Snow 1988, and see references there), psycholinguistic operating principles (Slobin 1982, 1985b) and generative grammar, assuming the innateness of linguistic principles (Hyams 1986, Roeper & Williams 1987). Within the *Principles and Parameters* theory, this question is rephrased, asking how children identify the particular characteristics of their language and set the parameters for the innate linguistic principles. Within this theoretical context it is suggested that minimizing the number of parameters and principles is desirable in order to account for the rapidness of acquisition, under the learnability assumption that the less the child has to learn the easier it is..

1.1. Parametric Approach to Functional Categories

Reviewing the history of generative grammar, Newmeyer (1988) argues that "the future success of GB ... will be determined in large part by its ability to constrain the language-particular parameterization of principles" (p. 27). My study proposes to take up this challenge and consider the way in which the number and type of parameters can be constrained. The discussion of parameters has always been motivated by the desire to account for typological differences between languages. It has also been suggested that parameters are a factor in language acquisition (Borer 1984, Weissenborn 1990) as well as in diachronic language change (Adams 1987, Lightfoot 1991, Platzack 1985).

What has been the subject of debate for many years is the form that these parameters take, that is, what can constitute a parameter. Many parameters proposed in the literature seem to be mere typological descriptions of the differences between

languages regarding particular phenomena, such as word-order parameters (Taraldsen 1983, Travis 1984), the null-subject parameter (Jaeggli & Safir 1989, Rizzi 1982, Rizzi 1986) or even the configurationality parameter (Hale 1983, Jelinek 1984, Maracz & Muysken 1989, Speas 1990). These parameters seem to miss the intended notion of parameters in *Lectures on Government and Binding*, where it is argued that for a parametric analysis to represent a genuine advantage over a mere description of differences, it must involve a wide range of empirical consequences.

Speas (1990) classifies the parameters considered in current linguistic literature into three types: (1) lexical variation in the input for the principles (Borer 1984, Manzini & Wexler 1987, Rizzi 1986); (2) parameterization of principles (Rizzi 1982); and (3) application of principles at different levels of representation (Borer 1984, Huang 1982, Rizzi 1991). Chomsky and Lasnik (1993) have argued that the options are restricted to only types 1 and 3.

More recently, in the Minimalist framework (Chomsky 1993), there are no distinct levels of representation, thus making parameters of type 3 impossible. Notably, though the Minimalist framework does not distinguish D-Structure, S-Structure and LF, making it impossible for parameters to relate to the various levels, the weak/strong parameterization of features yields parameterization at the level in which checking applies (before LF or at LF). This might entail the application of principles at different levels of representation, both intralinguaally and crosslinguistically, but this outcome is derived from the proposed framework, rather than being built into the principles. Thus, within the Minimalist framework (Chomsky 1993) parameters are restricted to a subset of type 1. My study aims to elaborate on this proposal.

The *Lexical Parameterization Hypothesis* of Manzini & Wexler (1987) focuses on parameters of type 1, suggesting that "values of a parameter are associated not with

particular grammars, but with particular lexical items." Following some observations of Borer (1984), I propose to narrow the application of the Lexical Parameterization Hypothesis to functional items as formulated in (1.):

1. **Functional Parameterization Hypothesis (FPH)** [1]
Values of a parameter are associated not with particular grammars but with particular functional items.

That is, parameters are associated with possible properties of lexical items which serve as functional heads. These items correspond generally to closed class items and morphological inflections, which vary considerably across languages (Shopen 1985, Anderson 1992). The generally accepted assumption that functional categories include bound morphemes in addition to the close class items might seem to violate the autonomy of syntax, since it crosses the word boundaries. If this proves to be the case, one result of this hypothesis would be to transfer syntactic notions such as parameters into the same domain as certain morphological categories, namely, the lexicon. This is not undesirable since parameters seem not to be limited to syntax but rather operate in other linguistic modules too, e.g., morphology (Anderson 1992) and phonology (ref).

Though functional categories are clearly distinct from the four lexical categories: N, V, Adj, and Adv, functional heads are lexical items, since they need lexical listing. The difference between functional heads and other non-functional lexical items lies in their syntactic function as fanctors rather than content words and distribution as extended heads rather than direct heads of extended projections. I argue that the set of potential functional heads is universal; what parameterizes is their surface manifestation (as words, bound morphemes, or zero) and the particular content and features that they carry (e.g.,

[1] The same term is used by Atkinson (1992), with a similar (but not identical) definition.

[+Wh] or [-Wh] Comp, [+Case-to-assign] or [-Case-to-assign] Infl,[2] etc.). This variation in the particular content and features is language internal as well as crosslinguistic. Thus, the FPH restricts parameters to a subset of type 1 -- potential functional heads in the lexicon. This view departs from the minimalist program (Chomsky 1993), where parameterization refers to the strength of single features which are associated with the functional head, rather than its content, i.e., the bulk of features and morphological information which encodes it. It also diverges from later works (e.g., Chomsky 1994), where lexical and functional items are viewed as complexes of features, but their strength, where relevant, is related to a particular feature. This diversity is further elaborated in Chapter 3.

Associating parameters with functional heads predicts that syntactic differences between languages correspond to different features of functional categories. Borer's (1984) parameterization of inflectional rules in Hebrew and Romance, Kuroda's (1986) Forced Agreement Parameter for distinguishing between English and Japanese, and Speas' (1990) breakdown of Hale's (1983) Configurationality Parameter into several independent lexical parameters, all associate syntactic differences among languages with parameters over functional heads.

Certain word order phenomena, such as the alternating position of the verb in Verb Second languages (German, Old French, Scandinavian languages) and Verb Initial languages (Arabic, Irish), have been reduced to the marking of inflectional features on different functional heads (Infl vs. Comp) (Armon-Lotem 1990, Platzack 1985). Koopman (1984) tries to reduce word order phenomena in the Kru languages to properties of a Case assigning Infl. Such approaches reduce the crosslinguistic differences in phrase structures to the values of two parameters: Specifier-head parameter

[2] The feature [Case-to-assign] is associated with the locus where Case is checked (see discussion in Chapter 3).

and Head-complement parameter (Travis 1984). The Null Subject parameter has similarly been associated either with the nature of the empty pronominal subject (pro or PRO[3]), a functional category like pronouns, or with the nature of Infl (Armon-Lotem 1991, Borer 1984, Jaeggli & Safir 1989).

More recently, under the impact of "minimalism" and "economy" two major ideas have come into focus. One is the "economy of derivation," used by Speas (1994) to account for the distribution of null elements across languages. Speas argues that every functional category has to be motivated by semantic or phonetic content. Yet in light of an economy principle, such content can be associated with either the head or the specifier of a category, but not both. Since functional categories which carry semantic content, like tense or aspect, are universal, what determines parameterization according to Speas is whether a category with no semantic content, such as agreement, is projected as an independent head in a language or rather depends on a semantically motivated category.

It follows from Speas' assumptions, for example, that the distinction between a null-subject language like Italian and a non-null-subject language like English lies in the content of AgrS. In Italian AgrS has independent morphologically marked phonetic content, so that [Spec,AgrS] is left empty, whereas in English AgrS has no phonetic content, the irregular morphology is marked on the verb, and so [Spec,AgrS] must be phonetically filled by the subject. Japanese has no agreement categories (Fukui & Speas 1986), so [Spec,TP] is the highest specifier it has at the IP level. Since Tns has semantic content, its specifier is left empty, resulting in a null-subject effect.[4] Along similar lines,

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[3] Huang (1989) has argued that PRO rather than *pro* functions as the empty subject in Null-Subject languages. A similar proposal is used by Deprez and Pierce (1994a) in their account of the use of empty subjects by children acquiring English.

[4] Japanese also allows null DOs, IOs, etc. To extend Speas' theory to these, one would have to assume that English and Italian have empty AgrPs for all NP arguments, whereas Japanese has none. This would imply that Japanese has other functional heads with content that allow non-subject null argument in their specifiers. I shall not elaborate this issue here.

Rohrbacher (1993) combined this idea with the non-stranding morpheme rule to account both crosslinguistically and diachronically for various verb-raising phenomena, such as V-to-I in French (but not in English) and V2 in Germanic languages.

A second “minimalist” line of thought, which has had a powerful impact on my study, is the attempt to reduce parameters to weak-strong values of functional heads. This idea though less precise than the requirements of Speas (1995) or Rohrbacher (1993) that overt morphemes be supported by a lexical head seems to account for a wider range of phenomena. The price of this proposal is the *ad hoc* nature of the distinction. Thus, for example, in an endeavor to make all, not just most, parameters conform with this idea, Kayne (1994) proposes to eliminate the directionality parameters (basically SVO-SOV) in favor of one basic order - SVO with no parametric variation. All other word-orders are derived by the need to check strong features on functional heads, which triggers verb raising and scrambling.

1.2. Parameter Theory and Continuity: Issues in the Acquisition of Syntax

Most of the ideas presented above derive from crosslinguistic research. However, a major goal of any linguistic theory is to offer a solution to "Plato's Problem" (Chomsky 1986b): how do children acquire so much based on so little? Any model of crosslinguistic variation and language-particular phenomena must, therefore, also satisfy certain learnability requirements in order to account for language acquisition. The universal principles and parameters which constitute Universal Grammar (UG) offer a possible solution for this problem. As phrased by Lightfoot (1991) UG is the genotype, and based on some external trigger, children should be able to "discover" the phenotype, the core grammar of their language. UG is crucial for this "discovery procedure" due to the apparent "absence of experience" (Crain 1991) in which language is acquired. Arguments for the poverty of the stimulus suggest that there are at least four senses in which

experience is absent: (1) the child's experience is finite, but language is infinite; (2) children are exposed to ungrammatical or marginal input which does not appear to effect their linguistic system; (3) children are not directly exposed to the critical data -- the paradigms needed to discover the rules of language; and (4) children are rarely instructed about the grammaticality of the utterances generated by their system, which, nevertheless, develops into the adult system. These arguments suggest that some predisposition such as that suggested by a UG based syntactic theory is essential to account for language acquisition.

Rizzi (1994) observes that the relationship between syntactic theory and acquisition theory can take one of three forms:

(1) Acquisition theory and acquisition data can be used to argue for the existence of UG principles based on early operativeness of these principles (See Crain 1991.).

(2) Syntactic theory and the UG mechanism can provide explanations for properties of language acquisition (Hyams 1986).

(3) Acquisition theory and acquisition data can be the source of new motivation and empirical evidence for some UG model.

In the case of the FPH, the interaction is of the second type. The FPH is not limited to crosslinguistic variations but rather implies that stages in first language acquisition, particularly in the acquisition of syntax, are closely related to the acquisition of functional categories.

However, applying the FPH to a theory of acquisition leads to an interaction of the third type, since acquisition data provide empirical evidence which is hardly accessible otherwise. For example, Weissenborn (1990) points out that the extent to which children acquiring German are aware of the different position of the verb in matrix

and embedded clauses depends crucially on their knowledge of inflections and Wh-movement to SPEC of CP. This suggests that whatever the Verb Second parameter is it must be associated with the functional categories Infl and Comp. In an earlier study (Armon-Lotem & Kfir 1989), we showed that acquisition of the adult setting of the Null Subject Parameter for Hebrew crucially depends on children's prior acquisition of both personal pronouns and verbal inflections. Only once these functional categories appear, do children show productive and proper usage of empty subjects (See Chapter 8.).

Radford (1990) proposes that the relatively late appearance of functional categories and their associated parameters indicates that children start with a grammar with no functional categories. This assumption explains -- according to him -- why children allow ungrammatical sentences, since principles which need to apply to functional categories apply vacuously (Guilfoyle & Noonan 1992). This, he argues, also explains why some parameters are acquired later than others. Radford, in fact, takes this additional empirical support for the maturation hypothesis (Borer & Wexler 1987). But, Hyams (1994b) as well as Penner and Weissenborn (1994) have pointed out that this could not be the case. They show that though there is no overt manifestation of functional categories in early German acquisition data, their effects, such as triggering movement of V-to-I are there. Similarly, Deprez & Pierce (1993, 1994) show that there is no way to account for the acquisition of Wh-movement and negation, both in English and French, without assuming that at least IP is available to children from their very early word combinations.

This debate raises the issue of continuity. Ideally, language acquisition is instantaneous. Children enter the process equipped with what Crain (1991), following Chomsky (1965), terms a language acquisition device, which consists of an innate set of universal rules -- Universal Grammar (UG) -- and some means to detect the core grammar of their language based on the primary linguistic data -- the input. This is the

ideal, but it is not reality. The process of acquisition is gradual; children evidently move through various stages in what appears to be far from instantaneous process. The goal of any developmental linguistic theory should, thus, be to account for this process.

Crain (1991) addresses this issue, pointing out that the generative framework and the innateness of UG call for rigid continuity. All knowledge is innate, and since the triggering data is available all the time, acquisition is necessarily instantaneous. In his view, there are no qualitative changes and hence no stages in acquisition. The apparent order of acquisition is a quantitative epiphenomenon which results from the development of nonlinguistic capacities. Crain suggests that acquisition is instantaneous within the I-Language. The apparent gradualness in the E-language only mirrors the interaction between the different linguistic and non-linguistic modules.

Hyams (1994b) addresses this issue from the perspective of parameter theory. She points out that although parameter setting is a discrete operation, the child seems not to pass through a series of discrete stages. Language development has the appearance of partial or non-discrete development. She also attributes this to the modularity of the language capacity. Language development involves the development of language specific rules and constraints, e.g., PF-rules, the lexicon, pragmatic and discourse rules and other exceptional aspects of the language. The interaction between all these functions and UG is responsible for the apparent nondiscreteness of language acquisition. Austin, Blume, Lust, Nunez del Prado, Parkinson & Proman (1995), for example, suggest that null-subject effects are a combination of syntactic and pragmatic factors. Children acquiring English set the syntactic null-subject parameter immediately, but mistakenly construe the discourse context which allows omission yielding a period where they seem to allow null-subjects, counter to the adult grammar, as if they have not set this parameter.

Crain's (1991) strong view does not hold if we assume that linguistic capacities mature. Maturation (as in Borer & Wexler 1987) entails non-continuity, since the accessible UG is qualitatively different each time a capacity matures. For example, a grammar with no functional categories is qualitatively different from a grammar with functional categories (Radford 1990) and a grammar with no A-chains is qualitatively different from one with A-chains (Borer & Wexler 1987). Maturation also entails that the immature grammar is not only discontinuous with respect to the adult grammar, but could in principle generate structures which violate UG constraints which have not yet matured.

The need to avoid these consequences led to the *UG-Constrained Maturation Hypothesis* (Borer & Wexler 1992), according to which all resulting grammars are consistent with UG, so that they never produce incorrect representation. Borer & Wexler (1992) argue that the *UG-Constrained Maturation Hypothesis* entails strong continuity since all grammars are not just subsets of UG, but are also subsets of each other, since maturation of principles means that every time a principle matures the grammar expands till the final state is reached. This view ignores the qualitative changes entailed by the maturation of a principle. Thus, the *UG-Constrained Maturation Hypothesis* seems to adhere to weak continuity rather than strong continuity, not in the sense of the type of changes, which are still qualitative, but in the constraints by UG on all stages.

At first glance it is not so obvious where the FPH and Parametric theory of acquisition belong in the continuity debate. Strong continuity (as in Deprez & Pierce 1994) means that the gradual changes in the growing syntax at each stage of the development form a set of syntactic rules which is a subset of the set of rules which is typical to the next stage, all being subsets of UG. Weak continuity (as in Clahsen, Eisenbeiss & Vainikka 1994) means that the gradual changes are all limited by UG, but the sets of rules at each stage are not necessarily subsets of each other. Parametric theory

seems to waver between these two poles. The question whether parameters have a default setting (Hyams 1986) is one of the sources of this diversity.

Bates & MacWhinny (1987) argue that parametric theory with a default setting for each parameter predicts a universal order of acquisition, where the only difference is at the end-state, thus entailing strong continuity. Thus, they argue, the idea of default setting misses the fact that acquisition is gradual and the order of acquisition differs crosslinguistically. This argument, however, seems to be a misconception, since default setting predicts only that the entry -- the initial state -- is universal, while resetting depends on the accessibility of the trigger in the input, and this differs across languages (Penner 1994b). Thus, a default setting which might change at some later point in development (Hyams 1986) entails two different grammars which are not subsets of each other, unless the resetting is to a wider value. In fact, the critical issue is the *Parameters Missetting Hypothesis* (Hyams 1994a), that is, the question of whether the setting of parameters can change and not whether there is a default setting. That is, unless parameters are confined to only those which obey the subset principle (Manzini and Wexler 1987), allowing changes in the setting of parameters entails weak continuity.

The *Parameters Missetting Hypothesis*, is relevant as long as parameters are viewed as values for the different principles. The FPH offers a different perspective on this issue. Here, the assumption is that what parameterizes are the features related to the functional items and the strength of these heads (Chomsky 1993). Each head may exhibit some variation with respect to its features (e.g., infinitive vs. indicative), and therefore the same functional head might be, in the same language, both strong, when endowed with a strong feature, but weak when marked with a weak feature. For example, Standard Arabic shows both strong finite inflection which licenses null-subject and weak finite inflection which does not license null-subject, and this is in addition to the weak nonfinite Infl (See the discussion in Section 3.4.2.). This means that there is no reason to

assume one of these options as a default setting for all languages, since all settings could apply to the same head within any language. The only possible default setting left is not setting the parameters but leaving the head underspecified for the particular feature (Hyams 1995). As a result, the case for weak continuity disappears. Assuming a universal set of options for features and their co-occurrence, parameter theory of acquisition actually entails strong continuity, without limiting itself to the subset principle. Since these different views might seem to belong to philosophy rather than science, the empirical implications of this argumentation are discussed at length in Chapters 5-9 in the second half of this work..

One last issue is the issue of learnability, that is, what is it in UG which makes acquisition feasible? Parameters clearly ease the acquisition task by limiting it to a reasonable set of puzzles. But it is by no means obvious how the child solves these puzzles: that is, what it is in the data that triggers the setting of these parameters, and what strategies the child uses for this task. Hyams (1986) associates the parameters with clusters of phenomena and the child has to identify one phenomenon of the cluster in order to set the parameter. This is done via syntactic bootstrapping (Landau & Gleitman 1985), using an error-driven process (Wexler & Culicover 1980). Whenever children encounter fragments of data which cannot be analyzed based on their grammar, they change the grammar in order to take care of these data. The trigger for resetting is the unanalyzed data. This view is in line with the *No Negative Evidence Hypothesis* (Bowerman 1982, Brown & Hanlon 1970; Chomsky 1981), which claims that children have no evidence for what is ungrammatical since they hear only well formed grammatical utterances.[5] There are two observations that should be made here. One, the error-driven process crucially depends on the idea of default setting, which creates some

[5] Valian's (1990) analysis yields a total of 4% ungrammatical utterances and 16% marginal utterances to which children are exposed. She argues that though children are not instructed about the grammatical status of these utterances, they seem to be equipped to ignore them.

initial hypothesis about the core grammar. Two, a major problem of this approach is that it involves a process of hypothesis test, which might result in incorrect final decisions if the child does not encounter the right evidence (Hyams 1994b, Penner 1992, Weissenborn 1993). If we assume the availability of other non-syntactic triggers this latter reservation might be resolved, but then there is no reason to presuppose a default setting.

Semantic bootsrapping (Schlesinger 1977, Pinker 1984, 1989) is one possible alternative. Schlesinger argues for a purely semantic approach, where children try to match the input with their cognitive semantic knowledge and through generalizations generate the grammar of their language. This approach, which rejects the UG hypothesis, is moderated by Pinker's proposal that semantics is merely the means for linking UG principles with the input. For example, word order is identified via the semantic structure of verbs and the thematic roles of their arguments, rather than the subcategorisation frame of the verb. Identifying the linear relations between an actor and the action or between a patient and the action and, enables the learner to set directionality parameters.

Other alternatives to syntactic bootstrapping are morphological bootsrapping (Behrens, Harris, & Cartwright 1995) and prosodic bootstrapping (Cooper & Paccia-Cooper 1980, Gleitman, Gleitman, Landau & Wanner 1988). Morphological bootstrapping relates to the use children make of morphological clues, such as agreement paradigms, in defining verb argument relations. The major argument for prosodic bootstrapping is that children use prosodic information, such as intonation, pausing, timing and lengthening, as cues for identifying syntactic units, such as a word, a phrase, and a clause (See Nespor & Vogel 1986 for the prosodic-syntax interface.). Cooper & Paccia-Cooper (1980) argue further that children's ability to map prosodic information onto syntactic units, enables them to acquire these units regardless of the syntax-semantics mapping. However, as argued by Pinker (1984), this last argument does not

seem to hold. In fact, each of these bootstrapping strategies solves some of the puzzles, but never all of them. Thus, it seems necessary for children to use various strategies in bootstrapping into the target language system.

One such attempt is Penner's (1994b) proposal that parameters are set by both syntactic and morphological bootstrapping. Penner describes three ways in which parameters are set: (1) parameters are set only by syntactic bootstrapping, which uses as triggers canonical syntactic information such as the contrast between expletives and non-expletives or matrix vs. subordinate clauses; (2) parameters are set only by morphological bootstrapping in which the paradigmatic trigger is some morphological information such as the inflectional paradigm; and (3) parameters are set by both syntactic and morphological bootstrapping and use triggers of both types, as in the case of null-subjects (See Chapter 8.). This leads him to predict that this third type is set later, being more complex and requiring the child to apply both strategies and find more than one trigger. This proposal allows Penner to derive a possible solution to the learnability question and at the same time make predictions for the order of acquisition. Penner supports his proposal empirically by detailed findings from the acquisition of German and Swiss-German. In Chapters 5-9, I review his proposal using acquisition data from Hebrew.

1.3. Aims and Structure

The first purpose of this study is to define and limit the set of parameters, and to account for the order and method in which these parameters are set. *The Functional Parameterization Hypothesis* leaves two questions unsettled. The first question concerns the form in which functional parameters are parameterized (Hyams 1984, Manzini and Wexler 1987). The second relates to the number and types of functional categories (Borer 1995, Cinque 1995, Grimshaw 1991). The present study aims to answer the first question by supplying ways to constrain the number of parameters, their form, and their locus of relevance in the theory of syntax. This issue is discussed from both a crosslinguistic and an acquisitional perspective. The second question constitutes a major issue in recent works in linguistic theory (e.g., Chomsky's *Bare Phrase Structure* 1994), and so is less central in the present context. It is considered only in so far as it relates to the first question.

The second aim of this study is to derive, rather than stipulate, the notion of "strong" which is crucial in crosslinguistic parameterization as well as in the acquisition of parameters. By the FPH, in its latest elaboration within the *Minimalist Program for Linguistic Theory* (Chomsky 1993), many parameters are associated with the strength of the functional item. Movement is triggered by the strength of the target, where a lexical item moves in order to check strong features on a functional item which are otherwise visible at PF (Chomsky 1993). Chomsky (1995) himself claims that "strong" remains an unexplainable primitive of languages, defined as "a feature that a derivation cannot tolerate beyond the maximal projection that contains that feature." This work offers a less stipulative way to compute the "strength" of functional heads, attributing overt movement to the PF component, and limiting Checking to the LF component.

The third and last goal of this study is to account for the apparent gradualness in language acquisition, and in particular in setting parameters. For this purpose, I propose to show how children learn to construct phrase-markers by building trees bottom-up and explain how they identify features or functional heads as "strong" in their language. This thesis was conceived before the more recent versions of Minimalism, thus some of the proposals and revisions are directed at the earliest publications. However, whenever it seems necessary, I show how my proposal stands in relation to the more recent versions.

In order to achieve these goals, the present study starts by narrowing the hypothesis that values of a parameter are associated only with lexical items that function as functional heads (Borer 1984, Chomsky 1993), by saying, in line with current theory, that parameterization refers to the different set of features which are associated with each functional head in each language. More specifically, language variation has been attributed to the distinction between strong and weak features, namely, a head endowed with a "strong" feature triggers overt movement and a head endowed with a "weak" feature triggers only covert movement. Chomsky (1994) suggests that the strength of features might vary crosslinguistically. As noted earlier, the strength of features is stipulated within recent works.

Chapter 2 focuses on the second goal and offers a way to eliminate this stipulation by a computing mechanism which computes the strength of a head rather than a feature and a PF-rule which applies only to "strong" heads. That is, I suggest that there are no strong and weak features but rather relatively strong heads and relatively weak heads (Armon-Lotem 1991a). The major hypothesis which underlies the computing mechanism is that lexical categories are fully specified for all their features, whereas functional categories are endowed with unspecified features. With the computing mechanism, when a lexical phrase-marker and a functional phrase-marker are merged into an extended

projection, the extended head shares the values of the features of the lexical head. By this computing mechanism the head-features of the functional head are specified.

Thus, the maximal set of features that can be associated with some functional head in a particular language is compared with the set of features which percolates from the lexical head in a particular derivation. When the two sets are equal the head manifests properties of a strong head, but when there is a mismatch between the sets, the head manifests properties of a weak head. The identification of matching sets, i.e., of "strong" heads, is attributed to the PF component. In the PF component, when the features of a functional head are fully specified, it needs to be associated with a lexical item. Thus we can eliminate the weak-strong distinction, assigning overt movement to PF and leave checking to LF.

In reference to the first goal, one type of parameters is characterized by this mechanism. These are relative parameters for which the strong-weak value of a functional head can vary within a language, relative to the maximal set of features. What parameterizes across languages is the maximal set of features associated with each functional head and their phonetic realization. This set of parameters is discussed in Chapter 3.

It is only in Chapter 3, when the computing mechanism is tested empirically, that the first aim is actualized. The set of possible parameters, the Relative parameters, is defined by computing the strength of functional heads rather than stipulating it. Relative parameters are not absolute binary parameters. Rather, they involve some computing mechanism that determines the relative value of the functional head on a weak-strong pendulum. The parametric effects which emerge from the computing mechanism and the PF-ban are discussed in the following sections. Sections 3.1 and 3.2 focus on the role of the computing mechanism for head-head checking, concentrating on head movement,

whereas in Section 3.3 spec-head checking is discussed, dwelling on the distribution of null subjects in Hebrew.

Though the syntax of relative parameters is a more central issue within this work, in Chapter 4, I review two other parameters which are needed in order to account for apparent gradualness in acquisition. I argue that these parameters are disjoint absolute binary parameters that do not allow any flexibility within a language. One example of an Absolute parameter is the possibility to neutralize categorial features of functional heads, first discussed by Grimshaw (1991) for DegP as the functional projection of both adjectives and adverbs, and more recently extended to other functional categories (Armon-Lotem 1994, Borer 1995) (Section 2.2). Another example of such parameters are the directionality parameters, known as *spec-head* and *head-complement* parameters (Travis 1994), which are redefined here in terms of precedence, borrowed from phonology (Clements & Keyser 1983, Selkirk 1984) and prosodic morphology (McCarthy & Prince 1993) (Section 4.2).

In Chapters 5 to 9, the third goal is addressed, and the apparent gradualness in acquisition is explained. The setting of both Relative and Absolute parameters is shown to crucially depend on the way children use the X-bar tree and acquire knowledge of language particular aspects of the tree. In Chapter 5, I argue that children seem to have access to the entire tree by the innateness of UG. Nevertheless, they seem to apply a "minimalist" approach in their production, doing only what they have to do, given the knowledge they already have of the language specific morphology at each stage. This work focuses on production. However, it has been argued (Penner 1994a) that children's comprehension of questions is delayed, since CP is not immediately accessed by the child. This might reflect a "minimalist" approach to comprehension.

Due to this "minimalist" approach, children use only truncated trees (Rizzi 1994), the parts of the tree for which they have clear evidence that they have to use. They gradually build partial bottom-up trees by merging only the subtrees for which they have evidence. Bottom-up trees, but not top-down trees, seem to be the only way to construct grammatical partial trees. The need for a particular subtree may become evident to the child from a morphological trigger, a syntactic trigger or even a pragmatic trigger. Thus, setting a parameter is only feasible once the triggering data make the subtree, on the head of which the parameter is marked, accessible.

The study further attempts to determine how the values of the parameters are set, in relation to the triggering data. Relative parameters are set only after the child has learnt some morphological paradigms, based on morphological bootstrapping. Absolute parameters may not be classified this way. Absolute parameters are purely syntactic and are set before the child starts to combine words, based on syntactic bootstrapping. The setting of some parameters may require both a syntactic and a morphological trigger, but these will also fall into the group of relative parameters.

The syntactic trigger for the absolute parameters specifies the option within UG that is relevant for the specific target language, and the parameter is set with an absolute value for that language. On the other hand, the value of the relative parameters for which a morphological trigger is needed is set on a language-specific weak-strong basis by the computing mechanism that compares the maximal set of features to the actual set of features within a derivation. Thus, the child needs to identify the maximal set of features in order to set the parameter. The task of setting the value of the relative parameters seems to be more difficult than setting the absolute parameters. The computing process that involves morphological triggers is gradual, and might, therefore, give the impression of incorrect setting when the child has not reached the final setting, that is, has not yet acquired the **full** set of morphological features.

Thus, the analysis given in Chapter 5 makes it possible to account for the apparent gradualness in parameter setting. The interaction between the assumption that absolute parameters are more accessible than relative parameters and the hypothesis that children are minimalists and use partial trees predicts the order in which parameters are acquired. Though the accessibility assumption requires that all absolute parameters are acquired prior to all relative parameters, the minimalist assumption might cause a delay. The predicted order is thus that **for each head in a bottom-up order, absolute parameters are acquired prior to relative parameters.**

This prediction and the assumptions on which it is based are dealt with in Chapters 6 to 9 for language acquisition data from Hebrew compared with English and German. Chapter 6 focuses on the acquisition of the nominal system, delineating the gradual building of the nominal trees up to the DP level and focusing on the acquisition of determiners and cases. Chapter 7 provides a similar analysis of the acquisition of the verbal system up to the IP, focusing on the order in which verbal morphology is acquired and its implications for the use of root infinitives. Chapter 8 discusses the use of pronominal and null subjects in child language as the result of the interaction between the acquisition of the nominal and verbal systems. Finally, in Chapter 9 the acquisition of CP is discussed, in relation to the use children make of preconjunctionals, wh-questions and subordination. Chapter 10 concludes the study by summarizing the findings of the research and showing how the three objectives are achieved. This will be followed by a discussion of what children have to say about Minimalism. In this discussion I shall consider what the elimination of agreement nodes by recent versions of Minimalism has to say about the order of acquisition and what the acquisition findings and the analysis proposed for them can tell us about the possible set of parameters and their values within the framework of the Minimalist Program (Chomsky 1995).

Chapter Two -- The Syntax of Checking

The *Functional Parameterization Hypothesis* (FPH) (Chomsky & Lasnik 1993) restricts parameterization to functional heads. In the derivational model of the *Minimalist Program for Linguistic Theory* (Chomsky 1993), lexical items are selected from the lexicon and projected into phrase markers which are merged and potentially undergo spell-out, checking the strong features before spell-out, and the weak features after spell-out. Within this model parameters are associated with the strength of functional items. Movement is triggered by the strength of the target where a lexical item moves in order to check strong features on a functional head which are otherwise visible at PF (Chomsky 1993). Chomsky (1995) himself claims that "strong" remains an unexplainable primitive of languages, defined as "a feature that a derivation cannot tolerate beyond the maximal projection that contains that feature." This chapter offers a less stipulative way to compute the strength of functional heads, attributing overt movement to the PF component and limiting checking to the LF component.

In the minimalist framework checking is an automatic procedure which applies when two phrase markers are merged. Merger captures the union of two novel phrase markers just projected from the selected lexical items and the insertion of a new phrase marker into an already existing construction as well as movement of a phrase marker within an existing structure. Checking applies in a head-head relationship which is the outcome of head-to-head movement and in spec-head relationship which stems from the equivalents of A and A-bar movements. In each construction the guest --the merged or moved element-- checks out the features of the host --the target for that merger. This is an automatic procedure which follows every merge operation which results in a checking structure.

This procedure is crucial for the convergence of the derivation of a sentence. At any point of the derivation a phrase marker may undergo spell-out. Once a phrase marker is spelled out, it becomes accessible to the interface levels (PF and LF) where it may either converge or crash. A phrase marker converges at PF only when all strong features, which are visible at PF, were checked prior to spell-out. Otherwise it crashes. On the other hand, the weak features, which are invisible at PF, are checked at LF.

What weak and strong features are, and how they are checked is not defined. Carried to its extreme one might say that whenever movement is detected strong features were checked, but this is circular. As mentioned earlier, Chomsky (1995) explicitly stipulates that strong features are the trigger for movement and then accounts for movement in terms of checking of strong features. Consequently, a definition of strong and weak features not in terms of movement is called for.

The second problem, also discussed by Chomsky (1995), involves the checking mechanism itself. What does this mechanism do? Does checking involve erasure of the features of the host? Or does it involve replacing the features of the host by those of the guest? Is it a unification procedure which matches the features on both and erases them when they match but not when they mismatch? One last question is whether checking is just an automatic procedure which applies after any merge operation or a trigger for merger (including movement)? These questions call for a detailed definition of the checking mechanism.

There is also the question of where the checked items, come from. The lexicalist approach which is assumed within the minimalist program entails that each item is selected from the lexicon and enters the Numeration with all its features. Lexical items are also fully inflected. Each item is selected independently of the other items. Thus, for example, subject agreement features are projected at least three time: on the verb, on

AgrS and on the subject itself. The checking procedure guarantees that there is no mismatch between the features on the various heads. Nevertheless, this strategy involves some redundancy since agreement features are projected more than is minimally necessary, i.e., on the verb and the subjects. What is needed is a definition of the checking procedure which avoids this redundancy and defines weak and strong in independent terms.

2.1. Is "strong" a stipulative notion?

The distinction between “strong” and “weak” features is crucial for checking since movement is triggered by the strength of the target, where a lexical item moves in order to check strong features on a functional item which are otherwise visible at PF (Chomsky 1993). Initially, in discussions of the null subject parameter (Rizzi 1982, 1986, Jaeggli & Safir 1989), AGR had traditionally been treated as comparatively "rich" or "poor", on a morphological base, with null subjects co-occurring only with "rich" AGR, i.e., with richly or uniformly inflected verbs. Similarly, based on Pollock (1989), there was some correlation between the strength of the head which triggered movement and the richness of the inflection.

In following works, and abstracting from the original correlation, this was extended from the English-French paradigm to other languages and from the inflectional agreement heads to other functional heads.. This change was basically motivated by some inconsistencies between strong heads and the richness of inflection, for instance in Swedish where it was argued that Agr is empty but strong (see footnote in Pollock), or in Chinese where an empty Agr behaves like a strong one in identifying *pro* (Huang 1989). Another motivation for this abstraction was the difficulty in associating non-Agr functional heads with richness or poverty of features.

Eventually, Chomsky (1993), departing from earlier proposals, did not lump together strong features and the features that license *pro*. Chomsky (1995) further proposes that what distinguishes strong heads from weak heads is the existence of abstract features, e.g., when I has a strong D-feature, the subject DP is raised to check it. Thus, “strong” remains an unexplainable primitive of languages, defined as “a feature that a derivation cannot tolerate beyond the maximal projection that contains that feature.” In this way Chomsky achieves the minimal arbitrary mechanism he needs but gives up the earlier generalizations from which the weak-strong distinction stems.

Thus, "strong" becomes a stipulative notion. To handle this issue, and maintain the second aim of this research, in the remainder of this chapter I propose a way to distinguish functional categories, for which the notion “strong” is relevant, from lexical categories, and develop a "computing mechanism" which derives the weak-strong distinction. More precisely, this “computing mechanism” enables us to eliminate this distinction and still maintain its effects for the checking procedure. This mechanism aims to capture not only the original correlation between the richness of features and the strength of functional heads but also the exceptions which led to the abstraction.

2.2 The lexical-functional distinction

Checking is one of the places where lexical categories meet functional categories. The first step towards gaining an understanding of this procedure and replacing it in a way which will make the notion “strong” less stipulative is to sharpen the distinction between the two types of categories. Traditionally, lexical categories correspond to open class items, whereas functional categories correspond generally to closed class items and morphological inflections (Shopen 1985, Anderson 1992). Clearly, this distinction at the level of the lexicon cannot account for the role they play in checking.

For this purpose, the hypothesize that lexical items are specified for all their features, whereas functional items are neutral or unspecified. The idea of feature neutrality of functional categories is first presented in Grimshaw's *Extended Projections* (1991) in order to account for partially non-distinct lexical categories. There, functional categories are defined as extended projections of lexical heads with which they share the values of the N and V features. Lexical heads are distinct from functional heads with respect to their F feature, where lexical heads are [F0], i.e., constituting the lowest projections in the tree, and functional heads are [Fn] (n>0), constituting higher projections.

This distinction serves Grimshaw in distinguishing extended projections from perfect projections. While extended projections share the value for the V and N features of the lexical head but not the value of the F feature, a perfect projection shares the value for all features. Thus, for example, DP and PP are perfect projections of the functional heads D and P respectively, and they are extended projections of the lexical head N; IP and CP are perfect projections of the functional heads I and C respectively, and they are extended projections of the lexical head V. Since PP, DP, and NP are all projections of the same lexical N, they and their heads share the features [+N -V].

Though functional categories are the extended projections of lexical heads, with which they share the values of the N and V features, Grimshaw further suggests that a functional category, but not lexical categories, can be neutral with respect to a feature. This hypothesis explains why Deg in English can head the extended projection of both A and ADV. With this hypothesis, Deg in English, being [+N,+V], can head the extended projection of both A and ADV since it is neutral with respect to a third feature that

distinguishes A from ADV[1]. In order to integrate this solution within her model, Grimshaw redefines the notion of extended projection, requiring that categories within an extended projection be non-distinct rather than identical.

In sum, Grimshaw makes two distinctions between lexical categories and functional categories:

(1) Position in the tree:- Lexical categories are [F0], while functional categories are [Fn n>0], where the value of [F] indicates their position within the extended projection, i.e., functional projections are extended projections of lexical projections but not vice versa.

(2) Feature neutrality: Only functional but not lexical heads can be neutral with respect to a feature.

While the first distinction seems stipulative since it simply mirrors the position of the different heads within the extended projection, the second distinction seems more inherent and could have wider predictions. Grimshaw herself, while elaborating on the first distinction, only comments on the second when it is required empirically.

My argument is that feature neutrality is not merely an option for functional categories. Rather, functional categories are distinct from lexical categories, not because they might be neutral with respect to some feature but because they must be neutral with respect to all features. This is what syntactically distinguishes lexical and functional categories, and all the other differences, including their relative order within the tree, are derived from this distinction. But before we discuss the benefits of this distinction, it is important to clarify in what sense functional heads are neutral with respect to a feature.

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[1] It seems that Deg is even less choosy since it can even select for nouns as in *How much money do you have?* Though I shall not elaborate on this question here, it is possible that Deg is neutral with respect to the [V] feature like D in Hebrew

Grimshaw in discussing feature neutrality suggests that the lexical head percolates its features to the extended projection. Thus, when the functional head is neutral with respect to a feature in the lexicon, this feature percolates from the lexical head to the extended functional one in the derivation. The example of A and ADV in English, suggests that the lexical head percolates its features to the extended projection, since the extended projections of A and ADV have different distributions, depending on the lexical head.[2] This sense of neutrality, which is close to the notion of underspecification employed by Hyams (1995), is used in the following section in computing the strength of functional heads.

There is, however, at least one more sense in which a head might be neutral with respect to a feature. While in Grimshaw's proposal a neutral feature which is associated with a functional head can be specified by percolation from the corresponding extended lexical head, it is also possible that such percolation be blocked. That is, when the functional head is neutral with respect to a feature in the lexicon, this feature will not surface on the extended projection by percolation from the lexical head. Empirically this would imply that in a language X, two distinct lexical categories, e.g., N and A, might have the same distribution if there is a functional category Y in that language, which is neutral in this latter sense with respect to the categorial feature which distinguishes N from A, i.e., the [V] feature. For example, in Quechua, an adjectival-noun language, there is no morphological distinction between N and A, and adjectival lexical items have the same distribution as nominal lexical items. In Chapter 4, such cases are discussed, concentrating on the distinction between nouns and adjectives in Hebrew.

The following notations are used for encoding the different senses of neutrality. In Grimshaw's Deg case, I propose to specify an "empty slot" (marked by underscore

[2] Referring to the different syntactic distribution of A vs. Adv does not exclude lexical homonyms such as *fast* which has two entries in the lexicon, both as an adjective and as an adverb.

[_feature]) for the neutral feature, rather than omitting the feature altogether, as suggested by Grimshaw[3] (See also Borer 1995.). This notation captures the intuition that what is neutral is the value of the feature, that is, the feature is underspecified. "Feature omission", i.e., no marking of the feature, is used for the second sense of neutrality, capturing the intuition that the neutral feature is actually missing and thus plays no role in the derivation. That is, the role of unspecified features is to require that specification take place. Absent features, on the other hand, can never be specified.

Empirically, an "empty slotted" feature is indifferent with respect to the value of this feature on the lexical head, just as is an omitted feature. Thus, this distinction has no effect on selection, i.e., both a head with a [_feature] and a head with an omitted feature can serve as extended heads of the same perfect projection. The difference is that when a [_feature] appears on a functional head, it supports the percolation of the value for this feature from the lexical head, rather than blocking it.[4] This is formalized in (1.):

1. **Feature Percolation**[5]

The values of features of an extended projection percolate from the lexical head under feature matching with the functional heads. Hence, when a functional head is not marked for a feature, the percolation is blocked.

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[3] In Armon-Lotem (1994), a neutral feature a-la-Grimshaw has been given the value zero (see Reuland 1985, for other uses of the 0 feature). For reasons discussed later in Section 3.2, an empty slot seems to be a more adequate notation.

[4] The percolation mechanism and the two types of neutrality, to a certain extent, resemble the explanation given in phonology for assimilation. Hayes (1986) claims that assimilation is a feature spreading from a consonant which is marked for a feature [f1] to a consonant which is not marked for that feature (I.e., it takes the default value.). Such assimilation (or feature spreading) is blocked when a consonant is already marked for that feature [f1], regardless of its value. The major difference between the two systems is in the terminology used, rather than the principles. Unfortunately, as will become clearer in Chapter 3, there is no way to assimilate the syntactic terminology to the phonological one. The other way, might still be open.

[5] Percolation might be viewed as a checking mechanism which applies when phrase markers are projected and merged, but not when merge captures movement operations. The relevance of percolation for checking is farther discussed in the next section, where percolation becomes part of the enumeration mechanism for checking.

That is, when a lexical head is marked for features which do not appear on the functional head, the features of the lexical head will not percolate to the extended projection, but when both lexical head and functional head are marked for a feature, the value of that feature on the lexical head will percolate to the functional head and then to the extended projection, filling the empty slot. Clearly, the structure will converge only as long as the features are non-distinct, and I assume that an empty slot, having no value, is non-distinct for both [+] and [-]. This formulation says nothing about perfect projections in which the projection shares all the features with the head by projection rather than percolation, i.e., it does not block projection of features from a head to its perfect projection. For example, in English, DegP headed by A will be [+f1 -f2] (where f# stands for any feature), and DegP headed by ADV will be [+f1 +f2], with Deg itself being [+f1 _f2]; but in Hebrew when D is only [+f1], DP headed by N [+f1 -f3] will be [+f1], just as DP headed by A [+f1 +f3] (See Chapter 4 for a full discussion.).

In sum, I argue that functional categories are distinct from lexical categories, not in that they might be neutral with respect to some feature but in that they must be neutral with respect to all features. There are two senses in which the features of a functional category can be neutral. On the one hand, by the "feature omission" neutralization a potential feature of a functional head is not marked on that head, i.e., omitted. In this case the value for that feature on the lexical head could not percolate to the functional head. On the other hand, by the "empty slot" neutralization, a feature is marked on a functional head with no value, i.e., with an "empty slot" [_feature], allowing percolation of the value of that feature from the lexical head. This sense of neutrality is closer to the notion of underspecification employed by Hyams (1995). The relevance of this distinction for deriving the strength of functional heads is discussed in the following section.

2.3. The computing mechanism and the PF-ban.

After a long detour, we are almost ready to replace the checking of "strong" features, with some other mechanism which avoids the need to stipulate which features are strong. The distinction between lexical and functional categories, in terms of feature neutrality, in particular "empty slot" neutrality, and the formalization of feature percolation are part of the "computing mechanism" in (2.) which enables this step:

2. **The "Computing Mechanism" for Checking of Strong Heads**

Lexical items are fully specified for all their features. Functional items are endowed with underspecified "empty-slotted" features. When a lexically headed phrase-marker and a functionally headed phrase-marker are merged into an extended projection, the extended head shares the values of the features of the lexical head. By this computing mechanism the head-features of the functional head are specified.

I call this process the "'computing mechanism' for checking of strong heads", since it offers a way to derive the value of a functional head on the strong-weak pendulum by computing the relation between specified and unspecified slots, as will be presented below.

In the derivation of a sentence, each **lexical item** is selected from the lexicon and projected into a phrase marker, **fully specified for all its features**. Each **functional item** is selected from the lexicon and projected into a phrase marker **with features without specified values**. By merge, lexical phrase markers and functional phrase markers are linked either in spec-head relation or in head-complement relation. When a lexical phrase-marker and a functional head are merged in head-complement relation they form an extended projection. In the extended projection, the extended head comes to share the values of the features of the lexical head, due to "percolation" within the extended projection. By the computing mechanism the empty slots for the head feature of the

functional head are filled. This recurs as long as the projection is being extended by functional phrase markers.

The “computing mechanism” makes use of the specified features of the lexical items and empty slotted features of the functional items without explaining how these features are identified. For the lexical items the specified features can be easily derived from the morphology of each item, but this solution does not seem to hold for functional items. Empty or filled slots on a functional item are not necessarily morphologically realized on that item, so it seems that missing, empty or filled slots can be used freely to derive the required results.

However, it seems that there is a non-stipulative way of deciding the number of empty, but existing slots, on functional items on the basis of the morphologically realized features on lexical ones. The details of such a solution are discussed Chapter 3, where it is argued on empirical grounds that the set of empty slotted features associated with a functional head corresponds to the maximal set of features which are morphologically realized on its potential extended lexical head. The set of empty slots associated with each functional head is consistent within each language but may vary across languages just as the morphology varies.

The "computing mechanism" is sufficient for filling up the empty slots, but it does not suffice for deriving the strong-weak distinction. Since the strong-weak distinction is crucial for convergence at PF, where no dangling strong features are allowed, or even for the continuation f the derivation itself (Chomsky 1995), I propose to convert this PF-ban on strong features into an output constraint --a PF-ban on fully specified empty functional heads, as in (3.):

3. **The PF-ban on empty functional heads**

When the features of a functional head are fully specified, the head needs to be associated with a lexical item.

The intuition which lies behind this PF-ban suggests that when all the slots associated with a functional head are filled, i.e., there are no empty slots, the functional head has the appearance of a lexical item and it needs to be overtly associated with a lexical item. That is, when functional heads wear "a lexical mask", they must have overt lexical content. This is what characterizes a head with "strong" features. Lexical content is achieved either by movement (V-to-T/AGR), or by lexical insertion (merge) when movement is blocked (Do-support) (Section 3.1.2). When a slot remains empty, the functional head remains as is, as was assumed at PF for heads with "weak" features. This, for example, is what distinguishes non-finite from finite forms in French. The infinitival form, having no [tns] feature, fails to fill the _tns slot of T, and no movement is triggered, while the finite form, being [+tns] marks T as +tns, and so triggers movement. Unlike French, in Italian the infinitival form is marked as [-tns], thus filling the empty slotted T, and movement is triggered.

This system seems not entirely interface driven since it seems to allow “garbage” (i.e., unspecified slots of partially specified functional heads) in the PF output. The basic intuition which lies behind the PF-ban suggests, however, that only lexical-like heads are visible at PF. This is why these heads need to be overtly associated with some lexical item. At PF, no “garbage” is left since heads with unspecified slots are not visible at that level and are, thus, ignored by the rules specified for this component.

The PF-ban is not a checking mechanism and diverges from the contemporary assumptions. Chomsky (1993) suggests that movement before spell-out is motivated by the need to check strong features before PF, whereas movement at LF is motivated by the

need to check weak features at LF. Overt movement before spell-out is not motivated by checking Because of the PF-ban,. Moreover, though checking follows each merge or movement operation, it motivates movement only at LF, as will become clearer when we discuss applications of the PF-ban in the following sections. Thus, I propose to waive the unified account for movement at all levels, in favor of two separate explanations which are inherent to the nature of each of these levels.

One major outcome of this system is that it captures the strong behavior of heads with weak or no morphology. Specifically, when a functional head initially lacks features, e.g., AgrS in Chinese, there are no slots and, hence, no slots are left empty. By the PF-ban, when no slots are left empty, the functional head has the appearance of a lexical item and must be lexically filled. This explains the unexpected strong behavior of Chinese inflection with respect to the null subject parameter.[6]

Thus, with the neutrality of functional heads, the computing mechanism and the PF-ban, it is possible to cover all parametric differences which follow from the weak-strong distinctions. In the proposed framework, these parametric differences have two sources. One source of crosslinguistic variation is in the features associated with the functional heads and marked morphologically on the lexical heads. That is, lexical categories vary crosslinguistically in their morphology, and this variation is reflected in the functional part. For example, the "featureless" AgrS in Chinese vs. the "featurefull" AgrS in Italian reflects the total absence of agreement morphology in Chinese vs. the rich and unified agreement morphology in Italian. This parametric variation is not a case of "feature omission" neutrality since there is no gap between the features of the lexical

[6] Fukui and Speas (1986) and Speas (1994) offer a different view of functional heads with no feature. Their basic idea is that these heads are missing altogether, thus allowing parameterization of the number of heads. Under this assumption Chinese (and Japanese) have no AgrS. The apparent strong behavior of the Chinese inflections is, thus, attributed to the strength of T. This option will be reconsidered in the discussion of the null subject phenomena both in adults and acquisition. For the current proposal, it makes no real difference.

head and those of the corresponding functional head to indicate that some feature of the functional head is neutral in this sense.

The second source of variation is the existence after spell-out of empty slotted features which are linked to the functional heads. That is, some features may remain "empty slotted" or underspecified after the computing mechanism has specified the value of all the features which were marked on the corresponding lexical heads. Examples are the "empty-slotted" AgrS in English whose maximal set of features is motivated by the inflections of *be*, vs. the "lexically masked" AgrS in Italian, or the "empty-slotted" T in French infinitives vs. the "lexically masked" T in French finite clauses. As suggested before only "lexically masked" heads trigger overt movement before spell-out in order to satisfy the PF-ban.

Thus, the balance between the two sources of variation is the source for paramneteric effects. With this solution, weak and strong are no longer absolute values arbitrarily determined for each head on a parametric basis in the lexicon and learned by rote. Rather, the weak and strong effects are derivative. What is determined in the lexicon are the features of each item and their values which provide full or empty slots by the computing mechanism. The terms weak and strong describe the existence or non-existence of unfilled slots for the features of a functional head after a functional item is projected and merged. Thus, this relativist definition is achieved by the computing mechanism described above. Weak and strong are not absolute values but relative derived notions, which produces a flexibility, manifested in the majority of the parameters.

Chomsky (1993) suggests, however, that each head is endowed with two sets of features: head-features and spec-features. The head-features are checked in head-head relation by an adjoined head, while the spec-features are checked under spec-head

relations. By the above definition, functional heads, but not lexical heads, are underspecified for all their non-categorial features. This is true both for the head-features and for the spec-features. For each type there is a maximal set of empty features which need specification. There is no reason to assume that both sets are equivalent. They may be equivalent as in Hebrew, where Agr is marked as [_Case], [_gender], [_number], [_person] both for its head and for its spec-features (Section 3.2.1), but they may diverge, as in German, where Agr is marked for [_person] and [_number] as head-features but also include [_Case] as its spec-feature.

The question is how these underspecified spec-features become specified and whether functional specifiers are also subject to a PF-ban. Head-features are specified by feature sharing within the extended projection, as suggested in (2.). Nevertheless, there is no way in which values of the spec-feature can percolate from the potential specifier, e.g., the subject NP in [Spec, VP], to the target, e.g., [Spec, AgrSP] or the spec-features of its head.. There are, consequently, two possible solutions. One is that the values of the spec-features percolate by spec-head agreement from the specifier of the functional head to the functional head after the specifier has been filled because of some other requirement (e.g., the *Extended Projection Principle*). Another possibility is that the values of the spec-features of a functional head are copied from the head-features of that head, and then, if required by a PF-ban, the Spec is filled. Since copying is the essence of the percolation mechanism, this last solution seems more attractive, making use of the current mechanism without introducing additional rules. That is, percolation copies features from head to head, whereas copy copies features within the same head. Moreover, the copying solution will be shown to derive the effects of the *Extended Projection Principle*, rather then presuppose it.

Under the assumption that the values of the head-features are copied onto the spec-features, three options are available. (1) If the two unspecified sets are equivalent

and the head-features are specified, all the spec-features are also specified. (2) In the same situation, if only some of the head-features are specified, this same partial set is specified for the spec-features. (3) If the sets are not equivalent and there are more spec-features than head-features, the spec-features cannot be fully specified by copying from the head-features. Nevertheless, as will be suggested for case checking, there is another way in which head-features become available, i.e., by adjoining a head with some specified feature to a head which lacks this feature. Thus, spec-features can also be specified by the features of an adjoined head. This does not change the original three options but enables specification of spec-features which cannot be specified by the head-features of that functional head. For example, it will be shown that the spec-features of Agr-head in German are specified by copying from the head-features the value for [_person] and [_number], and from the raised verb the [Case] feature.

Extending feature percolation to the spec-features leads to an extension of the PF ban. Originally the requirement was that functional heads which are specified for all their head-features, need to be associated with overt content. This is extended in a way which mirrors the main distinction between heads and specifiers, pointed out in *Bare Phrase Structure* (Chomsky 1994). There, it is argued that while the head is obligatory, being the terminal node which projects and gives its name to the projection, the specifiers are optional, marking local (but not "most local") relations between the head and other XP. In this spirit the first version of the PF-ban is extended to the spec position of functional heads, requiring that at PF, specifiers of functional heads which are specified for at least one spec-feature, need to be associated with overt lexical content. Thus, once the local relations between the head and the specifier are marked by the spec-features of the functional head (and, for this one feature is enough), spec needs to be associated with lexical content to make these relations visible at PF. This revision of the PF-ban is summarized in (**4.**):

4. The PF-ban on empty functional nodes (revised)

(i) When the head-features of a functional head are fully specified, the head needs to be associated with a lexical item.

(ii) When at least one spec-feature of a functional head is specified, its specifier needs to be associated with a lexical item.

The difference between heads and specifiers is in the number of specified features which motivate lexical filling. While for a head, the requirement is that all the features be specified with values, for the specifier it is enough that one feature is specified with value. The PF-ban can be rephrased, saying that once a specifier is projected, and this happens only when at least one spec-feature is specified, it needs lexical content. A similar line of reasoning is developed in the concluding chapter about acquisition. On the other hand, since the head is the core of the projection, it accessible at all levels, even when it has some unfilled slots and no lexical content at PF. A functional head needs lexical content only when it no longer looks like a functional head, i.e., when all its head-features are specified with values.

One question which is raised by the argument that Spec is realized only when there is at least one spec-feature which is specified for its value is what happens in a language in which a head has no spec features. There are two such cases. One is the Swedish case in which Agr has neither head features nor spec features. In this case it is not clear whether Agr has any reality at all. In fact, there might be no Agr node in Swedish. In this case, it is suggested that the subject raises to [spec, TP]. Two is the Irish case in which there are head features to Agr but no spec features. In this case Agr has no spec, and the subject, which cannot raise to [Spec, Agr], remains inside the lexical projection (McClosky 1991, 1992).

Applying (**4.**) to [Spec, AgrP] implies that whenever the value of a spec-feature of Agr is specified, by copying, [Spec, AgrP] must be lexically filled. Though this

requirement can be fulfilled by any XP, for the sentence to converge at PF, it must be the subject in order to satisfy case and agreement checking. Thus, the PF-ban entails that every IP must have a lexical subject when I is specified for the value of a spec-feature. This is usually the situation when verbs are inflected, i.e., finite, and satisfied by overt DP or by *pro* when identified and licensed, as discussed in Section 3.3.

As for non-finite verbs, when the features of Agr are usually unspecified, there is no need for an overt subject. Saying that non-finite verbs have no overt subject does not mean that they do not have a subject at all. In fact, it has always been argued that non-finite verbs have a PRO subject. The only thing that the PF-ban entails is that this PRO subject need not move out of the VP in order to enable checking of spec-features. PRO, unlike other NPs, is motivated solely by the Theta-grid, and does not take part in the checking process. Alternatively, one might assume, as Chomsky (1995) does, that PRO checks some "null case" associated with non-finite I. This possibility will be returned to in Section 3.2.3, in a discussion of some exceptional cases in which non-finite sentences have nominative subjects, suggesting that one feature, i.e., the case feature is specified.

The revised PF-ban can now account, not only for the verb movement to comp in verb second language, but also for the need to move some XP to [Spec, CP]. In the account , presented in Section 3.2, it will be argued that the head-features of C, in V2 languages, are fully specified by percolation, which triggers verb raising, when the head is not otherwise lexically filled. Thus, in general, movement is triggered in matrix but not in subordinated clauses. This is also true for the A-bar movement of a non-wh XP, occurs only in matrix, when the verb moves.

If one assumes that the specification of the head-features of C is identical in matrix and embedded clauses, the difference can be only in the spec-features. The basic idea would be that C, like I in Irish, is marked for head-features but not for spec-features.

However, while universally, the spec-features of I parameterize, C is not endowed with spec-features at all. Thus, the only way by which C can be specified for a spec-feature is by copying from a lexical head, e.g., the raised verb. Recalling that what merges with C is not just the verb but some I_V, that is, some verbal complex formed by the recursive adjunction to functional heads on its way to C, this verbal complex might be specified for more features than the verb itself. In this case, a spec-feature of the adjoined verbal complex may be copied with its value onto C. Intuitively, since the matrix C is the interface junction between the sentence and other utterances, it seems plausible that after the verb adjoins to it (overtly or covertly), it will carry all the information which is encoded by the sentence.

When C is specified for spec-features, the PF-ban motivates overt movement of some XP to [Spec, CP]. There is quite a lot of evidence to argue that it is some topic feature (Clahsen & Smolka 1985), but since it makes no difference to the argument and has no farther implications here, I have deliberately avoided stipulating the exact feature. One important factor in determining which feature it is is the assumption that in a V1 language this feature would not exist since it would be impossible to specify the value of this feature, thus, creating another widely discussed parametric difference (McClosky 1992).

The assumption that C copies its spec-features from the head that is merged with it does not entail that all lexical items have spec-features. It seems that lexical categories do have such features, whereas lexical items which constitute the functional categories are not necessarily endowed with spec-features. Thus, for example, the complementizer, might as well not have a spec-feature which can be copied to C. This stipulation may also account for the "Doubly Filled Comp Filter", as well as for violations of this filter. The underlying assumption is that universally C has no spec-features, but a spec-feature might be copied from a lexical item in C. A particular language variant might have a

complementizer which is endowed with spec-features, motivating an overt specifier in addition to the covert C.

In sum, in this section I have proposed that lexical heads are projected from the lexicon fully specified, whereas functional heads are projected underspecified, i.e., with unspecified features. Through the “computing mechanism” the values of the features of the lexical head are projected onto the empty slotted features of the functional heads. These features in turn are copied onto the spec-features of the functional head. Once features of a functional head are specified, a PF-ban requires overt content for fully specified functional heads and specified functional specifiers. This triggers merger or movement of heads and maximal projections. It also seems to capture the effects of the *Extended Projection Principle*.

In the next two chapters the proposed model is put into practice, showing the impact that this "computing mechanism" has for mapping parameters. Chapter 3 shows how the "computing mechanism" and the PF-ban capture the empirical distinction between “strong” and “weak.” This is shown for V-to-I in Hebrew, English and French (Section 3.1), for V-to-C in verb second languages (Section 3.2), for A-movement into subject position and topicalization in verb second languages (Section 3.2) and for the null-subject phenomena (Section 3.3). All the parameters in this chapter are of the relative type, while Chapter 4 presents absolute parameters, which become available by the same mechanism. The chapter concludes with a possible exception to the above generalization. Then, in the following chapters, data from early acquisition of Hebrew further support this analysis. These data suggest that though children do not always initially use all functional projections, they presuppose that the ones available are strong unless they encounter some counter evidence, a consequence derivable from the notion of "strength" proposed in this chapter.

Chapter Three -- Sorting-out Parameters (A): Relative Parameters

The former chapter offers a computing mechanism and a PF-ban in order to eliminate the stipulative notion “strong” and, instead, organically derive it, thus achieving the second aim of this work. What is still necessary is the empirical evidence that such a mechanism can really do what it claims. The purpose of the present chapter is to show how the "computing mechanism" and the PF-ban capture the empirical distinction between “strong” and “weak” and how they affect sorting out parameters . Thus, this chapter will continue and complete the discussion of the second goal and reopen the discussion on the definitions and limitations of the set of parameters, which are the subject of the first goal. This latter discussion will continue in Chapter 4.

The parameters which are discussed in this chapter are all of a single type: parameters in which the crosslinguistic differences are due to the strength of the head, e.g., the verb-second (V2) parameter, or the null-subject (NS) parameter. In line with current theory, it was indicated in Chapter 2 that strong-weak variations are not only of a crosslinguistic nature but also apply intralingual. In the proposed model, “strong” is a relative notion which is computed by comparing the set of specified features on a lexical head with the set of unspecified features on the corresponding functional head. The computing mechanism specifies the technicalities of this process. Thus, the strength of the head is always relative, never absolute, since it varies from one derivation to another, and I refer to these “strong” heads as “relatively strong” heads

and those parameters which rely on the outcome of the computing mechanism, i.e., on the “relative strength” of the head, as Relative Parameters.

In the following sections, the operation of the proposed model is shown for various Relative Parameters, for V-to-I in Hebrew, English and French (Section 3.1), for V-to-C in verb second languages (Section 3.2), for A-movement into subject position and topicalization in verb second languages (Section 3.2) and for the null-subject phenomena (Section 3.3).

3.1. Relative parameters : head-head checking

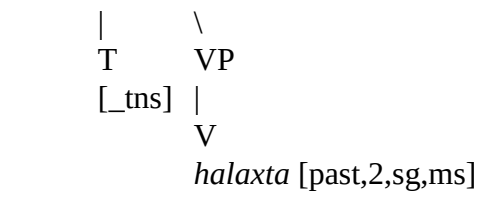
In the minimalist framework the need to check strong features is the indirect motivation for movement. It is indirect since movement (or merge) is optional; anything can move anywhere. Nevertheless, when a head does not move to check strong features, the derivation crashes at PF. Thus, indirectly, strong features trigger movement.

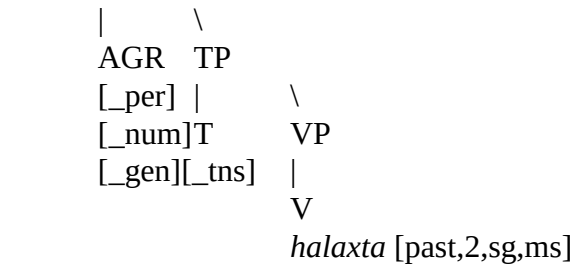
Within the current definition of the checking mechanism, this is made more explicit. The strong appearance, that is, the situation in which a functional head wears "a lexical mask" when all the slots are filled is a direct trigger for merge-α or move-α. That is, by the PF-ban, when a functional head wears a lexical mask it needs to be associated overtly with a lexical item. One of the ways to fulfill this requirement is by head-to-head movement. This will be demonstrated in the following sub-sections for Hebrew, English and French and for German, Swedish and Yiddish, verb-second languages, in Section 3.2.

3.1.1 Hebrew

In Hebrew, a Semitic language, verbs are marked for tense (present, past and future), gender (masculine vs. feminine) and number (singular vs. plural). In the past and future they are also marked for person. These inflectional categories of tense and of person, number and gender agreement, are marked by prefixes and suffixes as well as by vowels interdigited with root consonants (See more details in Chapter 7.). Thus, within the proposed model T has an unspecified tense feature, and Agr has unspecified person, number and gender features.

Verbs inflected for past and future are raised to AgrP. The derivation of the verb *halaxta* ‘you went’ will demonstrate the workings of the computing mechanism and the PF-ban. A verb like *halaxta* 'go, past, 2nd, sg, ms' is lexically marked for all its features (including, perhaps, nominative case assignment), whereas T is projected as _tns and AGR as _per, _num, _gen (Either T or AgrS or both might also be _Case). Applying "merge" to these items when projected from the lexicon forms the extended projections in (1.1.). The intermediate X’ level is not marked for any of the trees unless it is overtly motivated:

1. a.


b.


The features of the lexical head percolate to the extended heads, filling the relevant slots:

2. a. TP
| \
T VP
[past] |
V
halaxta [past,2,sg,ms]

b. AgrP
| \
AGR TP
[2] | \
[sg] T VP
[ms] [past] |
V
halaxta [past,2,sg,ms]

In this particular case all the slots are filled, giving T and, later in the derivation, AgrS the appearance of a lexical head, which triggers V-movement, checking the features of the functional heads:

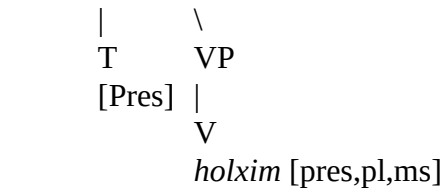
3. a. TP
| \
[$_{T}$ V T] VP
halaxta |
[past,2,sg,ms] V
t

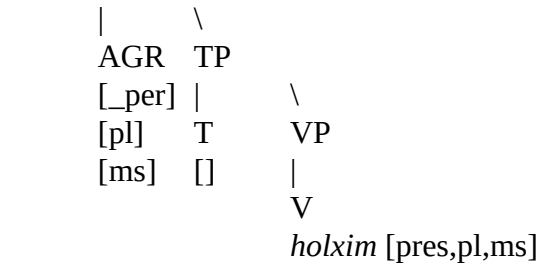
b. AGRP
| \
[$_{AGR}$ [$_{T}$ V T] AGR] TP
halaxta | \
[past,2,sg,ms] T VP
t |
V
t

The exact order of derivation is (1.a)>(2.a)>(3.a)>(1.b)>(2.b)>(3.b). That is, T is projected and merged with VP; features percolate from V, making T appear lexical; V is merged with (moved to) T, giving it a lexical content; AGR is projected and

merged with TP; features percolate from [$_T$ V T], giving AGR a lexical appearance; [$_T$ V T] is merged with AGR; giving it a lexical content.

In contrast, in a participial form, which also serves as present tense in Hebrew, e.g., *holxim* 'go, present, pl, ms,' the computing mechanism fills the empty slots of T, but Agr is left with an empty slot, so no value is specified for the person feature:

4. a.


b.


This suggests that the present participial form will move as high as T but not higher.

Recently Shlonsky (1995) has argued in a similar vein on independent grounds. He bases his hypothesis on various pieces of empirical evidence related to the distribution of the existential negative marker *eyn* optionally used for negating present participial verbs and on the distribution of the existential semi-auxiliary *haya* 'was' with present participial forms. Unlike the present participial form, which is inflected only for gender and number but not for person, both *eyn* and *haya* can also be inflected for person, e.g., *ani lo holex* 'I not go-sg-ms' vs. *(ani) eyneni holex.* In sum, though all finite verbs are raised in Hebrew, their final overt position is different.

The PF-ban, extends from head-head checking to spec-head checking and in the present context to the identification of *pro*. Borer (1995) argues that *pro* is licensed only as a specifier of a functional projection. In addition, it has been suggested that it is identified by a rich or strong head (Jaeggli & Safir 1989, Rizzi 1982, 1986). In Section 3.3, it will be argued that only lexically masked functional heads can check and identify the features of *pro* in their specifier.[1] Thus, for example, the distinctions in strength between past and present forms, which affect verb raising in Hebrew might be expected to extend to the identification of *pro.* In fact, this is precisely the case. *Pro* is licensed and identified for [Spec, AgrSP] exactly in those cases in which it is lexicalized in the past but not in the participial (present) form. Section 3.2.4. will be devoted to this issue.

3.1.2 English

While it has been argued in the previous section that in Hebrew all finite verb-forms move targets, English has always been an example of a language in which the verb never moves (Emonds 1976). This is evident from the distribution of the auxiliary verbs in English and, in particular, from the Do-support phenomenon. Ignoring for the moment the diachronic aspect of this phenomenon (Lightfoot 1991, Rohrbacher 1993), synchronically, *do* -- an expletive auxiliary verb -- is inserted in negation and yes/no questions in the simple past and present tenses.

Thus, *do* is inserted in the following schematic structures:

[1] Again, see Speas (1994) and Rohrbacher and Roeper (1995) for a similar line of reasoning. Their proposal are further discussed in section 3.3.

5. a. Negation: [$_{IP}$ Subject [$_{I'}$ I **not** [$_{VP}$ verb]]]
   b. Yes/No questions [$_{CP}$ [$_{C'}$ [$_{C}$ C I_i] [$_{IP}$ **Subject** [$_{I'}$ t_i [$_{VP}$ verb]]]]]

Pollock (1989) has observed that in these cases the verb is linearly separated from I, either by negation or by I-to-C movement (subject-auxiliary inversion). Briefly, Pollock argues that verb raising is blocked in English whenever I and V are not adjacent since the raised verb, being weak, cannot bind its trace. Thus, when the verb is not raised, *do* is inserted to support the inflectional features in I.

Alternatively, in his dissertation Rohrbacher (1993) argues on diachronic grounds that while in some languages inflectional morphemes are independent entries in the lexicon, in other languages they are generated on the verb. When an inflectional morpheme is projected independently in I, it triggers verb movement to avoid dangling morphemes, but when it is generated on the verb no movement is required prior to PF. In English morphemes are generated on the verb, and, therefore, movement is not triggered. *Do* as well as other auxiliaries are reminiscent of a time when morphemes in English were independent entries in the lexicon, thus occupying I.

Within the framework presented in this chapter, English I is endowed with the head features [Person] and [Number], as shown by the morphology of the auxiliary system, in particular *be*. Main verbs in English need not move before spell-out, since I is always underspecified for these two features. However, they must move within the LF component. The members of the paradigm of the auxiliary verb *be* move before PF since they fully specify I. This explanation captures the difference between main verbs and the auxiliary verb *be*.

There are two exceptions within the English system. One exception is verbs inflected with *-s* for singular third person in the present tense. Though these verbs seem to be specified for the relevant features they, nevertheless, do not move. A possible solution is to distinguish between a rule and a uniform paradigm (Jaeggli & Safir 1989, Rohrbacher 1993). Jaeglli & Safir (1989) characterize null-subject languages as having a uniform inflectional paradigm. Rohrbacher (1993) proposes that when the paradigm is uniform it is specified for I, but when it is only a rule, it is specified for the verb. Within the current proposal it is possible to stipulate that uniform paradigms be specified both on the head-features and on the spec-features of the verb, whereas an agreement rule be specified only for the spec-features. If this is so the features of *-s* in English are specified on the spec-features of the verb, thus, not specifying the head-features of I, and the first exception is explained.

The other exception is the status of *have* and *do*. Here the problem is reversed. The inflectional paradigms of both verbs are as limited as that of the main verb. Nevertheless, they do appear as high as I. The answer to this question is not given by the PF-ban on lexically masked functional heads. By stipulation one might suggest that when the verb cannot raise, I in English must be overt in order to bind the verb at LF. I shall not elaborate this idea any farther (See Pollock 1989 and related proposals for further elaboration.). In summary, the PF-ban explains why the main verb in English does not raise before spell-out and why *be* is raised. At the moment, an additional stipulation is required to account for the distribution of *have* and *do.*

3.1.3 French

Another example is the paradigmatic behavior of the infinitival vs. finite forms of the verb in various languages, particularly French. It has been argued (Pollock 1989, Emonds 1976) that while in English main verbs never move (or move to a low functional projection such as Asp), in French finite verbs move but nonfinite verbs demonstrate an English type of behavior.[2] Since the PF-ban predicts that head movement is triggered by a fully specified functional head, the difference between finite and non-finite forms in French should be in the features they specify on I.

As was done for Hebrew, T and AgrS will be discussed separately. Since the [tns] feature of T is left empty-slotted when the VP contains an infinitival form, the non-finite verb will never raise even as high as T (as is also the case for English infinitives). The finite form certainly raises as high as T. The question is why it raises to AgrS? To answer, we should discover which features are associated with AgrS in French and whether they are fully specified in the finite forms. Traditionally and historically, as evidenced by the written language, French verbs display a full paradigm rather than a rule. Phonetically, however, not all forms are distinct.

A partial example of the French inflectional paradigm is given in

[2] In Italian, there is a third picture in which both finite and non finite verbs seem to move. This is also explained by the PF-ban since Italian infinitives are morphologically inflected and, thus, can specify the features of Tns (and maybe Agr). Portuguese has agreement on the infinitival form (Raposo 1986 and Section 3.2).

Table 1 for the verb *chanter* ‘to sing’:

Table 1 - A partial example of the French inflectional paradigm for the verb *chanter* 'to sing.

Person	Present	Future	Past simple
1st sg	chante	chanterai	chantai
2nd sg	chantes	chanteras	chantas
3rd sg	chante	chantera	chanta
1st pl	chantons	chanerons	chantɔmes
2nd pl	chantez	chanterez	chantɔtes
3rd pl	chantent	chanteront	chantɔrent

What is apparent from this partial example is that orthographically the forms are different. Phonetically, the distinction is less sharp. In the present paradigm 2nd sg, 2nd pl, and 3rd pl, are all similarly pronounced. In the future paradigm 2nd sg and 3rd sg are phonetically homonyms, and so are 1st pl and 3rd pl. The question is of course whether the features associated with the verb are determined by the written morphological paradigm or the spoken morphological paradigm. This becomes most crucial from the acquisition perspective, to which we shall return later.

With this problem in mind Rohrbacher (1993) defines a full paradigm in a slightly different way. He does not require that all forms be distinct but rather that (i) in at least one number (singular or plural) of one tense of the verb, the person features [1st] and [2nd] be distinctively marked and (ii) in at least one person (1st, 2nd, or 3rd) of one tense of the verb, the number feature [sg] be distinctively marked.[3] Rohrbacher needs this definition to distinguish between languages with a full paradigm in which the inflectional feature have their own lexical entry, and languages with a partial paradigm in which the inflectional system is marked on the verbs. For the current work what Rohrbacher's proposal implies is that languages with a "full paradigm" mark all head-features on the verb and, thus, fill all the slots in AgrS, whereas a

language with a partial paradigm marks only some of the features, leaving some slots empty or, as stipulated for English, when the partial paradigm is a rule, it marks only the spec-features.

In French all finite verbs move, suggesting that its AgrS is strong (Pollock 1989). Rohrbacher's criterion for a full paradigm seems not to work for Spoken French though it works for the written language, as can be seen in

[3] Hyams & Hoekstra (1995) suggest that the crucial paradigm is in the plural. That is, whenever all three persons are distinguished in the plural, this will count as a "full paradigm" = "strong" Infl.

Table 1. Thus, Rohrbacher suggests that the subject clitics in French (the nominal personal pronouns) are in fact agreement morphemes, leaving a null specifier, i.e., null subject. Is this stipulation, which Rohrbacher defends by evidence from Colloquial French necessary for our argument? The answer depends on our assumptions regarding the lexical entries of verbs.

Under the assumption that grammatical paradigms are distinct from a set of rules (which might be empty) in its scope of application, it seems that a language which has an inflectional paradigm would mark the verbs for all the features which form the paradigm, whereas a language with no inflectional paradigm would not. Thus, the term partial paradigm becomes irrelevant since paradigm means marking all the verbs for all the head features in the paradigm and filling the slots of the functional heads, while a set of rules means that the verbs are not marked for these head features but rather for spec-features only, and some slots might remain empty.

Written French clearly has an inflectional paradigm and since there are no differences in verb movement between the written and the spoken language, this should apply to the spoken language, as well. The question is whether this knowledge can be acquired by children with only spoken language. The answer seems positive. Whereas a rule applies consistently everywhere, what remains of the written paradigm in the spoken language are partial paradigms which vary from one verb group to another and from one tense to another. Thus it cannot be analyzed as a rule, but rather as a set of rules, i.e., a paradigm. In accordance with the proposed assumptions, French marks all inflected verbs with a full set of features, which results, after

percolation, in fully specified functional heads, i.e., verb raising.[4] Thus, the distinction between French finite and non finite verbs is captured, as is the distinction between the position of main verbs in English and French.

The following section concentrates on the implication which the computing mechanism and the PF-ban have for Case checking, focusing on head-to-head movement in verb second languages.

3.2 The "computing mechanism" and Case checking.

While the former section discussed head-to-head movement, relying only on the agreement and tense features of I, in this section a discussion of Case theory will extend in two directions. First, Case features are considered. Second, since Case is checked within the minimalist framework in spec-head relations, the discussion will extend in this section and Section 3.3 from the head-features of the functional head to the spec-features of that head and from head movement to NP-movement, i.e., A-movement.

In the Minimalist program the requirements of Case filter (Chomsky 1981) are satisfied by assuming that nouns (like other lexical items) are selected from the lexicon and put into the Numeration with all their morphological features, including Case. This is motivated by theta-marking (Chomsky & Lasnik 1993). Next the DP moves to the specifier of some AgrP and checks the DP features of that AGR-head (including Case).

---

[4] In his proposal that subject clitics are agreement feature, Rohrbacher (1993) captures the movement, as well as making French a null-subject language. As mentioned elsewhere in this chapter, "strong" Infl tends to correlate both with verb raising and with null-subjects. This correlation and its exceptions are discussed in section 3.4.

Nominative case is checked in [Spec,AgrSP], and accusative in [Spec, AgrOP]. Thus, Case is checked under spec-head relations with a functional head rather then being assigned under adjacency by a governing lexical head, as has been suggested at least since after the appearance of *Lectures on Government and Binding* (Chomsky 1981).

In the minimalist program (Chomsky 1993, 1995) Case is checked rather than assigned. Nevertheless, since most literature on Case is written within the Government and Binding model (Chomsky 1981, 1986a), the discussion of Case in this section will use both Case assignment and Case checking. However, whenever the different notations produce different predictions, preference will be given to Case checking.

Though the Case Filter, which states that "*NP if NP has phonetic content and has no Case" (*LGB* 2.3.(6)), still underlies the current version of Case theory, other assumptions of Case theory have certainly changed. Following *LGB* the Case Filter was defined for NP-chains. In *Knowledge of Language* (Chomsky 1986b) and later in *Principles and Parameters Theory* (Chomsky & Lasnik 1993) the effects of the Case Filter are achieved by the reformulated principle of theta-marking: a chain is visible for theta-marking only if it contains a Case-position (P&P 4.3 (307)). Since the spirit of the Case Filter is kept, the original formulation is used, here.

In *LGB* and thereafter, it has always been assumed that Case assignment requires that the Case assigner is [+Case to assign]. A structural case is assigned by [-N] [+Case to assign] heads as V and P (and finite I), under government. Inherent case like the genitive is discharged from a [+N] [+Case to assign] head by a mediating [-N]

head (e.g. 'of' in English or '*shel*' in Hebrew). In some cases, Inherent cases are assigned by a [+] [+Case to assign] head without a mediating [-N] head. Thus for German, As and Ns seem to assign Case to Ns that vary in oblique Case (Dat, Gen, and even Acc). These [+Case to assign] heads clearly bear inherent case, since it varies from one lexical item to another. Thus, it seems that the crucial feature is [+Case to assign], whereas [-N] is not always required.

Within the current framework, Case features, like all other features, are checked at the functional level. Moreover, by the lexical-functional dichotomy Case, like other features, is specified with a value only on lexical heads but not on functional heads. The notation [+Case] is used to indicate that a head has a Case as part of its spec-features, i.e., it does not indicate that it either received Case or need not receive Case. For example, since only lexical heads are projected with features, V and P must be marked in their spec-features for the cases they assign, e.g., [acc], [dat], [gen], etc., whereas a functional head might have in its spec-features an empty slot for [_Case]. Marking verbs and prepositions as [+Case] in the lexicon distinguishes between those which take NP complements (transitive verbs) and those which do not (transitive verbs with CP complements and intransitive verbs). It should be possible to account for the distinction between active and passive within a theory that explains the disappearance of Case and Theta in the passive.

The implication of the above is that all cases are in some ways inherent, since some mediation is always needed. Case is always inherent since it is marked in the lexicon for each lexical item. But it is also structural, since it is always checked in the same structural configuration, i.e., spec-head relations.

One of the results of the current proposal is that language variation in the position where Case is checked (See Koopman 1984 for example), can be solely attributed to parametric variations of the functional heads which are marked as [_Case] in their spec-features. This is stated in the Case Parameter in (6.):

6. **The Case Parameter**

Languages vary as to which functional heads are [_Case], i.e.,
languages vary as to which heads can have [_Case] among their features.

Thus, Case-checking, like other checking processes, starts with a functional-lexical pair. The functional head is marked with an empty slotted Case feature. The lexical head is endowed with particular cases, e.g., *tries* has only [nom] among its features, whereas *ate* has [nom] and [acc]. Both heads are projected from the lexicon and when merged the value of features of the lexical head percolate to the functional head, filling the empty slots. One question is what happens in the infinitive where it is usually assumed that nominative case is not assigned. One solution is to associate the [_Case] feature with the [_tns] feature, in the spirit of Koopman (1984). Alternatively, and this is the solution adopted here, nominative might be associated with the verbal morphology which projects with the verb from the lexicon, similarly to ϕ-features.

Once the functional head is specified as [+Case], some DP must raise to the specifier of that head to check its spec-features. This triggers A-movement. However, whereas head movement is triggered by the PF-ban on fully specified functional heads, A-movement is triggered when there is at least one specified spec-feature, i.e., by a PF-ban on (partially) specified functional-specifiers, as was suggested in the revised PF-ban, repeated below:

7. **The PF-ban on empty functional nodes (revised)**

(i) When the head-features of a functional head are fully specified, it needs to be associated with a lexical item.

(ii) When at least one spec-feature of a functional head is specified, its specifier needs to be associated with a lexical item.

The major question is of course whether there is any empirical evidence which favor the revision of Case theory imposed by the minimalist theory and the current proposal. In order to show the advantages of the proposed framework, in the following subsections I shall discuss some of the better known phenomena which were traditionally attributed to the Case system, showing that the current model improves the explanation without loss of clarity. I particularly refer here to V2 and V1 languages in which it has been argued that nominative case plays a major role in triggering V-movement (Diesing 1990, Koopman 1984).

3.2.1 Nominative case and obligatory verb movement to Infl and Comp

Whereas the assignment of accusative case has almost never triggered wide discussion in the linguistics literature, the assignment of nominative case has always been a major issue. This section concentrates on the predictions that Case-checking under the above proposals has for checking nominative case and various phenomena related to it in the past.

For example, it has been suggested that V-to-C in V2 languages is triggered by Case requirement (Armon-Lotem 1990, Koopman 1984). As part of the ongoing research on V-movement, verb second (V2) phenomena are analyzed in terms of V-to-I-to-C (Koopman 1984, Pollock 1989). There are two possible directions of analysis.. It has been suggested either that Infl and Comp be conflated into one functional category (Haider 1985, Haegeman 1986, Koopman 1984) or that some of the features which are traditionally attributed to Infl (AGR, TNS, FINITE) be

transferred to Comp, usually on a parametric basis (Diesing 1990, Platzack 1985, Platzack & Holmberg 1989, Taraldsen 1983). In many of these accounts directionality and the assignment of nominative case play a major role as triggers of V-movement.

A different direction was taken by Rizzi (1991) who argued that the wh-criterion accounts for V2 effects. Specifically, a wh-feature triggers the movement of some XP to [spec, CP], in order to satisfy the wh-criterion. Once an XP moves to [Spec, CP], the verb has to move to C in order to avoid an ECP violation by the empty head. Though this works for residual V2 effects such as wh-questions, the solution is less satisfactory for V2 phenomena in Germanic languages. Travis (1984) gives an ECP account of the V2 phenomenon. She suggests that the ECP also be applied to base-generated empty categories. Thus, the verb moves in order to properly govern the head of IP or CP. In her account, some V2 structures are IPs while others are CPs. However, very convincing arguments against this last requirement as well as against her general approach appear in Schwartz and Vikner (1989).

The *Split Infl Hypothesis* (Pollock 1989), which takes TNS and AGR to be heads rather than features of INFL or COMP, and the concept that all languages have the same functional categories in the same order are incompatible with those approaches which transfer agreement or tense features from Infl to Comp. The question is no longer whether TNS, for example, is a feature of Comp or Infl, but, maintaining the idea that Case requirements underlie the V2 phenomena, whether [Case] is a feature of Comp, Agr or Tns.

Following the Case parameters, I adopt this latter option, proposing that any of the functional heads of the maximal extended projection of V: T, Agr or Comp can be [_Case][5]. The Case parameter refers to all Agr heads. For nominative case, it is assumed that AgrS is the relevant node. Recently, however, it has been suggested that there are no Agr nodes, in which case only T and Comp are [_Case]. In addition, I here ignore the possibility of a split-comp hypothesis, which gives us Topic and Focus as functional heads (Haegeman 1994). Each language chooses the functional head(s) to mark as [_Case] on a parametric basis. Nominative case can percolate from the lexical head, the verb filling the empty slot. Thus, when all other features are specified, the verb is overtly raised in order to satisfy the PF-ban and not in order to enable checking of nominative case. Nominative, like other features, is checked by the LF component.

The Case parameter and the computing checking mechanism generate a variety of languages. The Case parameter in (6.) suggests that languages vary with respect to the Nominative Case Checker. But it does not entail that there be only one such head. On the contrary, the Case Parameter opens the way for more than one location where

[5] For a discussion of the possible environments for nominative case assignment see Armon-Lotem (1990)

nominative case is checked. Thus, it can imply a quadripartite-parameter if we distinguish only Comp from Infl (or T, see fn. 5) and a multi parameter if we assume more functional heads. The variability which the Case Parameter gives is relevant not only for V-raising and case-checking but also for identification of null categories (e.g. *pro*), as is demonstrated in Section 3.3

Table 2 summarizes the implications of the quadripartite-parameter proposal for nominative Case checking, classifying languages into 4 major groups and predicting the word order in each of them:

Table 2 - Languages types by a Case Quadri-Parameter (with no reference to NFC)

COMP **INFL**	**[_Case]**	**no Case feature**
no Case feature	Group I: German, Dutch, Swedish, Yiddish (and maybe all V2 languages)	Group III: Japanese, Chinese (and maybe ergative languages)
_Case	Group II: Arabic	Group IV: English, Italian[6], Hebrew

As shown in Table 2, a quadripartite-parameter suggests four types of languages : languages in which only Comp is [_Case] (e.g. German), languages in which only Infl (AgrS) is [_Case](e.g. English or Italian), languages in which both are [_Case] (e.g. Arabic), and languages in which none of them is [_Case] (e.g. Japanese). The linear position of the verb depends on the position of the [_Case] feature, and its

[6] Rizzi (1982) analyzes some instances of Aux-to-Comp in Italian, as involving Case assignment from Comp, under government and adjacency. If this analysis is correct, we might want to allow the option of [_Case] Comp in Italian as a residual phenomenon (Rizzi 1991).

effects on the strength of the functional heads. Since [_Case] is a possible feature of functional categories, it adds another empty slot which needs filling, in order for the head to count as strong. For example, [_Case] Infl may count as strong only if it inherits Case, but if Infl is not specified for Case, than it needs no such specification in order to count as strong (all else being equal and assuming that all other features are specified by percolation).

Verb second languages of Group I (e.g. Swedish, Yiddish, Old French) demonstrate one type of obligatory verb movement which mainly occurs in matrix sentences: movement of the verb into Comp. In Swedish, Comp is [_Case], and it inherits the Case feature from the lexical head of the extended CP projection -- V when it is [+nom]. Ignoring for the moment the rest of the features (See Section 3.2.2.), a [+Case] Comp has the appearance of a lexical head and as such needs lexical content. In matrix sentences [V+I] is raised to Comp since it is the only possible lexical candidate. In most embedded clauses (complements or adjuncts) there is no movement at all (not even to Infl), since Comp is usually filled by some complementizer which satisfy the selection requirements of the embedder, and gives C lexical content[7].

---

[7] There are some cases, such as (i) (from Swedish), in which Comp is empty but the verb does not move:

(i) *skorna jag kopte, var mycket dyra*

the-shoes I bought were very expensive

Note that it is also possible to say:

(ii) *skorna som jag kopte, var mycket dyra*

the shoes that I bought were very expensive

This led Koopman (1984) to suggest that *som* is deleted by a PF rule, after it prevents V-movement, and enables Case assignment. Within the proposed framework, this explanation means that the PF-ban will operate before deletion. I return to this issue in Section 3.2.2, where an alternative is proposed.

Verb second languages like Yiddish and Old French form a subgroup within the first group. They also exhibit movement of the verb into Comp, similar to that of Swedish. The differences between languages like Swedish (in which the verb does not move at all in embedded clauses) and these languages (in which the verb moves to Infl in embedded clauses) emerge from the different set of features specified for Infl, and since [_Case] is not one of them, it is irrelevant here. In Yiddish, however, there are also instances of movement of the verb into Comp in embedded sentences. In most occurrences of V2 in embedded sentences, the embedded sentence is an adjunct rather than a complement. Being an adjunct, Comp is not selected, i.e., it is not associated with a lexical item and, therefore, when it is "strong" it must be lexically filled by the verb.[8] This is elaborated in Section 3.2.2.

These are the effects the Case Parameter has for movement in Group I. As for Case checking, it requires spec-head relations between the NP (i.e., the subject) and a head which is [+Case]. In this group, Case can be checked at one of the following positions: (i) At [Spec,VP], by V which is inherently [+Case], if we assume that checking is not limited to functional categories (e.g., Swedish embedded clauses); (ii) At [Spec,IP], when the verb adjoins to I, making the Case features of the V available (e.g., Yiddish and Old French); (iii) At [Spec, IP], when the verb moves to Comp via Infl (e.g., Swedish V2 clauses). The first position, i.e., [Spec,VP], is not an obvious checking position. This can be solved by assuming Chomsky's multiple-spec analysis

[8] There are cases in which an overt complementizer precedes am embedded V2 structure. In the next section, I shall argue, following Schwartz and Vikner (1989) for a double CP hypothesis.

for separating Theta and Case checking. An alternative is that the verb raises in these cases to a lower aspectual node and Case is checked there. Both these options are considered in the next section.

Languages of Group II (e.g., Arabic) have [_Case] both for Comp and for Infl. In the derivation both can inherit the Case feature from V. When all the empty slots of Infl (including [_Case]) are filled, lexical content is needed, which the verb supplies. This also satisfies the Case requirements since Case is checked under spec-head relation in [Spec,IP]. However, since the raised verb also checks the features of Infl, including [Case], there is no [+Case] feature left for Comp to inherit and Comp remains with an empty slotted feature, i.e., it is "weak" and triggers no movement at PF (e.g., Arabic SVO clauses). When some of the empty agreement slots of Infl remain empty Case might still be specified, by the Case features which percolate from V. However, since these slots are left empty, the verb does not raise and the features are not checked. Thus, the value of the Case feature, may farther percolate from Infl to Comp and fill the empty slot there. In this situation, assuming all other features of Comp (if there are any) are also specified, the verb moves via Infl to Comp giving it lexical content (e.g., Arabic VS matrix clauses). Thus, in a language like Arabic the verb is raised to Comp only when Infl is too weak to trigger verb raising.[9]

Group III consists of languages in which neither Comp nor Infl are marked as [_Case]. In these languages the Case of the subject is not checked for these heads but

[9] See Armon-Lotem (1991b) for a more elaborated discussion.

rather is checked in [Spec,VP] or a specifier of a lower aspectual projection, as was suggested for embedded clauses in Swedish. This does not imply anything concerning the position of the verb. It suggests, however, that the NP in [Spec,IP] is not necessarily nominative. Since Case is checked within the VP, it can be for any of the cases that the verb is specified in the lexicon. This seems to be the situation for ergative languages too, e.g., Georgian. Moreover, since the verb is not necessarily marked for nominative case, a language might not have such a case at all (e.g. Chinese and Japanese, where the subject is marked by some topic marker, rather than by Case marker).

In the last group, Group IV (e.g.) the [_Case] feature is only a feature of Infl. The empty slot is specified by percolation from the verb, following merge. In English where the verb does not fill all the empty slots the verb is not raised at all since Infl does not require lexical content. Nevertheless, this is only true in English for main verbs. Auxiliary verbs in English apparently move to I or are generated in I though such movement is not required by Case theory. This is accounted for by the relative strength of the auxiliary system as argued earlier in Section 3.1.2. As in English, Italian and French have no obligatory movement to Comp, but, unlike English, these languages exhibit obligatory movement to Infl. V-movement in these languages follows from the PF-ban since the all features (Case and agreement) are specified.

As suggested above, it is the head which exhibits nominative that provides variation. Thus, a quadripartite-application of the Case parameter to nominative case distinguishes four groups of languages. Similar differences might emerge from applying Case parameter to other Cases, e.g., accusative or genitive, but elaborating this option is beyond the scope of this work. Moreover, as suggested by the

differences within Group I such as between Swedish and Yiddish, the Case parameter is obviously only one factor by which languages can be classified. The following section focuses on the interaction between parameterization of agreement features and parameterization of Case features as manifested in languages from Group I, focusing on the distinction between Swedish and Yiddish.

3.2.2 Obligatory verb movement to Comp and Infl in verb second languages

Swedish, a language from Group I in Table 2, demonstrates how the Case parameter, the computing mechanism and the PF-ban account for the V2 phenomenon. Swedish is a typical example of a V2 language. It is an SVO language which shows V2 properties in matrix sentences but only rarely in embedded ones. In Swedish this phenomenon is carried to its full extent, allowing any maximal projection to occur in initial position in matrix sentences just before a tensed verbal element which appears in second position. The maximal projection might be anything from an NP to a CP including APs, ADVPs, VPs, etc. The verbal element in the second position is either a tensed main verb, a tensed auxiliary verb or even a tensed modal, all of which show the same behavior . This is demonstrated in the following matrix sentences (8.) - (10.).

8. a. *Han tveta bilen igår*
   he washed the-car yesterday
   b. *Igår tveta han bilen*
   yesterday washed he the-car
   c. *Bilen tveta han igår*
   the-car washed he yesterday

9. a. *Jag ska äta ust imorgen*
   I shall eat cheese tomorrow
   b. *Imorgen ska jag äta ust*
   tomorrow shall I eat cheese
   c. *Ust ska jag äta imorgen*

cheese shall I eat tomorrow

10. a. *Sven tvetar inte bilen, nהr han הr sj□k*
Sven wash not the-car when he is sick

b. *Bilen tvetar Sven inte, nהr han הr sj□k*
the-car wash Sven not when he is sick

c. *Nהr Sven הr sj□k, tvetar han inte bilen*
when Sven is sick wash he not the-car

As is already evident from (10.), and farther exemplified in (11.) - (13.), embedded sentences are usually introduced by a complementizer such as *som* 'that/as', *om* 'if', *att* 'that', etc. and show regular SVO order:

11. a. *Pojken som jag trהffade igר, ska dצ imorgen*
the-man that I met yesterday shall die tomorrow

b. **Pojken som igר trהffade jag, ska dצ imorgen*
the-man that yesterday met I shall die tomorrow

12. a. *Jag har tappat bצcker som du gר mig igר*
I have lost the-book that you gave me yesterday

b. **Jag har tappat bצcker som gר du mig igר*
I have lost the-book that gave you me yesterday

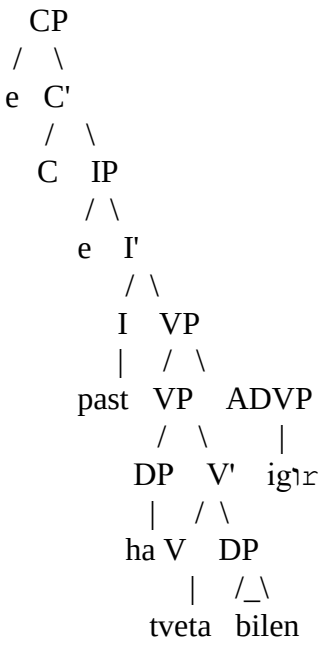
13. a. *Sven tror att han sjהlv הr sj□k*
Sven believe that he self is sick

b. **Sven tror att sj□k הr han sjהlv*
Sven believe that sick is he self

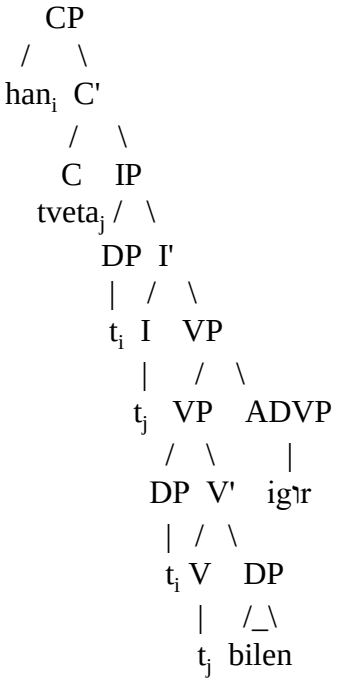
Following the standard assumption that sentences which show the V2 phenomenon are instances of V-to-I-to-C, examples (8.a) and (8.b) are both derived from the deep structure in (14.a) and have the surface structure as in (14.b) and (14.c) respectively[10].

[10] The trees are based on the X-bar model presented in *Barriers* (Chomsky 1986).

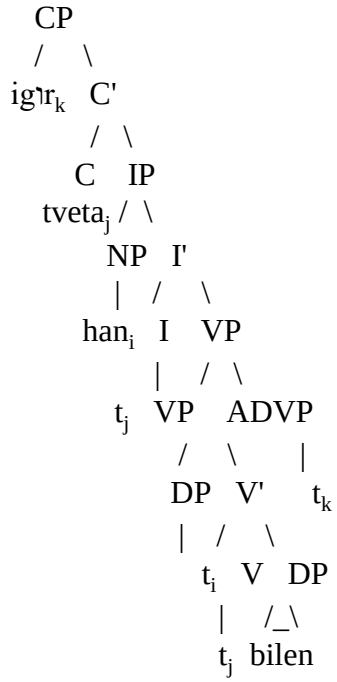
14. a. Deep-structure of (8.)



b. Surface structure of (8.a)



c. Surface structure of (8.b)



Taking Comp to be [_Case] in V2 languages, we can easily account for differences between clauses which show V2 properties and clauses which do not. As

Comp is [_Case] the Case feature of V percolates to C, specifying it for Case. Assuming that all other features, e.g., _wh, _affirmative, _finite, etc., are also specified, Comp has the appearance of a lexical head, and as such needs lexical content for the PF-ban to be satisfied. As always, there are two ways in which this requirement is satisfied:

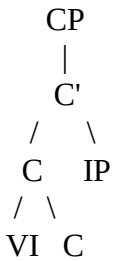
(i) Merging (or moving) a lower head into Comp, e.g., V+I or I, when it hosts an auxiliary verb or a modal (15.a).

(ii) Projecting Comp with a functional item, e.g., a subordinating coordinator or a complementizer in embedded sentences (15.b-c).

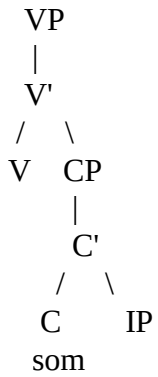
Both solutions are available in matrix and embedded clauses. Nevertheless, applying the wrong solution, e.g., projecting a subordinator in matrix clauses or raising the verb in embedded clauses, will cause a crash when checking applies, and the sentence will not converge at LF. (15.) gives sketchy phrase markers for the different options:

15. Lexical content to functional heads: C in V2 languages

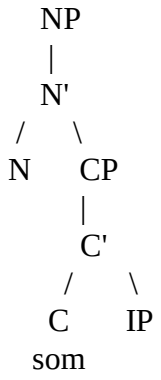
a. V-raising



b. Sentential Complement



c. Relative Clauses & N-complements[11]



These are the effects of the requirement that fully specified functional heads have lexical content. The second factor is how Case is checked, that is, the need for the DP to be in spec-head relations with the Case Checker (= a functional head which is marked for [+Case]). A head is a Case checker if it is either [+Case] by birth (e.g., V or P), or inherits this feature by percolation within the extended projection (e.g., [_Case] I or C from V [nom]) or from an adjoined head (e.g., I from an adjoined V [nom]).

Sentences (16.) - (19.) demonstrate how the value for the Case feature percolates in Swedish to enable Case checking. In matrix clauses V-to-I-to-C is operative:

16. a. *Han tveta bilen igɔr*
he washed the-car yesterday

b. *Bilen tveta han igɔr*
the-car washed he yesterday

c. *Nɔr Sven ɔr sj□k, tvetar han inte bilen*
when Sven is sick wash he not the car

In the matrix clauses in (16.) the value of the nominative Case feature percolates from V to C and movement is triggered in order to give C a lexical content as in

[11] Notice that it would make no difference, as far as the conditions on Case checking are concerned, whether the relative clause is a sister to N, an adjunct at the N' level, or an adjunct at the NP level. Thus, there should not be any differences between restrictive and non-restrictive relatives with respect to the V2 phenomenon.

(15.a). While there is no independent reason for V-to-I when VP and IP are merged, V still passes through I on its way to C, avoiding violation of strict cyclicity. The question is how and where Case is checked. Case, being a feature of C, could have been checked in [Spec,CP]. There are, however, two possible reasons why this is not so. First and foremost is because I is specified with value for the agreement spec-features. Thus, by the PF-ban, some DP, i.e., the subject, has to fill it. Had the subject moved directly from [Spec,VP] to [Spec,CP], [Spec,IP] would remain empty and the derivation will crash at PF. The second possible reason is that some other XP would raise to [Spec,IP], but then the derivation would crash at LF once checking detected a feature mismatch. Thus, the subject has to move to [Spec,IP] to fill it. The movement of V through I, makes nominative Case available for I by the trace of the adjoined V. Thus, [nom] together with the agreement features can be checked by [Spec, IP].

In the sentential complement in (17.a), C is projected with an overt functional item, *att* 'that' as in (15.b). Thus it is lexically filled, and there is no need for verb raising by the economy principle. The unmotivated V-movement in (17.b) is the source of the ungrammaticality of this sentence:

17. a. *Sven tror att Ulf är sjuk*
Sven believe that Ulf is sick

b. **Sven tror att är Ulf sjuk*
Sven believe that is Ulf sick

Nevertheless, since C is [+Case] by percolation from V, it still needs checking at LF by the verb or, as suggested by Chomsky (1995), by the verb's Case features which may move to do the checking. Thus, the same constellation in which Case is checked in matrix, is available at LF for embedded non-V2 clauses. Note that [+Case] cannot percolate to I since I is not specified for [_Case] in Swedish.

In the relative clauses in (18.) and (19.) the structure is the same as in (15.c). C is projected with an overt functional item *som* 'that/which' and the verb need not move:

18. a. *Pojken som jag trɔffade igɤr, ska dɤ imorgen*
the-man that I met yesterday shall die tomorrow

b. **Pojken som trɔffade jag igɤr, ska dɤ imorgen*
the-man that met I yesterday shall die tomorrow

19. a. *Jag har tappat bɤcker som du gɤv mig igɤr*
I have lost the-book that you gave me yesterday

b. **Jag har tappat bɤcker som gɤv du mig igɤr*
I have lost the-book that gave you me yesterday

Both subject and object relative clauses show the same distribution of V2 as sentential complements. As in the complements the verb does not move so that economy can be maintained. Examples (18.b) and (19.b) are economy violations and, therefore, ungrammatical. Case is checked by I, which obtains its Case feature by feature percolation at LF.

These examples from Swedish clearly demonstrate the distinction between overt and covert movements. As suggested in Chapter 2, overt movement has motivations distinct from that of LF movement. That is, overt movement is motivated by the PF requirement that functional heads which are specified for all their features need to be associated with a lexical item, whereas covert LF movement is motivated by the LF requirement that all uninterpretable features be checked. In Swedish, verb movement to C is motivated by the need to satisfy PF requirements. Once these requirements are satisfied, economy bans other overt movements. At LF, where all features (including Case) need checking, movement is motivated by this requirement.

Verb second languages of the subgroup of group I (e.g., Yiddish) also exhibit V-to-I-to-C, which results in V2 structures. But they also exhibit V-to-I, similar to V-to-I in Italian and triggered by the same factors, that is by the need to give lexical content to lexically masked heads. Thus, the differences between matrix and embedded clauses in languages of this type follow from the different landing sights of the moved verb, as shown in (20.) for the particle verb *avekshikn* 'send away':

20. a. *... kedei avekshikn dem briv*
... in order to-away-send the letter
'...in order to send away the letter'

b. *Ix freg zix, far vos er shikti avek ti dem briv*
I ask refl. why he sent away the letter
'I ask myself why he sent the letter away'

c. *Far vos shikti er ti avek ti dem briv*
Why sent he away the letter
'Why did he the letter away?'

d. *Dem briv shikti er ti avek ti*
The letter sent he away
' He sent away the letter'

In (20.a) there is no V-movement at all since the infinitival form of the verb has no agreement or tense features which can specify the value of these features in Infl. Thus, the infinitival form of the verb *shikn* follows the preposition *avek*. In the embedded question in (20.b), the verb precedes the preposition and follows the subject, i.e., the inflected verb moves to I but not to C. The movement to I is motivated by the need to satisfy the PF-ban on lexically masked functional heads, i.e., the need to lexicalize the finite I. When V adjoins to I, the spec- features of the complex I + V may be checked by the DP subject. When IP is merged with C, the Case feature of V percolates to C. Thus, C also needs lexical content.

(20.b) and (20.c) raise an interesting question which has been addressed in Rizzi's (1991) paper on residual verb second phenomena. The question is what distinguishes (20.b) from (20.c), that is, why is Comp in (20.b) lexically empty when it needs content as can be seen in (20.c). This question is not specific to verb second languages as can be seen in the English gloss of these examples. Rizzi (1991) suggests that the wh-criterion is satisfied in (20.b) since the wh-feature in C is licensed by selection by the matrix verb, whereas in (20.c), the wh-feature is inherent to I and is raised to C to satisfy the criterion.

The wh-criterion, however, is an LF checking requirement. Thus, the question is whether licensing by selection can qualify as a way to satisfy PF-ban and explain

the PF contrast. Moreover, any verb movement to C might take place prior to selection (depending on the mechanism) so verb movement cannot depend on selection. And last but not least, if selection is enough in embedded questions, why is it insufficient in other embedded selected non-V2 structures? Thus, it appears that selection cannot be the immediate cause. Nevertheless, selection can indirectly effect the status of C under the assumption that the requirement for lexicalized Comp can be satisfied by a null element, i.e., a null C morpheme, if this null morpheme can be licensed by the selecting head and identified in spec-head relation[12]. In the examples in (20.c), the null element is licensed by the governing head and identified by the wh-word in [Spec,CP].

Another phenomenon which calls for an explanation is the occurrence of embedded V2 clauses, in which the complementizer is followed by a non-subject XP, a verb and only then, the subject. Embedded V2 clauses are found in all V2 languages, but they differ in their distribution. They are very restricted in Mainland Scandinavian Languages, have a wider usage in Yiddish and are even more common in Frisian and Afrikaans. This is shown by examples (21.) from Yiddish, and (22.) from Swedish:

21. a *Avrom zogt, az haint vet Roxele kumen*
Avrom says that today will Roxele come

b. *Der jid vos in Boston hobn mir im gezen iz a groiser lamdn*
The man that in Boston have we him seen is a great scholar

c. *Ix bin zix mexaie, vail nextn iz er gekumen*
I am self happy because yesterday has he come

22. *Han pɪstod att den boken hade han aldrig hɜrt talas om*
He pretended that this book had he never heard about

[12] Under the above assumptions, a null element in head position obeys similar conditions to those imposed on *pro*.

However, leaving aside frequency of distribution, all one has to show is that in embedded V2 sentences C cannot be lexicalized, either overtly or covertly, unless the verb moves.

Swedish allows embedded V2 clauses only when they follow a certain class of verbs, as in (22.). These data are clearly reminiscent of the observation made by Hooper & Thompson (1973) that in English inversion is essentially possible with verbs of reported speech, e.g., *He claims that never again will he do such a thing.* The Swedish class of verbs is not that homogenous, and the possibility seems to be specified for each lexical item separately. Koopman (1984) reports that Lowenstamm (p.c.) suggests that in Yiddish embedded V2 clauses can follow the verb only when it is a factive verb, i.e., after a similar class of verbs, but this statement does not cover all the cases.

Yiddish, in fact, allows embedded V2 clauses almost everywhere as object and subject relative clauses, adverbial sentences and indirect questions as well as after the same class of verbs. Diesing (1990) suggests that embedded V2 clauses in Yiddish are IPs. On the other hand, Schwartz and Vikner (1989) argue that all V2 clauses are CPs, including, of course, the embedded ones[13]. Assuming this to be the case raises the question of the way in which these CPs differ from embedded clauses in which the verb does not move to C. Den Besten and Moed-van Walraven (1985) argue that embedded V2 clauses should be analyzed as CPs, the heads of which takes CP complements, i.e., a double CP hypothesis (See also Armon-Lotem 1990.). In line with this proposal and following the above analysis for V2 phenomena, one solution suggests itself. Since there are two CPs, there are two lexically masked heads which need lexical content before PF.

[13] For further arguments against Diesing's (1990) approach see Armon-Lotem (1990).

Why one language should make a wider usage of double CPs than another is not obvious. There are some cases when this structure is restricted to a certain class of verbs, as in Swedish, or to clauses which are introduced by a particular adverbial preposition, as *denn* 'because' in German. In these cases, the choice seems to be lexical. If double CP is a lexical choice, it may have different distributions in different languages.

Another solution might be to use the split CP hypothesis (Haegeman 1994) with similar results. The split CP hypothesis requires that the verb selects the content of higher projection, whereas the lower projection hosts the verb which is raised in order to satisfy the PF-ban. Such a solution, however, has to be able to explain why these heads are lexically filled in one language but not in another, while the lexical based solution avoids this problem. On the other hand, the split CP hypothesis might more efficiently explain relative clauses, for which the lexical account has to stipulate that the content of C, i.e., the subordinator, selects the next C.

This concludes the discussion of the verb second phenomena. In the following subsections, I will discuss further consequences of the Case parameter, focusing on the other types of languages.

3.2.3 Nominative subjects of infinitivals

In Section 3.2.2 we saw how the proposal accounts for V2 clauses in languages from group I. However, there was only a brief account for V-to-I in Italian (from group IV) and in embedded clauses in Yiddish with hardly any explanation for the movement of auxiliary verbs in English as these V-movements are not triggered by case theory but rather by the PF-ban, as discussed in Section 3.1. In this section, I return to the distinctions between finite and non-finite clauses and focus on nominative subjects in infinitivals as in (23.) from West-Flemish (Haegeman 1986) and (24.) from Portuguese (Raposo 1987):

23. [$_{CP}$ *Mee* [$_{IP}$ *ik da te zeggen*]] *hee-se dat hus gekocht*
with I that to say has-she that house bought
'Because of my saying that she has bought that house'

24. *Emprestou-me dinheiro para* [*eu comprar um casaco*]
lent-3 me money for I to buy-AGR a coat
'He lent me money to buy a coat.'

Clearly, there are other structures where nominative case is possible. For example., in Romanian NOM is possible for subjects of participial and for post-verbal subjects of infinitivals. However, since this is not the central focus of the current work, I will not attempt to account for all these cases and trust that the proposed mechanism is capable of doing so.

As argued earlier, the distinction in the position of the verb in finite and non-finite clauses emerges, in French, for example, from the absence of features on the non-finite verbal head. Since the features are not specified for the head, they do not percolate to I, leaving I "empty slotted". Thus, there is no need for the verb to raise. Since French is a language in Group III, in which I is [_Case], nominative case is checked by I regardless of verb movement. This is true for finite clauses. In non-finite forms the verb is not specified for nominative and agreement features, and I remains unspecified for Case. Therefore, Case cannot be checked on subjects of infinitival clauses and their subjects, if any, cannot be nominative as is evident from the data.

With this analysis in mind, let us turn to languages which allow nominative subjects in infinitival clauses. West-Flemish is one of these languages as the sentence in (23.) shows. As West-Flemish is a V2 language, Comp rather than Infl is [_Case]. The question is whether the non-finite verbs in West-Flemish can be identified as specified for Case. Haegeman (1986) herself shows that these infinitivals are specified for tense but not for agreement. She demonstrates that in West-Flemish some infinitivals act like finite clauses and unlike other infinitivals and allow clitic movement into Comp. In addition, she shows that the same infinitivals which allow

cliticization onto Comp also allow "tense and adverbial selection and interpretation [that] do not crucially depend on the properties of the main clause" (p. 130). Considering these findings, she argues that these infinitivals are [+TNS], just as finite clauses are. She says that they differ from finite clauses in the value of AGR; [+TNS] infinitivals are [-AGR], while [+TNS] finite clauses are [+AGR].

In our proposed framework, Case is not associated with the agreement features of the verb nor is it associated with a particular agreement head. Rather, as suggested earlier, Case and other features are associated with the verbal head, and in particular, with the verbal morphology. Thus, there is no universal syntactic or morphological reason which prevents Case from being a feature of a non-finite verb. Particularly, in West Flemish, it is argued that non-finite verbs are specified for tense but not for agreement. If this is the case, they might as well be specified for Case, especially since in this language Case is not a feature of AgrS but rather of C. Interestingly, though C is filled by the preposition *mee* 'with', the subject is not specified for the Case that the preposition can check. Rather it is specified for nominative case, which is checked by the features of the verb inside the VP or if checking is limited to functional categories, by the feature which move to I at LF. Thus, there is no need to conflate Infl with Comp, as Haegeman suggests, in order to account for this phenomenon.

Moreover, a similar explanation accounts for the Portuguese (and Spanish) infinitivals with nominative subjects in (24.) Here, too, the infinitival is a complement of the preposition *para* 'for', but the subject is nominative, unlike the ECM clauses in English. In Portuguese (group IV), Infl is [_Case]. As suggested before, in West-Flemish, a non-finite verb can be marked for nominative case. However, while in West-Flemish the verb is also endowed with tense features, in the Portuguese sentences the verb is marked with some agreement marker. Being morphologically marked for agreement, it might also be marked for Case, and a similar explanation is

available. This does not mean that Case is related solely to agreement or tense features. Rather, cases like agreement and tense are features of the verb and its morphology. Though some correlation between these features seems to play a role in some languages, it is not necessarily the case in all languages. This discussion of spec-head checking is continued in the next section, focusing on its relevance for the null-subject parameter.

3.3. Relative parameters : spec-head checking

The previous sections with the exception of 3.2.3 concentrated on head-to-head movement triggered by a PF-ban on functional heads with some allusions to A-movement which is triggered by a PF-ban on functional specifiers. In this context, head-head checking was also discussed. In this section the major focus will shift from heads to specifiers. More specifically, this section assumes the revised PF-ban in (7.), in which a specifier needs lexical content when at least one spec-feature of a functional head is specified with a value. As suggested in discussing (7.), this ban can replace the EPP with the explanation that subjects are obligatory in clauses since there is always at least one spec-feature of AgrS (or T, if there is no AgrS) which is specified with a value. Nevertheless, the PF-ban makes no distinction between partially specified spec-features and fully specified spec-features. Examining this distinction, I shall show its implication for the identification of phonetically empty specifiers, e.g., null-subjects.

In this section, the distribution of *pro* will be accounted for by the Case parameter and the computing mechanism. . Using the PF-ban on functional nodes, I will derive the notion of relative "richness" of the spec-features of AGR as relevant to

the distribution of referential *pro*. Next, I will formulate the licensing conditions for *pro* using the notion of relative "richness" and demonstrate how they account for the distribution of referential and non-referential (expletive) *pro* in Hebrew and German. This is summarized by showing how the PF-ban, the licensing conditions for *pro* and the requirements posed by the computing mechanism (for agreement and Case features), all interact to account for the correlation between word-order and null-subject in Standard Arabic.

3.3.1 The null-subject phenomena: relatively "rich" vs. relatively "poor" AGR

"Richness" and "poverty" or "strong" and "weak" of the minimalist program (1993) are derivative notions, as suggested in chapter 2. There, I suggested that the strong-weak distinction be replaced by a PF-ban on empty fully specified functional heads, which motivated overt verb movement, whereas checking motivates movement only at LF. The PF-ban was extended by a ban on specified functional specifiers in order to account for A-movement and A-bar movement.

The revised version of the PF-ban derives the "richness" and "poverty" of spec-features for triggering movement, but it appears not to derive the “richness” or “poverty” of these features as identifiers of *pro*. By the PF-ban, [Spec,AgrP] should be specified with value for one feature in order to be the target for the moved subject. It means nothing, however, for the identification of *pro.* The basic idea is that while one spec-feature is enough to trigger movement, only when all spec-features are marked with value, can a *pro* be licensed. Before we turn to the solution, a brief descriptive overview is required.

In discussions of the Null Subject Parameter, AGR has traditionally been treated as comparatively "rich" or "poor" on a morphological basis, with null subject co-occurring only with "rich" AGR, i.e., with richly or uniformly inflected verbs. This evaluation has always been done across languages. However, empirically it appears that "richness" or "poverty" of AGR cannot be an absolute value.

In Armon-Lotem (1990), I argued that the "richness" of AGR is relative within each language rather than across languages. For each language the basic content of AGR is selected out of a universal set of lexical features such as [_Case (to assign)], [_gender], [_number] and [_person]. For each of these features there is a choice of a full (uniform) paradigm or a partial (non-uniform) paradigm which is marked on the extended lexical head of AGR, i.e., the verb[14]. Though the verb is always marked as [+Case], the choice of the feature [_Case] on a functional projection is determined by the Case parameter. The set of spec-features selected for the agreement functional head constitutes the maximal set of agreement features available in the morphological paradigms of that language. When all these features are specified by copying, AGR is "rich".

For each language, constituting the maximal set of spec-features for AgrS takes into consideration the verbal agreement paradigms, while the spec-features of D (or NUM) are based on the nominal agreement paradigm. In addition, by the Case parameter, spec-features may include [_Case]. As a result, the head-features are not necessarily identical to the spec-features. Thus, a language may have a head which is "strong" enough to trigger head movement since all its head features have values but

[14] The term "uniform" is adapted from Jaeggli & Safir (1989), but see also Rohrbacher (1993) and the discussion in Chapter 8.

not "strong" or "rich" enough to identify *pro* since some of its spec-features remain “empty slotted”. Such a head is marked for all its head-features, but some of its spec-features have no value since there is no corresponding head-feature or spec-feature of the lexical head that could provide the basis for copying.

One such example is AgrS in French, in which the head-features are [Person] and [Number] and [Case], whereas the spec-features include [Gender] in addition to the head features. Thus, even when the head-features of AgrS are fully specified by percolation from the verb, the spec-features are never fully specified to allow *pro*, since [Gender] is not a head-feature of the finite verb. Similarly, in French past tense, in which the main verb in its participial form is marked only for gender and number but not for person, the verb is raised only as high as AgrPrt, as in the Hebrew *benoni*. The auxiliary verb might percolate features to AgrS, but it is not marked for gender, leaving this spec-feature of the French AgrS “empty slotted.”

The application of the same solution to Italian or Spanish, both of which are null-subject languages, faces some problems since there is no gender agreement with the subject in these languages, yet *pro* is licensed. Gender is certainly not a feature of AgrS in these languages since it is not marked by the verbal morphology. The question is whether gender is a spec-feature of AgrS. The reason for assuming that the spec-features of AgrS in French include [Gender] is that the feature [gender] is part of the participial paradigm, in which the verb in its participial form agrees with the subject in gender and number. In other Romance languages, e.g., Italian or Spanish, the participial form is not specified for gender and number. Thus, [gender] is never specified within the verbal paradigm, and [gender] is not, therefore, a spec-feature of AgrS. Thus, there is no gap between the spec-features and the head-features of AgrS

in these languages. As a result, the spec-features are fully specified with a value whenever the head features are, and *pro* is licensed whenever the verb is triggered to lexically fill the “lexically masked” AgrS.

In addition, a head which is marked with no head-features, e.g., Agr in Chinese, can serve as a "strong" head for movement, and since it also has no spec-features, none is specified by copying. But, as suggested earlier for the head-features, all features out of none are none, and this gives Agr in Chinese "rich" status. Following Fukui & Speas (1986), Speas (1994) argues that agreement heads with no features are not motivated. This means that Chinese will have no Agr head. Speas suggests that in such languages the subject is checked in the specifier of T. In this case, the spec-features of Tns must be fully specified in order to identify *pro.* Speas herself has a different account which I will return to in Chapter 8.

To summarize, when AGR is not specified for all its spec-features but only for a proper subset, i.e., when the number of spec-features which are specified by copying is less than what can be maximally specified for that language, AGR becomes "relatively poor" for identification of *pro,* as in the French example. This arises due to morphological factors, e.g., in the case of infinitival forms or participles like the Hebrew *benoni*. This means that AGR can be simultaneously "relatively poor" and "relatively rich" It may be "relatively poor" in its spec-features for identifying the content of *pro* but "relatively rich" or “strong” in its head-features to trigger head movement.

Relative richness of AGR and the Case parameter are used in formulating the licensing conditions for *pro* in (25.) Condition (i) is a condition on the formal identification of *pro*. It defines the potential site for *pro,* stipulating that it must be a Case marked position, i.e., a position of Case checking[15]. Condition (ii) is a condition

[15] This means that *pro* cannot be collapsed with PRO, unless PRO is associated with a null case.

on the content of *pro*, i.e., it defines the head which can identify the content of *pro* wherever condition (i) allows it to appear. Condition (ii) employs the notion of "relative richness", and a variant of the PF-ban on the content of specifiers:

25. Licensing Conditions for *pro*

(i) Formal identification: The Case of *pro* must be checked by the functional head X which identifies its content.

(ii) Content identification: *pro* can be identified by the spec-features of X only when X is "relatively rich", i.e., when all the spec-features of X are specified with value.

Pro is licensed only when all its features, including Case are checked by the same head, which has fully specified spec-features.

One question which is raised by these conditions is how *pro* satisfies the PF-ban on empty functional specifiers. *Pro* is used only when the spec-features of a functional head are fully specified. Nevertheless, by the PF-ban, such a specifier must be associated with a lexical item. Can *pro*, being covert, satisfy the PF-ban? How is this situation distinct from leaving the specifier empty? *Pro* satisfies the PF-ban in two ways. First, *pro* can count as a lexical content since it is projected from the lexicon. Nevertheless it is certainly not an overt lexical filling. Thus, it may play a role in Checking at LF, but it is not obvious that it is visible at PF. The PF-ban does not require overt content but rather association with some overt lexical item. This is the second way in which *pro* satisfies the PF-ban since it is associated with the verbal head (and its morphology) which occupies the head which identifies *pro*.

These conditions, have several immediate consequences. First, they eliminate the need for a null subject parameter, whether as a parameter on the nature of Infl (Rizzi 1982) or as a parameter on the licensing heads (Rizzi 1986). The difference between so called null subject and non-null subject languages follows from the fact

that AGR is "relatively rich" in the former and "relatively poor" in the latter. This is illustrated in (26.) for Hebrew and (27.) for Italian:

26. *ata/pro* *halaxta*
    2nd-sg-ms go-past-2nd-sg-ms
    'You went'

27. *io/pro parlero* *con Gianni*
    1st-sg speak-fu-1st-sg with Gianni
    'I shall speak with Gianni'

The agreement suffix *-ta* on the verb in (26.) marks all three features: person, number and gender in addition to Case. Since Agr in Hebrew is [_Case], [_per], [_num] and [_gen], all these features are specified by percolation for the head-features and automatically copied to the spec-features. Thus, *pro* is licensed by Agr which checks its Case and identifies its features. The Italian suffix *-o* on the verb in (27.) marks person and number in addition to Case so it is also "relatively rich" given the feature inventory of Italian.

Both Hebrew and Italian obviously differ from English in this respect since in English, as the gloss of (26.) and (27.) indicates, Agr is never fully specified for the values of all the features, and *pro* is never licensed. English, however, raises one problem. It was suggested earlier in this chapter that *be*, unlike main verbs in English, fully specifies the head features of I with a value, and it is, therefore, raised. The question is whether it specifies all the spec-features, too. Since there is no gender morphology in English, there is no base for assuming that [gender] makes the difference. To use Jaeggli & Safir (1989) terminology, the gap can be achieved by the non-uniformity of the head-features, if we stipulate that values can be copied from head-features to spec-features only when the paradigm is uniform. This will, of course, weaken the above proposal since an extra mechanism is added to the theory. I leave this open for further consideration.

Another consequence of the licensing conditions in (25.) is that they account for the distribution of *pro* in partially null subject languages, i.e., languages which allow pro to co-occur only with some inflections (e.g., Hebrew) or in certain environments. When a Case checking AGR is "relatively rich" *pro* can be licensed, but when this AGR is "relatively poor" (as in the Hebrew *benoni*) or when Case is a feature of Comp (as in Arabic V1 clauses) *pro* cannot be identified. An example is the Hebrew paradigm in (28.) (A similar paradigm exists in Arabic.):

28. a. *at/pro axalt tapuax*
2nd-sg-fm eat-pa-2nd-sg-fm apple
'You ate an apple'

b. *at/pro toxli tapuax*
2nd-sg-fm eat-fu-2nd-sg-fm apple
'You will eat an apple'

c. *at/*pro oxelet tapuax*
2nd-sg-fm eat-pr-sg-fm apple
'You eat an apple'

In the past and future tense examples, (28.a) and (28.b), the verb is inflected for person, gender and number, in addition to Case. In contrast, in the present tense example (28.c) (the Hebrew *benoni* participle form) the verb is inflected only for gender and number and not for person. Thus, it is "relatively poor". In (28.a) and (28.b), *pro* is licensed while in (28.c) it is not.

The first *pro* licensing condition on formal identification has a further consequence. It explains why languages such as German or Dutch, both verb second languages, in which Case is a feature of Comp rather then Infl, can have only non-referential *pro* in subject position even when their AGR is "relatively rich." The distribution of non-referential (expletive) *pro* in such languages is captured by the fact that the notion of "richness" in term of agreement features is vacuous for C. Thus, a [_Case] C can license *pro*, but as C has no agreement spec-features which can identify the content of *pro*, i.e., check its features, this *pro* can only be non-referential (expletive) since expletives do not need feature identification. We would predict that

if in some language agreement spec-features are marked on a [_Case] C, this language might have both verb second word order and referential *pro*, as is suggested for Frisian.

A similar account is valid for the distribution of non-referential (generic) *pro* in the Hebrew *benoni*, as in (29.a) or expletive *pro*, as in (29.b), where AGR is not "rich enough" to identify a referential *pro* but can license a non-referential one:

29. a. *bederex-klal* pro_{gen} *holxim la-yam ba-kayic*
usually go,pl,ms to-the-beach in-the-summer
'Usually, people go to the beach in the summer'

b. *ze/* pro_{arb} *nir'e li she hu yagia bazman*.
it seem,sg,ms to-me that he will-come,3,sg,ms on-time
'it seems to me that he will be on time'

This situation pertains since a non referential *pro* is marked with fewer features than the referential one. Consequently, there is no feature left after checking takes place.

The occurrence of referential *pro* in Old French, which was a verb second language (Adams 1987), might seem to provide counter-evidence to this proposal. A closer look at the data, however, suggests that this is not the case. In example (30.) from Adams (1987, (2b)), it was suggested by the author that the adverb *encor* 'still' is in [Spec,CP], the verb is in C and *pro* follows it in [Spec,IP]:

30. *Encor ne sai* pro_i *ou* g_i*'en doie trover*
Still not know *pro* where I some should find
'Still I don't know where I should find some'

Note, however, that the verb is preceded by the negation marker *ne*, suggesting that it never moved higher than Infl. Thus, *pro* checks [_Case] on Infl which licenses it. This, of course, requires a different account for Old French as a verb second language, but such an account is not within the scope of this work.

Based on the assumption that there is an AgrO, a separate functional head for object agreement (Chomsky 1991, 1993), allowing *pro* to be identified only by a

functional head is general enough to also account for the distribution of *pro* in object position. The objective case can be checked either by AgrO or by the verb when adjoined to AgrO (just as nominative case is checked either by AgrS or by the verb which adjoins to it). Whenever accusative case is checked by a "relatively rich" AgrO, *pro* is licensed in object position.

Considerations of when AgrO triggers overt movement and when it is "relatively rich" merit separate treatment. By the former assumptions verb movement to AgrO is triggered when all its features are specified with a value. By the Case parameter, AgrO can be [_Case] in a language. When it has a [_Case] slot which is specified with a value by the verb, the verb will raise overtly. Moreover, since [_Case] is also a spec-feature, [Spec,AgrO] is projected and the object moves, forming a checking environment. When AgrO is not associated with a Case feature, Case is checked by the verb, either within the VP or, when the verb or its features raise to AgrO, at LF for feature checking. When [_Case] is the only feature of AgrO, its specification with a value enables licensing of *pro.*

Thus, for English, we can stipulate, on a parametric basis, that AgrO is not [_Case], and since the verb does not raise overtly PF, *pro* does not appear in object position. In Italian, on the other hand, AgrO is [_Case], and this feature is specified by the value which percolates from the verb, triggering overt movement of the verb. This is also what make *pro* a possible specifier of AgrO. This *pro* is generic like the one used in the Hebrew example in (29.a). In the Hebrew example it is identified as plural by the features of AgrPrt. It is not that obvious whether AgrO is specified for this feature in Italian. I shall not offer more stipulations here but turn to a further application of the proposed model, the distribution of *pro* and verb initial sentences in Standard Arabic.

3.3.2 The distribution of *pro* and verb initial sentences in Standard Arabic

To this point, the distribution of *pro* was discussed for languages in which either C or I is marked with [_Case]. In this section, I will concentrate on Standard Arabic (SA), in which both C and I can be [_Case]. The main question, is what determines which of the two, C or I, is specified with a value for [_Case] in each derivation. In answering this question I use all the assumptions concerning the PF-ban, checking and the notion of "relative richness" as applied to spec-features.

In SA, as in Hebrew, Infl is marked for all four features: [_Case], [_person], [_gender] and [_number]. However, unlike Hebrew, C in SA can also be [_Case]. This last property serves to account for the distribution of verb initial clauses. As suggested earlier for the distribution of V2 clauses in V2 languages, verb initial clauses are always finite main clauses. Since V1 clauses cannot be embedded clauses, it is suggested that the verb raises to C in main clauses but not in the embedded ones where C has independent content, e.g., by selection. In finite main clauses, when the verb follows the subject it must agree with it in person, gender and number, but when the verb precedes the subject, it agrees with the subject only in person and gender. This is exemplified in (31.) and (32.):[16]

31. a. *l-?awla:d-u ja:?-u:*
the-boys-nom came-3rd-pl-ms
'The boys came'

b. **l-?awla:d-u ja:?-a*
the-boys-nom came-3rd-sg-ms

32. a. *ja:?-a l-?awla:d-u*
came-3rd-sg-ms the-boys-nom

b. **ja:?-u: l-?awla:d-u*
came-3rd-pl-ms the-boys-nom

This phenomenon is limited to third person (masculine and feminine), and the verb which precedes the subject takes the “default,” i.e., unmarked form. The sentences in

[16] All the sentences from SA are taken from Fassi-Fehri (1989).

(32.) seem to resemble the French use of expletive subjects, as in *Il est venu 3 jeunes filles* 'There has come 3 young girls,' where the verb is invariantly singular and agrees with the subject. Such sentences in French are used both in main and embedded clauses, whereas the SA use of verb initial clauses is limited to main clauses, suggesting that these structures are not similar. Spoken Hebrew also shows a tendency towards using the default form of the verb in verb-initial utterances. As in French, this use is not limited to main clauses. Unlike French, it is limited to unaccusative verbs, e.g., 'fall,' 'arrive,' 'broke' and the Hebrew existential auxiliary *haya* '(there) was'. In SA, all verbs can appear in this position and only in matrix clauses, so these two cases clearly differ from each other.

While in third person the verb can either precede or follow the subject, first or second person gives a different picture. A full DP subject, which is not third person, as shown in (33.a), must precede the verb which agrees with it in person, gender and number, but it can never be preceded by a partially inflected verb, as shown in (33.b). Pronouns, on the other hand, can appear both before and after the verb, but the verb has to agree with them in all three features, as in (33.c):

33. a. *?anta wa Zayd-un / ?antum / pro ji?-tum*
you-sg-ms and Zayd-nom / you-pl-ms / pro came-2nd-pl-ms

b. **ji?-ta ?anta wa Zayd-un / ?antum / pro*
came-2nd-sg-ms you-sg-ms and Zayd-nom / you-pl-ms / pro

b'. ** ja:?-a ?anta wa Zayd-un / ?antum / pro*
came-3rd-sg-ms you-sg-ms and Zayd-nom / you-pl-ms / pro

c. *ji?-tum *?anta wa Zayd-un / ?antum /*pro*
came-2nd-pl-ms you-sg-ms and Zayd-nom / you-pl-ms / pro

In first and second person, a full DP, as exemplified by the coordinated DP, and a pronoun can both precede a fully inflected verb. None of them can follow a partially inflected verb, whether or not it is the default form as (33.b') or a verb with unmarked number morphology, i.e., singular, as in (33.b). (33.c) is grammatical only when the fully inflected verb is followed by a pronoun but not when it is followed by a full NP.

One possible way to account for (33.c) is to stipulate that the postverbal position where the pronoun is found is not in A-position, i.e., not in subject position but rather in an A-bar position, cliticized to the verb. This stipulation is supported by the phonological pattern of such clauses, in which the verb and the pronoun form one unit. If it is an A-bar position, Case can not be checked there, which explains the ungrammaticality of full DPs in this position. Since this position cannot check Case, *pro* cannot be licensed there. Thus, as shown in (33.), *pro* can appear in SA only in pre-verbal position, in an A-position where its Case is checked by a "relatively rich" AgrS which identifies it but not in a post-verbal position where its Case cannot be checked by an identifying head.

This same explanation can account for the ungrammaticality of (32.b), assuming that Case, and other features cannot be checked in this postverbal position. Alternatively, the ungrammaticality of (32.b) could be analyzed as a violation of the PF-ban since nothing moves to [Spec,IP], which is required by the spec-features of I. This can also be applied to (33.c), but it does not explain what in the structure of (32.a) makes it grammatical. (31.a) and (32.a) demonstrate how the PF-ban, immediate checking and "relative richness" interact. By the Case parameter, both I and C are [_Case]. In SA, Infl is also [_person], [_number] and [_gender]. (31.a) and (32.a) mirror the two possible derivations, corresponding to the two possible choices of verbal morphology.

In (31.a) the verb *ja:?-u:* 'came-3rd-pl-ms' is marked for all the features. When VP merges with I, which is [_Case], V specifies, by percolation, all the head-features of I with values, and the values of the head-features are copied to the spec-features of I. Since all head-features of I are specified with value, I needs lexical content by the PF-ban. Since there is at least one spec-feature with value, [Spec, IP] needs lexical content by the PF-ban. The verb and the subject are raised to satisfy the PF-ban. The raised verb checks the head-features of I, and the subject checks the

spec-features of I. I can identify *pro* since it is "relatively rich", i.e., all its features are specified with a value, and *pro* can be associated with the verbal morphology, thus satisfying the PF-ban though it is covert. Thus, when [_Case] C is projected from the lexicon, no value can percolate from the verbal complex I_V, and by the PF-ban, C needs no lexical content.

In (32.a), the verb *ja:?-a* 'came,3rd,ms' is not marked with value for [number]. Thus, when VP is merged with I, there is at least one head-feature of I, which is left without value, I does not need lexical content at PF and the verb does not move. Since, by copying, at least one spec-feature is specified with value, the subject is raised to [Spec,IP]. Though the spec-features of I, i.e., person, gender, and Case, could all be checked by the subject, the subject would be left with one feature, i.e., [number], which is unchecked, so the subject cannot be *pro*. The head-features of I cannot be checked since nothing raises to I. Next [_Case] C projects from the lexicon and merges with IP. The value of the head-feature [Case], which was not checked, percolates from I to C. C, being specified for all its head-features, motivates verb-movement by the PF-ban. Thus, only when the verb is partially inflected, Case, which was not checked in I since the verb did not raise, can percolate up to C, and trigger V-to-I-to-C. When the verb is fully inflected, Case is checked at I by the raised verb, and C is left unspecified for the value of Case.

The explanation for the distinction between (31.a) and (32.a), extends to the other examples. (31.b) and (32.b) are both economy violations. In (31.b) the verb moves to I when such movement is not imposed by the PF-ban, violating economy. In (32.b) the verb moves to C when such movement is not obligatory. The account of (31.a) and (31.b) extends to the examples in (33.a) and (33.b).

To summarize this section, when the subject precedes the verb, it is in [spec, IP], an A-position, where Case is checked by a "relatively rich" AGR, so the subject can be a full NP, a pronoun or *pro*. When what looks like a subject follows a fully

inflected verb, it can only be a pronoun which appears in an A-bar position, cliticized to the verb, and coindexed with its AGR. [Spec,IP] in this structure might be filled with *pro,* though I shall not discuss this option here. When the subject follows a partially inflected verb, it can only be a full NP since *pro* cannot be identified by the Case checker nor could AGR be coindexed with a pronoun. Thus, it appears that when a language has two [_Case] functional heads, the choice between the two follows from the least effort principle (Chomsky, 1991). C is specified with value for Case only when, given I's other features, the verb need not move to I and Case, like other head-features cannot be checked. Thus, the C/I Case parameter has a price. Its application requires either some "delayed" cyclic raising or a look-ahead version of the Last Resort principle.

To restate the argument, the licensing conditions for *pro* which suggest that only "relatively rich" Case checking functional heads, i.e., heads for which all the spec-features, including Case, are specified with a value, can license *pro* account for a wide range of phenomena. They provide an explanation for the distribution of referential as well as non-referential *pro* in subject and object position. This account can even be extended to account for the occurrence of *pro* within the DP if we assume that D is a Case assigner.

These conditions might seem unable to account for the distribution of *pro* in languages in which neither Infl nor Comp are [_Case], such as Chinese and Japanese. In order to account for the distribution of *pro and* assuming that such languages lack functional heads altogether (Fukui & Speas 1986), we might need an additional licensing condition on the content of *pro,* formulated in terms of Control theory, as suggested by Huang for Chinese (1984, 1989).. Such a condition can easily be

incorporated into the above framework if we formulate the licensing conditions for *pro* as an implicational parameter with one condition for *pros* which check Case on functional heads and another condition for those which do not. On the other hand, if we assume, following Speas (1994), that these languages lack syntactically motivated agreement heads but have semantically motivated functional heads such as Tns, *pro* might be licensed by the available heads.

This section concludes the crosslinguistic discussion of ways in which the computing mechanism and the PF-ban are used in accounting for the phenomena described as relative parameters. I have shown that this mechanism can replace the stipulated strength of features as the trigger for overt movement, both for head-movement and for A and A-bar movement. A major result of this change is that in the spirit of "minimalism" checking remains an LF operation. This means that by LF all features must be checked. It does not necessitate waiting with checking till LF. At LF, however, the principle of Full Interpretation operates. This means that all uninterpretable features must be checked by LF or the derivation will crash.

All the relative parameters in this chapter made use of "empty slotted" feature neutrality with some allusion to "feature omission" neutrality. In the next chapter, this latter sense of neutrality will be used in order to account for crosslinguistic differences which have no "relative" grounds, that is, differences which do not seem to emerge from the "strong-weak" pendulum.

Chapter Four -- Sorting-out Parameters (B): Absolute Parameters

In the previous chapter we saw some examples of relative parameters, i.e., parameters for which the computing mechanism and the PF-ban determine their value. However, as noted earlier, most but not all parameters, are of this kind. Two parameters which are not relative in the above sense are presented in this chapter. These two parameters have in common the fact that their value is not relative but rather absolute. In other words, they cannot change within a language, only crosslinguistically. I call such parameters **absolute parameters** since they have only one value for each category within a language.

Of the two types of parameters, **relative** and **absolute**, relative parameters have already been discussed in the previous chapter, so in this chapter, I will limit myself to the ways in which the two types are different and review a few parameters of the second type, which might be needed for acquisition, where Kayne's antisymetry cannot explain the findings. The major support for this second type of parameter comes from early acquisition of Hebrew versus English and German, where the two types of parameters seem to be set at different phases. For example, children manifest knowledge of the base word-order of their language before they manifest effects involving checking, such as verb-raising.

Relative parameters (RELPs) and absolute parameters (ABSPs) differ qualitatively in many ways. RELPs, as conceived and developed in Chapters 2 and 3, are relative parameters, where a feature or combination of features serves to compute the strength of the functional head on a weak-strong pendulum within each language. The value of a head can be both weak and strong due to different feature

combinations, in different constructions within the same language. The strength of the head triggers overt movement to satisfy the PF-ban.

Absolute parameters, unlike relative parameters, are not relative but rather absolute properties of X^0-categories. These properties project from the lexical items and figure in the construction of X-bar phrase markers rather than being computed in the derivation. The values of these properties vary only crosslinguistically, not within a language. That is, for any given head within a language (but not for all heads) the set value is constant, and variation is expected only on a crosslinguistic basis. Examples for ABSPs are the categorial feature neutrality of functional heads, discussed in Section 4.1 and some directionality parameters, discussed in Section 4.2, which are marked for lexical as well as functional items.

While the RELPs, which constitute the majority of parameters, are consistent with the FPH since they relate to feature combination of functional items, it is less obvious that this is the case for all the ABSPs. The categorial feature neutrality of functional heads in Section 4.1 is clearly consistent with the FPH. However, directionality and selection apply to X^0-categories, which are not necessarily functional. Thus, while the FPH offers a step towards minimizing the scope of parameterization, this second type of parameters, in contrast, seems to be less restrictive, allowing non-functional parameters and possibly extending the variety of parameters. Since this problem arises only for directionality parameters, I will return to it in Section 4.2, where these parameters are discussed, showing that there is a "trade off", as usual.

4.1 Absolute parameters: feature neutrality of categorial features

In Chapter 2, feature neutrality of functional heads was proposed. There it was suggested that lexical items are specified for all their features, whereas functional items are neutral, i.e., unspecified for all their features. As mentioned there, this

proposal extends Grimshaw's suggestion that a functional category but not lexical categories can be neutral with respect to a categorial feature. This hypothesis explains why Deg in English can head the extended projection of both A and ADV. With this hypothesis Deg in English, being [+N +V], can head the extended projection of both A and ADV since it is neutral with respect to a third feature that distinguishes A from ADV. In order to integrate this solution within her model, Grimshaw redefines the notion of extended projection, requiring that categories within an extended projection be non-distinct rather than identical.

In Chapters 2 and 3, Grimshaw's proposal was extended to non-categorial features, and the term "empty slot" neutrality was coined for this type of feature neutrality which enables percolation of the values of the neutral feature from the specified lexical head to the unspecified feature on the corresponding extended functional head. Another possible type of neutrality briefly mentioned in Section 2.2 is the "feature omission" neutrality. The consequence of "feature omission" neutrality is that when the functional head is neutral with respect to a feature in the lexicon this feature will not surface on the extended projection by percolation from the lexical head.

This second sense of neutrality is used in this section for neutralizing categorial features of functional heads on a parametric basis. This parameterization is of the absolute type since it cannot vary within a language and, as has been suggested for such parameters, is projected with the functional item from the lexicon rather than being computed in the derivation. This "Feature Neutrality Parameter" was previously discussed within an earlier syntactic framework (Armon-Lotem 1994).

The Feature Neutrality Parameter (FNP) was conceived in order to account for crosslinguistic variation in the syntactic inventory of lexical categories. For example, in Quechua, an adjectival-noun language, there is no morphological distinction between N and A and adjectival lexical items have the same distribution as nominal

lexical items. Mandarin Chinese, an adjectival-verb language, does not distinguish A and V (Schachter 1985). A more extreme case is Tagalog which seems to have just one single open class and makes no distinction between N, V, and A (Gil 1992).

In addition to accounting for these clear cut cases, the FNP attempts to account for instances of "mixed behavior" of lexical categories. For example, in Hebrew the two categories, noun and adjective, are non-distinct in some ways but distinguishable in others. Adjectives are morphologically marked with nominal agreement for gender and number. They can be extended lexical heads of DPs, occurring in the construct-state, which is limited to nouns (Berman 1978, Borer 1984).[1] Hebrew adjectives are, however, distinct from nouns since they can head both DPs and DegPs, while nouns can head only DPs. Moreover both nouns and adjectives as heads of DPs can be used wherever DPs are used, either in subject or object position, but only nouns can be used when D is absent in a bare form. This will be discussed in detail in Section 4.1.1.

"Mixed behavior" such as that of adjectives in Hebrew poses a problem for any attempt to parameterize the inventory of lexical categories across languages. One possibility in line with the subset principle (Manzini & Wexler 1987) would involve hierarchical ordering of lexical categories across languages. This parameter, as in (1.), distinguishes between languages such as Quechua, Mandarin Chinese and Tagalog which seem to have an inventory of lexical categories syntactically different from that of languages like English

1. Hierarchy of Lexical Categories

   N > V > A > Adj

[1] One might think of other categories in Hebrew, such as numerals and universal quantifiers which also observe these criterion. Since this work does not defend the view that nouns and adjectives are one category in Hebrew (Gil p.c.), the argumentation does not require that numerals and universal quantifiers form one category with either adjectives or nouns or both.

By the FPH, such a solution is undesirable in principle since it extends parameterization to all lexical items rather than restricting them to functional items and features. Moreover, the parameter in (1.) extends the form parameters take by allowing the absence of some categories rather then just referring . Such a solution is contrary to the goal of restricting the form of parameters. In addition to these theoretical reservations, this parametric solution does not capture the actual differences between languages with adjectival-verbs and languages with adjectival-nouns as well as failing to account for the "mixed behavior" of adjectives in a language like Hebrew.

The FNP attributes these phenomena to the existence or absence of certain categorial features on the corresponding extended functional heads, i.e., the functional heads of the extended projection, rather than the existence or absence of particular lexical categories. By the FNP, as discussed below, the feature in question is omitted in order to achieve this neutrality. The FNP -- being an absolute parameter which varies only crosslinguistically, not within a language -- is an ABSP. The essence of the FNP is that once a feature is omitted the functional head can still head the extended projections of lexical heads which are marked for this feature, regardless of its [+/-] value. Moreover, the value of this feature, if present on the lexical head, cannot percolate from it to the head of the extended projection and give the illusion of non-distinct lexical categories in a particular language.

As mentioned in Section 2.2, the idea of feature neutrality of functional categories in order to account for partially non-distinct lexical categories was first raised in Grimshaw's *Extended Projections* (1991). Grimshaw suggests that a functional category can be neutral with respect to a feature on the basis of feature omission. Thus, Deg in English, being [+N +V], can head the extended projection of both A and ADV since it is neutral with respect to a third feature that distinguishes A from ADV.

Grimshaw's analysis of non-distinct behavior of lexical heads holds as long as a language syntactically distinguishes all lexical categories as English distinguishes N, V, and A.[2] It is less obvious how this analysis works for languages in which the syntactic distinctions between the lexical categories are not as sharp as in adjectival-noun or adjectival-verb languages. An even more serious problem for Grimshaw's account of functional categories is the "mixed behavior" of adjectives in Hebrew.

The Feature Neutrality Parameter in (2.) and the mechanism for feature percolation which is formalized in Section 2.2 and repeated in (3.) solve this problem while accounting for the crosslinguistic variation in the syntactic inventory of lexical categories. Extending Grimshaw's proposal to all functional items makes it possible for the [N] and [V] features to restrict the functional item's ability to serve as the head of an extended projection of a lexical head. A language like English, which syntactically distinguishes nouns as [+N -V], verbs as [+V -N] and adjectives and adverbs as [+V +N], makes the same distinction among functional items, i.e., full specification of [±N, ±V], as suggested by Grimshaw. But, as the Feature Neutrality Parameter in (2.) states, in a language in which two or more lexical categories are syntactically non-distinct, the relevant functional heads are neutral, by "feature omission" with respect to one or more features, specifically one of the [N,V] features:

2. **The Feature Neutrality Parameter**

Functional heads might be neutral with respect to one or more categorial features. This varies crosslinguistically.

3. Feature Percolation

The categorial features of an extended projection percolate from the lexical head under feature matching with the functional heads. When a functional head is not marked for a feature, the percolation is blocked.

[2] Though the features [N] and [V] potentially yield four distinct categories, I refer only to nouns, verbs and adjectives, since Grimshaw (1991) suggests that prepositions --the fourth category-- are a functional rather than lexical category.

The Feature Neutrality Parameter in (2.) and the mechanism for feature percolation in (3.) specify for categorial features the generalization made about the nature of functional categories in Section 2.2. Feature neutrality is absolute and does not change within a language. Thus., it is an ABSP which is effective in projecting the lexicon into phrase markers since the feature in question is omitted in the lexical representation in order to achieve this neutrality, and its value never changes within the derivation. Even though a feature is omitted on a functional head, the functional head can still head the extended projection of a lexical head which is marked for this feature, but this feature cannot percolate from the lexical head to the extended projection.

Thus, a [+N -V] functional item (e.g., D in English) will only head the extended projection of N, while a functional item which is [+N] with no specification for the [V] feature (e.g., D in Hebrew) may head the extended projection of both N and A. When no functional items in a language are marked for the [V] feature, the distinctive feature is [N], and nouns and adjectives are syntactically non-distinct. In such a case, the language appears to have just nouns and verbs, syntactically, and the nouns function both as nouns and adjectives. This applies to adjectival-noun languages such as Quechua. When no functional items are marked for the [N] feature, [V] is the distinctive feature, adjectives and verbs are non-distinct and the result will be similar; only nouns and verbs will be manifested. But in this case, the verbs will function both as verbs and adjectives, as in adjectival-verb languages such as Mandarin Chinese. When no functional items are marked for either [N] or [V] features, the language is characterized as having just one lexical category, i.e., one open class such as Tagalog[3].

[3] Neutralization in Tagalog means that both N and V can be inflected for aspect, and both can receive case. It is important to note, however, that there is a closed class of items which appear in first position and do distinguish N from V (Gil 1992, Schachter & Otanes 1972).

Parameterization of the features of the functional categories allows semantic, pragmatic and even morphological distinctions between different lexical categories in any language, but it also predicts similar syntactic behavior when functional items are category-neutral with respect to one or more features. This does not mean that it is always possible to identify which of these domains is responsible for each phenomenon. FNP only enables two categories to have the same syntactic distribution when they are otherwise distinct in their morphological, semantic and pragmatic behavior. Thus, for example, Tagalog, which syntactically permits any open class item both as the head of a nominal phrase and as its modifier, would still rule out phrases which are pragmatically unacceptable. The mixed behavior of Hebrew or Mojave results from the availability of the [V] or [N] feature, respectively, for some of the functional heads but not for all. In, Table 1 these predictions of the feature neutrality parameter are indicated for Hebrew as **no [V] & [±V]**, since D is marked only for the [N] but not for the [V] feature selecting for both NPs and APs, whereas Deg is marked for both features and being [+N, +V] it selects only for adjectives. Similarly, for Mojave the mixed behavior is indicated by **no [N] & [±N]**.

Table 1 -- Mapping of Languages by the Feature Neutrality Parameter

	no [N] feature	**[±N]**	**no [N] & [±N]**
no [V] feature	One lexical category e.g., Tagalog	Adjectival noun language, e.g., Quechua	
[±V]	Adjectival verb language, e.g., Mandarin Chinese	3-4 lexical categories, e.g., English	Mixed behavior verbal adjectives, e.g., Mojave
no [V] & [±V]		Mixed behavior nominal adjectives, e.g., Hebrew	

As suggested earlier, in order to integrate this solution within Grimshaw's model we would have to use Grimshaw’s redefinition of extended projection suggested for Deg and A, which requires that categories be non-distinct rather than

identical. However, using the percolation mechanism in (3.) the mismatch between the features of the lexical head and the features of the functional head within the same extended projection raises the question of which features percolate to the extended projection. In the case of "empty slot" neutrality, as in the example of A and ADV in English, the lexical head percolates its features to the extended projection. This is evident since the extended projections of A and ADV have different distributions, depending on the lexical head.[4] This is **not** the situation in our case. Here, and this is most important, the extended projections have similar if not identical distributions even though the lexical categories are different. If the extended projections are non-distinct, their categorial features must percolate from the functional head rather than from the lexical head. This is one of the characteristics of "feature omission" neutrality.

Thus, neutralization of functional categories in our case seems to be different from that suggested by Grimshaw for Deg since in the latter case the features of the lexical head do percolate to the extended projection. The Hebrew case of neutralized categories and the proposed solution diverge significantly from Grimshaw's case. The "empty slot" neutralization which is accurate for Grimshaw's case is similar to Hyams' (1995) "underspecification," whereas in "feature omission" neutralization as in the Hebrew D case the neutralized feature is absent on a parametric basis. These distinctions have already been discussed in Chapters 2 and 3. The empirical advantages of "feature omission" neutrality for the current problem will be discussed in the following section.

4.1.1 The feature neutrality of D in Hebrew: nominal behavior of adjectives

Neutralization phenomena are probably to be found in any language. The question, however, is whether these are sporadic or habitual phenomena. In English, for example, names such as *Richard the Third,* or *Napoleon the Great* might suggest

[4] Referring to the different syntactic distribution of A vs. Adv does not exclude lexical homonyms such as *fast* which has two lexical entries, as an adjective and as an adverb.

that D in English can also be neutral. However, since this structure is practically limited, it seems to me that the correct analysis here would involve some empty nominal head. Similarly, adjectives are used with a determiner in proverbs, such as, *the rich get richer*. But these are frozen limited forms rather than a wide spread productive system as they are in adjectival-noun languages or even in mixed languages like Hebrew.

Hebrew adjectives, as mentioned earlier, show some nominal behavior which exemplifies the implications of the Feature Neutrality Parameter. I shall argue that in Hebrew (but not in English) D is only [+N] with no marking for the [V] feature, while Deg is [+N, +V]. This will account for both the similarities and differences in the distribution of nouns and adjectives in Hebrew. While the V feature of D is neutralized by omission, it is not obvious that this is also the case for the other nominal functional heads, e.g. Num (Ritter 1991) or AgrGen (Siloni 1994).

Hebrew adjectives are morphologically marked with nominal agreement for gender and number, and they have similar syntactic distribution to nouns in that they can be extended lexical heads of DPs. They can also occur in the construct-state (Section 4.1.2), which is traditionally limited to nouns (Berman 1978, Borer 1984). These similarities are not semantically motivated nor are they limited to particular adjectives. On the contrary, the similarities as well as the differences which are discussed below apply to all adjectives and nouns with hardly an exception.

In spite of the large number of similarities, Hebrew adjectives do not have the same distribution as nouns. Morphologically, although they use the nominal inflectional system to mark gender and number, adjectives are different from nouns when derivations are considered. One derivational suffix which can be attached only to nouns but not to adjectives is *-i*, a form which derives adjectives from nouns, e.g., *yeled* 'boy' + *-i* = *yaldi* 'child-like,' *sifrut* 'literature' + *-i* = *sifruti* 'literate,' but

xaxam ‘clever + *-i* = **xaxami* ‘clever-like,’ *arum* ‘naked’ + *-i* = **arumi* ‘naked-like’.[5] These examples crucially support the proposal that nouns and adjectives are of two different lexical categories and that the similarities are at the functional level rather than in the lexical system.

Syntactically, Hebrew adjectives are distinct from nouns since they can head both DPs and DegPs, while Ns can head only DPs. For example, both nouns and adjectives can be used as arguments, e.g., as subjects, in the heads of DPs, i.e., when D is overt, as in (4. a). But, as (4. b) suggests, only nouns can be used when D is covert:

4. Subject position:[6]

a. *ha-yeled rakad / ha-tipesh rakad / ha-yalduti rakad*
the-child danced / the-foolish danced / the-childish danced

b. *yeled rakad / *tipesh rakad / *yalduti rakad*

(a) child danced / (a) foolish danced / (a) childish danced Likewise, nouns and adjectives, as heads of a DP and only as heads of DPs, have a similar distribution to noun modifiers in (5.), and modified heads in (6.):

5. Noun-modifier position:
a. *ha-talmid ha-yeled rakad*
the-pupil the-child danced
'The childish/child pupil danced'

b. *ha-talmid ha-tipesh/ ha-yalduti rakad*
the-pupil the-foolish/the-childish danced
'The foolish/The childish pupil danced'

---

[5] One exception to this rule is when *tipesh* ‘fool’ + *-i* = *tipshi* ‘foolish’. But in this case ‘fool’ is used only for [+animate], e.g., *yeled tipesh* ‘a foolish boy’, whereas ‘foolish is used for [-animate], e.g., *sefer tipshi* ‘a foolish book’. Ravid and Schlesinger (1987) found in a journalist corpus that out of 336 adjectives ending with *-i*, only 4 were derived from an adjectival base, suggesting again that this process morphologically distinguishes nouns from adjectives.

[6] Though all the examples in this section are of adjectives which are appropriate for animates, usually people, similar findings are found for inanimate adjective, e.g., *zarakti et ha-shvor la-pax* ‘I-threw the-broken (one) to-the-dustbin’.

6. NP-head position:

ha-tipesh ha-talmid rakad vs. **tipesh talmid rakad*
the-foolish the-pupil danced (a) foolish pupil danced
'The pupil(ish) fool danced'

Examples (4.) through (6.) show that the only restriction on the use of adjectives as arguments is that their extended projection must be a DP (headed by the definite article *ha-* 'the'). This means that we need to allow for both [+N -V] XPs and [+N] XPs to satisfy the subcategorization requirements of verbs like ‘dance,’ which subcategorize for a [+N -V] subject. This is easily achieved if we require that the features be non-distinct rather than matching. That is, only the features which appear on the extended projections are checked. When there is a mismatch for these features the structure collapses, but when these features match (regardless of other features of the lexical head) the structure converges (I.e. it satisfies subcategorization requirements, c-selection, canonical Theta-role assignment, etc.). Since only lexical heads subcategorize and select functional heads (and categories) (Grimshaw 1991), this mechanism remains fairly restricted.

Another apparent problem is the status of a noun which is not preceded by a definite article, e.g., *yeled* 'child' in (4. b). It is questionable whether the assumption that adjectives are just APs rather than DPs when there is no overt marking of a nominal functional head D can be extended to NPs. This is certainly not a standard assumption nor is it assumed here. Alternatively, if a null D is allowed for nouns, then in principle adjectives could also have a null D, so one would need a stipulation with respect to the value of the lexical items, i.e., *ha-* being [+N], while *0* determiner is [+N -V].

This problem and the resulting stipulation are avoided since by default the extended projection of NP is DP, and the extended projection of AP is DegP. Thus, in (4. b), *yeled* 'child' is a DP while *tipesh* 'foolish' or *yalduti* 'childish' are DegPs. Extending an AP to a DP is the more marked option and, as such, should be realized

at PF (See Rienhart 1995 for a similar use of the notion of markedness.). This is why the only restriction on the use of adjectives as arguments is that their extended projection must be a DP headed by the definite article *ha* 'the.'

While in Hebrew, as noted, D is only [+N], Deg is [+N +V]. Thus, only adjectives but not nouns can head DegP, as shown in (7.). As a result they have a different distribution though semantically they are identical. (7.a & b) give examples of the comparative use of adjectives where the degree marker can precede and follow the adjectival head. (7.c) is an example of the superlative use of adjectives. In each of these pairs the untagged example involves an adjective which is replaced by a noun in the ungrammatical tagged examples:

7. Degree Marked Modifiers:[7]

a. *(ha-)talmid (ha-)yoter yalduti / tipesh rakad*
the-pupil the-more childish / foolish danced
'The more childish/foolish pupil danced'

a' **(ha-)talmid (ha-)yoter yeled rakad*
the-pupil the-more child danced
'The more childish pupil danced'

b. *(ha-)talmid (ha-)yalduti / tipesh yoter rakad*
the-pupil the-childish / foolish more danced
'The more childish/foolish pupil danced'

b'. **(ha-)talmid (ha-)yeled yoter rakad*
the-pupil the-child more danced
'The more childish pupil danced'

c. *(ha-)talmid (ha-)yalduti / tipesh be yoter rakad*
the-pupil the-childish / foolish in more danced
'The most childish/foolish pupil danced'

c'. **(ha-)talmid (ha-)yeled be yoter rakad*
the-pupil the-child in more danced
'The most childish pupil danced'

[7] Hebrew adjectives have four values. In the simplest form, as shown in all examples, it can be replaced by a noun. Similarly, for assimilation both nouns and adjectives are possible options, e.g., *ha-yeled matok kemo sukar* 'The child is sweet as suger' and also *ha-yeled talmid kmo axiv* 'The child is a pupil like his brother'. But in the other two values, comparative and superlative, both of which make use of Deg, nouns are not a grammatical option as shown in (7.).

A noun, being [+N -V], cannot head a DegP since its features conflict with those of Deg and therefore with those of DegP [+N +V], and the structure will crash. This conflict does not occur with adjectives.

One last interesting case is the use of definite degree marked adjectives in argument position, e.g., in subject position as in (8.):

8. Degree Marked Arguments

a. *ha-yoter yalduti / tipesh rakad*
the-pupil the-more childish / foolish danced
'The more childish/foolish pupil danced'

a' **(ha-)yoter yeled rakad*
the-pupil the-more child danced
'The more childish pupil danced'

b. *ha-yalduti / tipesh yoter rakad*
the-pupil the-childish / foolish more danced
'The more childish/foolish pupil danced'

b'. **(ha-)yeled yoter rakad*
the-pupil the-child more danced
'The more childish pupil danced'

As the examples in (7.) show, only adjectives can function as heads of a DegP. Moreover, as can be seen from comparing (7.a) and (7.b), "real" adjectives, i.e., those used as modifiers, can precede or follow the degree marker. Example (8.) gives further evidence that adjectives are a separate lexical class in Hebrew.

The data support the assumption that D has no V-feature. Whether this type of neutrality is to be extended to all nominal functional heads in Hebrew is an empirical question which is addressed below. Some type of neutralization seems to be necessary, at least for NUM, in order to account for the nominal plural marking of Hebrew adjectives. The use of adjectives in the construct state in Hebrew helps us to answer this question.

4.1.2 Hebrew adjectives in the construct state

Crucial evidence for the nominal behavior of adjectives in Hebrew is their distribution in the construct state (*smixut)* where only nouns are assumed to be possible both as the head (*somex*) and specifier (*nismax)*. The construct state in Hebrew has three forms: bound genitive as in (9.), free genitive as in (10.) and double genitive as in (11.) (Berman 1978, Borer 1984, Ritter 1991):

9. Bound Genitive:
   bney (ha-)melex
   sons-gen (the-)king
   'The king's sons'

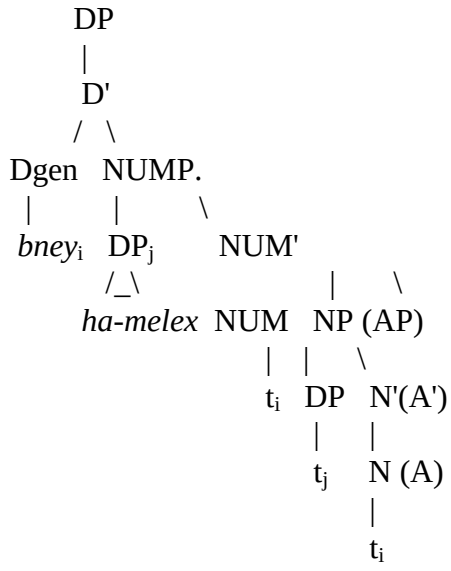
10. Free Genitive:
   (ha-)banim shel (ha-)melex
   (the-)sons of (the-)king

11. Double Genitive:
   banav shel (ha-)melex
   sons-gen of (the-)king

The structure of the three forms (from Ritter 1991) is given in (12.) for the bound genitive, (13.) for the free genitive and (14.) for the double genitive. In this analysis, NUM is associated with plural morphology, D with the definite article as well as the genitive morphology (Dgen) and K with the genitive case marker *shel* 'of' as well as with other case markers, i.e., the accusative *et*.

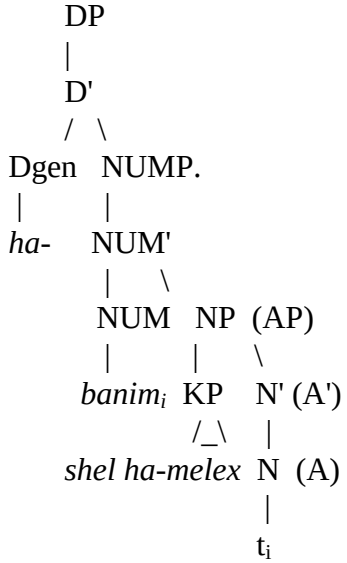
Ritter argues that in the bound genitive the nominal head of the construct state is raised via NUM to Dgen where it checks the genitive morpheme whereas the DP specifier of the NP, which modifies the head moves to the specifier of NumP.:

12.



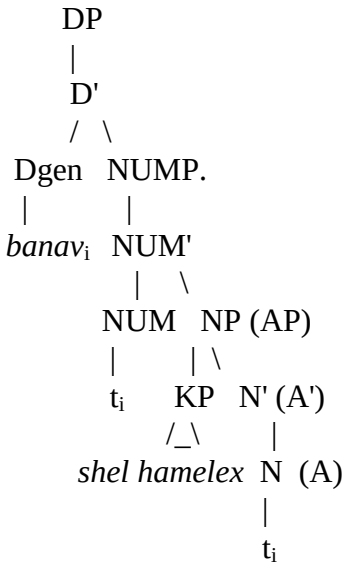
In the free genitive, the nominal head, having no morphological marking for genitive, moves only as high as NUM, and the modifier in [Spec,NP] does not move at all. Therefore, the case of the specifier cannot come from Dgen, and is overtly manifested by *shel* 'of',' forming a KP. Dgen, itself being free of the genitive marking, can host the definite article.

13.



In the double genitive, the nominal head is raised to Dgen to check the genitive feature, but the modifier in [Spec,NP] need not move since it is already marked by *shel* 'of'' within the KP.

14.



As mentioned above, it is generally assumed that only nouns can constitute both the head (*somex*) and the specifier (*nismax*), in all three forms[8]. Yet, Hebrew adjectives can serve as heads and as specifiers in the construct state. One such class is semi-lexicalized forms (in which the head modifies the specifier), as in (15.):

15. a. *tovat mar'e*
good-gen look
'Good looking'

b. *arox raglayim*
long-gen legs
'Long legged'

But Hebrew adjectives can also occur in such constructions in non-lexicalized contexts. The examples in (16.) to (18.) show that adjectives are licensed whenever there is overt evidence for a DP, i.e., when used with the definite article *ha* 'the' (the functional head D), in the plural form (due to the functional head NUM), with the case marker *shel* 'of‘ (the functional head K for Kase) or in the bound form --a Dgen (the functional head D with a genitive marker). Nevertheless, there are at least two cases (in 16.a and 18.a), where this generalization allows lexical exceptions.

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[8] Berman (1978) uses the term "adjunct" for the *nismax*. Since the term "adjunct" implies a specific structure within the current framework, and in addition this position is analyzed by Ritter (1991) as occupying [Spec,NP], I refer to it in this chapter as a specifier.

16. Bound Genitive with Adjectival Head (a.)
and Adjectival Specifier (b. and c.)

a. *Yefat (ha-)kita / *yalduti (ha-)maxzor*
beautiful-gen (the-)class / childish-gen (the-)year group
'The class beauty' / 'The childish one of the year group'

b. *bigdey *(ha-)xevruti*
clothes-gen (the-)friendly
'The friendly person's clothes'

c. *bigdey xevrutyim*
clothes-gen friendly-pl
'Friendly people's clothes'

17. Free Genitive with Adjectival Head (a. and b.)
and Adjectival Specifier (c.):

a. *ha-yafa shel ha-kita / ha-yalduti shel ha-maxzor*
the-beautiful of the-class / the-childish of the-year group
'The beauty of the class'/'The childish one of the year group

b. *?ya`fa shel kita / ?yalduti shel maxzor*[9]
beautiful of class / childish of year group
'A beauty of a class' / 'A childish one of a year group'

c. *(ha)-begadim shel (ha)-xevruti*
(the-)clothes of (the-)friendly
'The clothes of the friendly person'

18. Double Genitive with Adjectival Head (a.) and Adjectival Specifier (b.):

a. *yafata shel (ha-)kita / *yaldutiyo shel (ha-)maxzor*
beautiful-gen of (the-)class / childish-gen of (the-)year group.

b. *begadav shel (ha-)xevruti*
clothes-gen of (the-)friendly

The above examples once more provide evidence that the overt manifestation of nominal functional heads is what enables adjective to function within the construct state. It is possible to argue that adjectives are licensed in the construct state only when they have a generic interpretation regardless of their structure. It seems, however, that generic interpretation is achieved whenever nominal functional categories constitute the extended projection of these adjectives, i.e., when they are DPs and not elsewhere.

[9] Question marks are used wherever judgments vary.

Using Ritter's (1991) account of the structure of construct state in Hebrew together with the above hypothesis that D has no V feature, we can account for these facts and see how far the feature neutrality extends. Before there is still one more problem which neutralization raises with respect to head-to-head movement. The problem is how head-to-head movement applies when there is no perfect feature matching between the heads. If head-to-head movement is by adjunction (Deprez & Pierce 1994), this is not a problem since feature matching is not a constraint on adjunction. But it is questionable whether a lexical head can substitute into a functional head when there is no perfect feature matching between the two. If substitution is limited by perfect matching, it blocks head movement completely when a lexical head is marked for a feature which does not appear on the functional head.

To argue logically, if feature matching is required, an adjective can never move to D by substitution. If we extend feature neutrality by omission to all other nominal categories, the adjective will never be able to move, and since the features of these categories will not be checked, the derivation will always crash when adjectives head a DP. If we limit feature omission to D and assume that other nominal functional categories, in particular NUM, have an empty slot for the V feature, adjectives can be raised to Num. This is enough to license them within the DP. In the following analysis it is assumed that in these cases raising means substitution rather than adjunction since adjunction is not restricted enough to produce the empirical differences.

Using Ritter's account for the various forms of the construct state, let us return to the data and examine the structures in which adjectives are licensed in the above examples. For the bound genitive state, Ritter suggests the structure in (12.), in which the nominal head of the construct state is raised via NUM to Dgen where it checks the genitive morpheme, whereas the DP specifier of the NP, which modifies the head, moves to the specifier of NumP. The conclusion of the above assumptions is that adjective are always possible heads for the genitive since all nominal functional heads

are neutral in one of the discussed senses with respect to the V feature. Nevertheless, by the restrictions on substitution, when an adjective heads the genitive, it should be restricted to derivations in which it does not substitute into D. Thus, since the head needs to move as high as Dgen in the bound genitive, it is expected that adjectives will not head it. On the other hand, there is nothing to block the use of adjectives as specifiers of the bound genitive (nor of the other types) as long as its extended projection is nominal.

These predictions are almost accurate. Example (16.a) of the head of the bound genitive shows that while some adjectives cause predicted ungrammaticality, others are licensed. Since most adjectives seem to behave in this construction like *yalduti* 'childish' and yield an ungrammatical reading rather than like *yafa* 'beautiful,fm,' which has a grammatical reading, it is arguable that the grammatical cases are the exception rather than the rule.[10] For the specifier, (16.b and c.) show that it can host a nominal extended projection which is headed by an adjective but not an adjective which is not extended into a nominal projection.

If we assume that only D is not specified for V feature the structure of the free genitive in Hebrew (in 13.) suggests that adjectives should be licensed both as heads and as specifiers., As a head, the adjective is the head of a DP which is only [+N] as in the bound form. Unlike the bound form, it does not move as high as D but remains in NUM which is [+N _V], yielding grammatical reading. This is where the data seems to support the assumption that it is only D in Hebrew which has no V feature, whereas the other nominal functional heads, particularly NUM, are underspecified for the V feature. Had NUM also had no V feature, adjectives would have never been possible heads of nominal structures which involve internal head movement, e.g., the free genitive. As a specifier, the adjective heads a KP which is also [+N], but it need

[10] Most exceptional cases where adjectives head the bound genitive can be attributed to the use of the specific adjectives in semi lexicalized forms as those in (15.).

not move within that KP. As a result the adjective is licensed both as a head and as a specifier of the free genitive.

The marginality of a free genitive headed by what appears to be adjectives with no nominal extended projection (as in (17.b)) is not syntactically oriented. Such a marginality seems more likely to be a matter of acceptability than grammaticality. One possible explanation is to assume that D is always strong in Hebrew, and A must move to D to check it when D is not phonetically realized. If this is the case, the discussed example should be ungrammatical rather then marginal since A can never substitute for D and the marginal cases would be acceptable ungrammatical derivations. Similarly, one might want to argue that NUM is also lacking a V feature, but this will not hold for the numerous cases of plural adjectives as well as for the cases discussed earlier. Alternatively, it is possible to assume that though these cases are grammatical they are unacceptable due to the PF similarity between these heads (which have no overt manifestation of a [+N] head) and non-nominalized adjectives, i.e. adjectives which do not head a DP.

Last but not least is the question of the licensing of adjectives in double genitive. in (14.), using Ritter's structure in which the nominal head is raised to Dgen to check the genitive feature but the modifier in [Spec,NP] need not move since it is already marked by *shel* 'of' within the KP makes the predictions obvious. Since the head moves to Dgen, an adjectival head yields ungrammaticality (18.a), with the same exceptions which are noted for (16.a). The specifier, as always, hosts an adjective with a nominal extended projection but not without it. Thus again, the arguments based on (14.) further support the claim that adjectives have the same distribution as nouns as long as they both head a DP and need not move as high as D. On the other hand, adjectives which do not head a DP cannot substitute for nouns, nor can nouns substitute for adjectives as heads of DegP.

In summary, this section shows that parameterization of the categorial features of functional heads by feature omission as in the feature neutrality parameter can account for cases in which two lexical categories are syntactically non-distinct in some ways but distinguishable in others. This was shown for Hebrew adjectives and nouns, and a similar account can be given for adjectives and verbs in Mojave[11]. Similarly, this solution can also account for the seemingly different inventory of lexical categories attested to, cross-linguistically. Further comments on this topic are available in the next sub-section.

4.1.3 Adjectival-verb and adjectival-noun languages

The mixed behavior of adjectives in Hebrew is problematic for the traditional hierarchy of lexical categories mentioned in (1.) as well as for Grimshaw's account for the distribution of Deg. The feature omission neutrality appears to have more explanatory power. This has already been shown for adjectives in Hebrew. In this section I will briefly discuss the advantages of the feature (omission) neutrality parameter for languages with a different inventory of lexical categories, i.e., adjectival-verb and adjectival-noun languages.

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[11] Mojave (a Hokan language spoken in Arizona and California) presents a similar example of the same problem. In Mojave verbs and adjectives are non-distinct in some ways but distinguishable in others: A and V are both inflected for tense and aspect, and they take the same suffixes when used as predicates, but they are distinct when used as modifiers. As a modifier, V must appear in a relativized form with a relative marker, i.e., in a relative clause, whereas for A the marker is optional, i.e. A can be an adjectival modifier or appear in a relative clause. This is shown in (1) (from Schachter 1985):

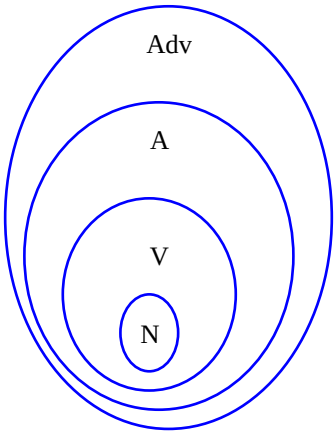
(1) a. *?i:pa *(kw-)su:paw-ny-c iva:k*
man rel-know-dem-subj is here
'The man who knows is here'

b. *?i:pa (kw-)homi:-ny-c iva:k*
man rel-tall-dem-subj is here
'The tall man is here'

The solution suggested in this chapter is applicable to this case, too.

The hierarchy of lexical categories makes the correct predictions for such languages. As can be seen in the subset drawing below the closer a category is to the center, the higher it is in the hierarchy:

19. Graphic Representation of the Hierarchy of Lexical Categories



The major prediction is that the missing categories are lower in the hierarchy than the remaining categories. All languages should at the least have N, which is most central. Thus, a language which has V in its inventory necessarily has N but might not have adjectives and adverbs. In such languages, it is argued, the semantic functions of adjectives are assigned to either the nouns or the verbs but not to both. One such example is Quechua, an adjectival-noun language, in which there is no morphological distinction between N and A, and adjectival lexical items have the same distribution as nominal lexical items. Another example is Mandarin Chinese, an adjectival-verb language, which does not distinguish A and V (Schachter 1985). If there are no verbs in a language, it will also appear to have only nouns. This should account for Tagalog which seems to have only one single open class and makes no distinction between N, V and A (Gil 1992).

As noted earlier, a parameter which is based on the hierarchy of lexical categories is not consistent with an attempt to restrict parameters to the FPH since it

violates it by associating parameters with lexical categories. Though this argument is sufficient to motivate the need for a different parameter, there is also an empirical problem. The hierarchy of lexical categories predicts which lexical categories are possible, but it does not predict which category or categories substitute for the missing categories. Thus, this hierarchy distinguishes Quechua from English but not from Mandarin Chinese.

The "empty slot" neutrality, as in Grimshaw's account for the distribution of Deg, could solve this last problem, by neutralizing the features of the functional heads which extend N and A in Quechua or V and A in Mandarin Chinese. Such a solution would capture the differences between Quechua and Mandarin Chinese with respect to the possible extended projections of adjectives but not the identical distribution of nouns and adjectives in Quechua or of verbs and adjectives in Mandarin Chinese since "empty slot" neutrality preserves the distinction between the lexical categories to the level of the functional projection.

This distinction makes "feature omission" neutrality preferable to "empty slot" neutrality. "Feature omission" neutrality, used in the feature neutrality parameter, blocks percolation of the features from the lexical head, when they are omitted on the functional head, thus explaining the similar syntactic distribution of nouns and adjectives in Quechua and of verbs and adjectives in Mandarin Chinese.

There are other advantages of the proposed feature neutrality parameter over the hierarchy of lexical categories. By the current proposal all languages have the same inventory of lexical categories, and even noun-adjectival or verb-adjectival languages have a distinct category for adjectives. This implies that even in such language nouns vs. adjectives or verbs vs. adjectives might be distinguished with respect to their lexical shape or derivational morphology operations yet show the same syntactic distribution and the same behavior with respect to inflectional

morphology. However, this prediction requires further elaboration, which I shall not attempt within this work.

This brief discussion ends this section, in which “feature omission” neutrality has been extensively used to derive parametric differences on an absolute basis. The absolute parameter discussed here seems to satisfy the first aim of this work, since it is consistent with FPH as well as with the requirements that parameterization apply to features of functional heads rather than the functional heads themselves. The question is whether all absolute parameters can be characterized in this way. One possible exception will be discussed in the next section.

4.2. Absolute Parameters: Directionality

Directionality parameters (Travis 1984) are a representative example of absolute parameters. Directionality parameters figure in the parameterization of X-bar phrase markers, determining the order of branches. The **head-complement parameter** defines the position of a complement with respect to the head when a lexical item is projected. The **spec-head parameter** defines the position of a specifier with respect to the head when a lexical item is projected. Since there are only two possible directions, these structural parameters are absolute and binary.

Since these parametric differences are marked for all X^0-categories, including lexical categories, directionality parameters are inconsistent with the FPH. Koopman's (1984) Case directionality parameter and Koopman & Sportiche’s (1991) Case assignment parameter, which both attempt to account for directionality in terms of Case theory, face a similar problem. Ouhalla (1991) proposes a framework in which lexical categories are not internally ordered (See also Borer 1995.). In Ouhalla’s system, crosslinguistic variety in word order results from the direction in which a functional head selects its complement. Thus, directionality is limited to functional

categories, and the FPH is not violated. Since Ouhalla's system has wider implications, I leave this option open for further consideration.

A different direction is proposed in Kayne's (1994) *The Antisymmetry of Syntax*. Kayne calls into question the necessity of directionality parameters. He proposes the elimination of directionality parameters (basically SVO-SOV) in favor of one basic order: SVO. This order is not stipulative but rather predicted by the *Linear Correspondence Axiom* (cf. the "time" assumption): d(A) is the linear ordering of T. That is, T is the set of terminals dominated by the ordered pairs that are members of A, where ordered pairs are defined as the pairs of non-terminal nodes, such that the first asymmetrically c-commands the other. He suggests that the SOV order is the result of head movement of V to the head of AgrOP, as exemplified by verb raising in Irish, which yields VSO order (McClosky 1992) and object-movement to [Spec,AgrOP]. When this verb-movement is accompanied by object-scrambling, it results OV order.

The Antisymmetry of Syntax hypothesis has already created wide impact and has been applied with partial success to Dutch (Zwart 1992) and Old English (Roberts 1993) and with somewhat less success to Turkish (Kural 1994), German and Yiddish (Rohrbacher 1994). In fact, both Kural and Rohrbacher argue that the *Antisymmetry of Syntax* is not applicable to the languages discussed in their works.

With the exception of some empirical as well as theoretical objections raised in the literature (See also Bouchard 1995.), Kayne's attempt to minimize the possible basic word orders into one SVO order in all languages is most elegant, but it is also expensive. Since all word orders other then SVO (and actually even some instances of SVO) are derived by movement, Kayne's proposal entails extra phrase markers, the addition of functional heads and additional merge operations which lengthen both the

derivation and the checking procedure.[12] Thus, Kayne's model is in the final analysis less economic than the earlier directionality parameters.

Another objection, which is not specific to Kayne's proposal but rather to any functional account for directionality, comes from language acquisition. Children show knowledge of the basic word order of their language as soon as they start combining words. However, at this stage there is hardly any evidence that children know how to use the functional system for Checking. On the contrary, children's use of language seems to deviate from adult use exactly in the way they make or do not make use of the functional system and Checking. Guilfoyle & Noonan (1992) argue, in fact, that principles which operate on functional categories apply vacuously when children use their early word combinations. This argument applies for Checking (see Hyams 1995). It seems nearly impossible to argue that German speaking children raise the verb to AgrOP and scramble the object when they produce early OV utterances.

Though Kayne's proposal nicely falls within the FPH, and the parametric variations within his framework emerge from relative parameters, similar to those discussed in Chapter 3, I shall here pursue a different proposal which preserves the absolute nature of directionality and gives a possible explanation for the early acquisition of these parameters.

4.2.1 The linearity marking hypothesis for word order

I propose to reduce the directionality parameters to marking precedence relations. These precedence relations are marked for all X^0-categories, including lexical categories, in terms of linearity. These resemble the way in which

[12] Chinque (1996) argues, based on the distribution of adverbials in Italian and French, for a tree with a functional projection to support each class of adverbs. This might serve as further empirical support for Kayne's model because they support the argument that these heads can host the moved elements. The same objection raised against Kayne's model, i.e., that it lengthen the derivation and the checking procedure, may as well be raised against Chinque's over extended trees.

morphological affixes are marked as prefixes, infixes and suffixes in the lexicon, as formulated in the *Linearity Marking Hypothesis* in (20.):

20. **Linearity Marking Hypothesis** (LMH):
Every meaningful morpheme is marked as linearly [+/-] final and [+/-] initial.

The choice of the terms final and initial rather than right and left in not just a matter of terminology. Final and initial are extensively used both in prosodic morphology for the linear position of morphemes (McCarthy & Prince 1993) and in phonology for the linearity of segments (Clements & Keyser 1983, Selkirk 1984). These notions do not depend on the way trees are drawn and are, thus, consistent with a wider range of linguistic and cognitive theories. Applying the LMH to bound morphemes distinguishes prefixes [-final, +initial], infixes [-final, -initial] and suffixes [+final, -initial]. The fourth option [+final +initial], while vacuous for bound morphemes actually characterizes free morphemes or words.

When the LMH applies to lexical items which function as syntactic heads (both lexical and functional), it distinguishes the various base word orders available in human languages. The **head-complement parameter**, which defines the position of the complement with respect to the head when a lexical item is projected, is reduced to marking each item as[+] or [-] final.. This assumption does not require that the child learn these features for each item separately. In the lexicon these features are certainly generalized to the whole category just as the morphological marking can be generalized for the whole morphological paradigm. However, projection from the lexicon is of single items rather than categories so this information is projected from the lexicon on each item separately.

Thus, V in Hebrew is always projected as [-final], while in German it is [+final]. This is true for all projections of V in these languages. On the other hand, all projections of C from the lexicon in both languages are [-final]. Similarly, the **spec-head parameter** is reduced to marking each item as [+] or [-] initial.. In Hebrew and

English, [-initial] V follows its specifier while in spec-final languages (e.g., French according to Friedeman 1994) the verb is marked as [+initial]. The choice of the feature [final] for the head-complement parameter reflects the traditional reference to SOV (and OSV) languages as verb final, whereas the choice of the feature [initial] for the spec-head parameter reflects the reference to VSO (and VOS) languages as verb initial.

Applying the linearity marking to V gives us, in Table 2, the four combinations available within the VP by X-bar theory:

Table 2: The Spec-Head and Head-Complement Linearity Marking on V

In languages with SVO VP, V is [-final, -initial]; in languages with SOV VP, V is [+final, -initial]; in languages with VOS VP, V is [-final, +initial] and in languages with OVS VP, V is [+final, +initial]. This says nothing about the final word-order at PF. It only refers to the projection of V from the lexicon into a VP. This extends to other categories as well. Thus, for example, in German, V is [+final, -initial] and I is [+final, -Initial], but C is [-final, -initial].

This formulation, which takes us back to the terminology used in Greenberg's *Universals of Language* (1963), might be criticized for being an ad-hoc solution, which looses all the advantages of more recent solutions such as Koopman's (1984) Case directionality parameter or Koopman & Sportiche's (1991) Case assignment parameter. Nevertheless, these solutions are problematic in at least two respects. First, empirically, not all heads are case-assigners, so the Case directionality parameter cannot apply to all heads. Second, theoretically, within the minimalist framework (Chomsky, 1993), Case is checked in spec-head configurations rather then being assigned under government, thus emptying the Case directionality parameter of its

content. On the other hand, a clear advantage of deriving linearity directly in terms of precedence features constraining the projections is that it extends the application of a system which is already available in the lexicon for marking affixes.

Another line of criticism against the proposal that the LMH underlies word order might arise from the Kayne's (1994) proposal in *The Antisymmetry of Syntax*. The LMH shares the same problem with Travis's (1984) directionality parameters since it is also specified for lexical categories violating the FPH. On the other hand, the derivations which are generated under this assumption are more economic than those generated under Kayne's assumptions. The extra phrase markers, functional heads and merge operations which lengthen both the derivation and the checking procedure are all avoided by the LMH.

Clearly the LMH is concerned only with the basic word order of each language and leaves space for other orders which are derived by merge and movement operations. These merge operations may result in verb-second or verb-initial order, depending on the relevant RELP. Merge operations and checking also result in the different positions of the verb relative to the negation marker in English and French for which Pollock (1989) accounts.

Here is the "trade off" which was promised at the beginning of this chapter. Though the absolute parameters and particularly directionality parameters might be marked for non-functional heads, the number of such parameters is most limited. Moreover, ABSPs are set for lexical heads and parameterize the value of their features (as RELPs do for functional heads) but not the existence of the heads themselves.

On the other hand, the majority of the parameters, i.e., the relative parameters, take a most restricted form. In this sense, at least, the essence of "minimality," is more closely approached since the internal options for each type of parameter are minimized and the exact form that parameters take is defined. One last advantage of

allowing directionality parameters is that they are more economic, generating a derivation which involves fewer steps. Since fewer functional categories are used, the LMH saves on merge and checking operations. In brief, ABSPs obey the *Lexical Parameterization Hypothesis*, whereas RELPs are limited by the *Functional Parameterization Hypothesis*. But beyond this change, parameters remain features of lexical items, which serve as input for UG principles. Thus, to use Optimality terminology (Grimshaw 1994), "minimality" requirements overrank other principles including the FPH, as in the case of the directionality features, thus allowing us to violate the FPH in order to minimize our model but not otherwise.

This section concludes the crosslinguistic discussion of the two types of parameters proposed at the beginning of Chapter 3: absolute parameters and relative parameters. In the discussion of relative parameters, the "computing mechanism" and the PF-ban on functional nodes were used in order to capture the strong-weak distinctions. Chomsky (1993) proposed that checking of strong features takes place before spell-out and checking of weak features at the LF component. This distinction was replaced by two independent operations which emerged from the lexical-functional dichotomy with respect to features and their values. The PF-ban on lexically masked, i.e., fully specified functional heads, which was extended to specified specifiers of these heads, replaced the idea of checking before PF. Checking remains an LF operation. However, as was pointed out, since checking is an immediate operation, it might take place any time during the derivation when the construction is accessible. Saying that checking is an LF operation means that LF makes sure that all features were checked, but it is not necessary to wait with checking till LF. Thus, we can reformulate this requirement as an LF-ban, saying that all features should be checked by LF.

This distinction plays a crucial role in the accounts for parametric differences between languages. The differences are reduced to the set of features that lexical items are morphologically endowed with and to the balance between those features

and the underspecified (valueless) features on the functional heads. Thus, the various relative parameters, e.g., null-subject or verb-second, are merely names for different phenomena, all of which are reduced to one common formulation in line with the FPH. Ideally, the absolute parameters would also reduce to this form. Alternatively, relative parameters might be viewed as crosslinguistic lexical variations whereas absolute parameters remain the only "real" binary parameters. Both ideas will be reconsidered in the concluding chapter after the test of the above model is presented in the following chapters with first language acquisition data from Hebrew.

Chapter Five -- The Acquisition of Hebrew

Children's early word-combinations in various languages have been the subject of intensive research (Bowerman 1973, Pinker 1984). Initial word order is crucial in order to determine when children acquire absolute parameters and whether they are ordered with respect to relative parameters. For example, initial word order can demonstrate how and when children start to use the base word order typical of their native language (Clahsen 1991, Weissenborn, 1992), which is determined by the absolute parameters, and how and when they start to use move and merge operations, which are triggered by the relative parameters. These questions can be reduced to asking when children acquire directionality parameters and to what extent the acquisition of functional categories is relevant for the task. More recently, in the wake of Kayne (1994), who argues that all languages have the same deep structure with underlying SVO word order and that all crosslinguistic word order differences are the result of movement, the question has become whether word order differences can be acquired without directionality parameters (Wu 1992). To be more precise, if children do not already have functional categories when they start combining words (Radford 1990, Guilfoyle & Noonan 1992), they should all start with the same word order, crosslinguistically. On the other hand, if word order is crosslinguistically different for the earliest word-combinations, children must have access to functional categories as soon as they start combining words.

Thus, while Chapters 2, 3 and 4 concentrated on the formulation of parameters in UG and the accompanying mechanism and constraints, on a crosslinguistic basis,

the following chapters are devoted to a discussion of the psychological reality of the proposed model with a focus on the way in which children acquire this knowledge. This chapter is basically divided into two parts. First, I will discuss the strategies available for the child in the process of acquisition, showing how economy and markedness play their roles in constructing trees based on partial knowledge. Once this has been established, I present an overview of the early acquisition of syntax in Hebrew, starting just before the transition from the one-word stage to early word-combinations (around 18 months) and ending when multi-clausal utterances are manifested (around two to two and a half years). Following this overview of the process that children undergo during this period, the next chapters will focus on the acquisition of various parametric values for head-directionality, null-subjects and the features of D and C, which are crucial for the construction of adult DP and CP. In particular, I will discuss the question of whether these functional categories are operative during the period of the first word-combinations and its implication for locating parameters.

5.1. Partial Knowledge - Partial Trees: Economy and Markedness

The acquisition of syntax is a developmental process which involves several tasks. Basically, children have to identify the syntactic properties of their language, that is, to set the values of the various absolute and relative parameters. The definitions for absolute and relative parameters from Chapters 3 and 4 are summarized in (1.) and (2.), respectively:

1. **Absolute Parameters** (ABSP) are absolute properties of X^0-categories, e.g., initial vs. final, [+N] vs. [-N], etc. These properties are selected from the lexicon and figure in the projection of lexical items into phrase-markers. The

values of these properties only vary crosslinguistically, not within a language.

2. **Relative Parameters** (RELP) use the "computing mechanism" to calculate the strength of a functional head, separately for the feature-combination of each functional item. This value varies on a weak-strong pendulum within each language, and the combinations are checked at PF.

For the RELPs the child, as does the adult, uses the "computing mechanism" in (3.), and makes sure that the outcome satisfies the PF-ban in (4.), which was elaborated on in Chapters 2 and 3:

3. **The "Computing Mechanism" for Checking**

Lexical items are fully specified for all their features. Functional items are endowed with underspecified “empty-slotted” features. When a lexically headed phrase-marker and a functionally headed phrase-marker are merged into an extended projection, the extended head shares the values of the features of the lexical head. By this computing mechanism the head-features of the functional head are specified.

4. **The PF-Ban on Empty Functional Heads Nodes (revised)**

(i) When the head-features of a functional head are fully specified, they need to be associated with a lexical item.

(ii)When at least one spec-feature of a functional head is specified, its specifier needs to be associated with a lexical item.

According to the PF-ban, fully specified heads are "strong" while partially specified heads are "weak." The child's task is both to identify the full set of underspecified features of the functional heads as well as the specific features of each functional or lexical item, in order to be able to set the value of RELPs on the strong-weak scale.

The process of setting ABSPs and RELPs is based on partial information available through the input. The input is only partial since in contains both grammatical and ungrammatical utterances, and it never contains the ordered paradigms which underlie some of the RELPs (See Chapter 1.). However, though the

input supplies only partial, unordered information, children finally reach full competence or knowledge of their language Of crucial interest is what happens in the intermediate stages. In what sense does partial evidence imply only partial knowledge? Clearly, children do not manifest full competence of the adult grammar when they begin to combine words, but the question is whether their partial competence mirrors partial knowledge which is caused by the incompleteness of the input.

The answer to this question varies with the assumptions regarding continuity. Advocates of the maturation hypothesis (Borer & Wexler 1987, Radford 1990) argue that children manifest partial knowledge of their language due to a biological process of maturation, which delays the accessibility of some aspects of the grammar, e.g., A-chains or functional categories. Early versions of this hypothesis entailed discontinuity since the inaccessibility of some aspects of UG implied that children may use grammar which is not UG-constrained and, thus, is certainly not a part of any adult grammar (Borer and Wexler 1987, Radford 1990). Borer and Wexler (1992) proposed the UG-constrained maturation hypothesis which seemed to solve the continuity problem. Nevertheless, neither variation of the maturation theory necessarily links the partial knowledge which children manifest to the incompleteness of the input.

Take for example "telegraphic speech," the language of children in which they primarily use lexical heads to construct utterances, e.g., *where helicopter? open door*, *mummy car* (Radford 1990). It is obvious that in this kind of speech children do not make overt use of functional categories for inflecting the words. That is, they do not manifest full knowledge of the adult system. From the perspective of maturation

theory, as argued by Radford (1990), this is because the functional system, i.e., the categories C, I and D, is absent. It is maturation which makes the absent categories accessible. Thus, the partial output mirrors partial competence, which is biologically motivated.

In this section I want to show, that there are good reasons to link the partial output to the incompleteness of the input. This is not done in a behaviorist sense but rather because of the strictly constrained way in which the child deciphers the input. With the underlying assumption that the process of acquisition is necessarily continuous, it has been argued both by advocates of weak continuity (e.g., Clahsen et al 1994, Pinker 1984) and by proponents of strong continuity (e.g., Crain 1991, Roeper and de Villiers 1992) that the child's perspective is first and foremost UG-constrained. Thus, the child picks from the input only what is compatible with UG. Following Weissenborn (1993) and more recently Rizzi (1994), I argue that the child's perspective is not just UG-constrained but rather strictly constrained by the principle of economy, which is ranked higher than any other principle of UG[1].

The following two assumptions, which will be further discussed in this chapter and the ones that follow, underlie my analysis of the acquisition process:

(1) From the beginning, children basically have access to the whole tree including functional heads (Clahsen et al 1994, Crain 1991, Rizzi 1994);

(2) Nevertheless, children use a “minimalist” approach --a least effort principle: do only what you have evidence that you have to do (Weissenborn 1993).

[1] Though this work is not written within Optimality Theory (Grimshaw 1994, Price & Smolensky 1993, McCarthy & Prince 1993), the term "ranked" is borrowed from OT. However, it is used here not for comparison with other principles but to mark the most prominent principle of UG.

Although on the basis of the first assumption, one might say that children use a full tree from their early word-combinations, the second assumption leads to the conclusion that, based on the partial input they have, children actually use no more then the partial trees which seem obligatory. In the following chapters, these two assumptions are identified as the **minimalist hypothesis of acquisition**.

This hypothesis clearly says something about the way in which children use the X-bar trees. Theoretically, trees can be construed as either top-down or bottom-up. However, the only way to project complete trees of a minimal size large enough to accommodate the lexical material is bottom-up. Partial top-down trees would lack a lexical head. Evidence for the initial knowledge of the whole set of functional projection by the child is provided precisely by this “bottom-up” progression.

Radford (1990) argues that functional categories mature later than lexical categories, and Guilfoyle & Noonan (1992) propose that somehow or other this maturation follows the tree from bottom to top. The minimalist hypothesis for acquisition and the bottom-up construction of trees offer a more plausible solution for the relatively late emergence of the functional system. Considering "telegraphic speech" and the above assumptions again leads to the conclusion that children have full competence of the tree and it is not really the input that is partial but rather their knowledge of what is obligatory. It is this partial knowledge whose results are partial trees, which is described as "telegraphic speech".

Another advantage of the minimalist hypothesis for acquisition is that it predicts the possibility of degree-2 (Wexler & Culicover 1980) and degree-1 (Morgan 1986) learnability. Both degree-2 and degree-1 learnability require the child to access

embedded clauses in order to identify their grammar. In addition, Lightfoot (1991) argues in favor of degree-0 learnability by which the child learns everything from the main clause "plus a little bit" (ibid. p.23). The bottom-up analysis predicts a referral to subordinate clauses when available as is suggested by degree-1 learnability.

The nature of partial input and obligatory structures forces us to discuss their nature, particularly the nature of the trigger for any advancement in the process of acquisition. Berman (1986) views language acquisition as a confluence of clues.[2] That is, the trigger which makes a structure obligatory can be of any linguistic domain, e.g., prosody, morphology, syntax, semantics, pragmatics, etc. In acquiring language, children can use triggers from any of these domains or from more than one domain in order to solve the acquisition puzzle.

Berman specifically argues for a process which starts with rote-learned lexical items, followed by a transition to a rule-based system. In such a view, the child initially approaches the input through lexical learning, limiting herself to partial use of the structures available for her (Clahsen et al 1994). This idea places a heavy load on lexical triggers which, as Roeper (1994) suggests, entail a process of lexically-oriented merger (Chomsky 1994), i.e., only merger of items which are selected from the lexicon. In other words, the incompleteness of the output is a result of the partial knowledge the child has of the input.

Referring to the above issues, I shall examine two tasks that the child has to master in detail. The first task is the acquisition of the case system of Hebrew

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[2] Berman (1986) is not UG oriented but rather views language acquisition as a problem solving task for which the child makes use of a confluence of clues. Nevertheless, as was discussed in the introduction (Chapter 1), this view can be applied to the trigger issue.

(accusative and genitive) and the way it is influenced by the acquisition of NP and DP. The second task is the acquisition of the verbal inflectional morphology of Hebrew and its implications for the acquisition of IP and CP. Both tasks will show us in what sense the input is partial in the eyes of the "minimalist" child and what the "marked" data which trigger violations of this minimalist approach are. These violations are, of course, not violations of minimalism but just evidence in line with assumption two that children have to do more then they thought they had to. Interestingly enough, the "marked" data involve morphological paradigms and lexical items as a basis for lexical learning and structurally complex phrases, as well as reference sets, i.e., sets of economically equivalent derivations where the choice of the appropriate derivation is triggered by the need to achieve a nonambiguous structure at the interface level.

While analyzing the two tasks, I address the question of how parameters are acquired, referring to both projection and relative parameters and showing the role that the "computing" mechanism for checking plays in the acquisition of parametric differences. Particularly, the focus is on the strength of Agr heads as identifiers of *pro* in null-subject languages and the strength of D as a landing site for moved heads. Though most of the analysis is for Hebrew, some relevant comparative data will be presented for English, German and French.

5.2 The Data

In view of the difficulties of conducting structured experiments with children at the young age relevant for early acquisition of syntax (ages 1;06 - 3;00), we have followed the accepted practice in early word order studies of analyzing naturalistic

speech output. In addition to the transcripts of Sivan and Asaf from the Ravid corpus and the once-a-month transcripts of Na'ama, which are also in CHILDES, longitudinal speech data were collected from four Hebrew-speaking children: Hagar, Leor, Lior and Smadar. Sex, age range, number of transcripts and the range of child utterances per transcript are summarized in Table 1 below:

Table 1- Children's longitudinal data

Child name	Age range	No. of transcripts	Range of child utts per transcript
Asaf, boy	1;04;08 - 5;09;18	29	50 - 150
Hagar, girl	1;07;03 - 3;03;11	136	50 - 200
Leor, boy	1;09;00 - 3;00;00	80	50 - 250
Lior, girl	1;05;19 - 3:01;01	151	100 - 300
Na'ama, girl	1;07;08- 2;06;24	17	30 - 250
Sivan, girl	1;11;02 - 6;11;04	37	50 - 300
Smadar, girl	1;04;14 - 2;04;26	34	100 - 250

The four children in the longitudinal corpus were recorded for approximately one hour per week (in one or more sessions). The range of recordings analyzed for each topic for each child was selected to cover the period from the very first occurrences of analyzed phenomena to the period when over 90% of the child usage of the analyzed structure demonstrated adultlike structures (Brown 1973).

Recorded materials were all transcribed and entered on computer according to the crosslinguistic conventions established for the Child Language Data Exchange System (MacWhinney & Snow 1985, 1990) adapted for Hebrew by the Tel-Aviv University Word-Order Acquisition Project (see summary in Armon-Lotem 1989). Manual searches were conducted of all materials in order to extract all more-than-one-word utterance types. Text-lines which contained repetitions of preceding adult

utterances, recitation of songs or verses, formulaic usage of set expressions like *ma ze* 'what's that?' or *od pa`am* 'another time, again' and unintelligible strings were not analyzed. Automatic searches were conducted for some of the topics using CLAN programs (MacWhinney 1991, Sokolov & Snow 1994).

To these corpora a longitudinal diary of my son, Yuval, was added. This diary starts when Yuval is 1;6 and starting to combine words and ends when he is 2;6. It covers all novel multi-word utterances produced in my presence. By novel I refer to utterances which he had not produced previously. This is almost a day to day diary with some gaps when we were away from home. Thus, though it cannot stand as a unique source, this partial diary has been added to the longitudinal corpora in order to fill some gaps in the data and capture short lived moments in the process of acquisition. It was added since it has lately become evident that "capturing the micro-steps in acquisition brings us a step closer to the articulation of a theory of UG that is biologically plausible" (Roeper 1994, p.30).

5.3 The Acquisition of Hebrew -- an Overview

This section is a descriptive overview of the order in which Hebrew speaking children acquire various aspects of their language and is based on the data referred to above with additional references to the extensive research conducted by Israeli researchers (Berman [1980, 1981, 1985, 1986, 1988a, 1990, 1993, 1994a], Guralnik [1990], Dromi [1986], Kaplan [1983] Levi [1980], Ninio [1992], Ravid [1995], Schlesinger [1982], among others). The period of examination starts at the end of the one-word period and before the first word-combinations (Dromi 1986) and ends when

children start combining clauses 1990). The focus of this description is mainly on the acquisition of syntax with some reference to morphology at the interface.

In Hebrew, as in other languages, by the end of the one-word period, children use mainly lexical categories, i.e., open class items: nouns, verbs and adjectives, with nouns and verbs being the majority (75%) and adjectives being quite rare (5%). The remaining vocabulary (20%) includes communicative words, e.g., *yes* and *no*, and a very limited number of instances of closed class items. These closed class items might be associated with functional categories, e.g., *lo* 'no, not' for negation, *ze* 'this,' a deictic pronoun, and the quantifier *od* 'more'. In addition, closed class items are used in unanalyzed forms, e.g., *loce* for *lo roce* '(I do) not want' and *eze* for *et ze* 'ACC this'. In these latter cases, the unanalyzed form is used although its segments do not necessarily occur independently in other contexts. Though morphology is hardly productive at this stage, its use, at least within the verbal system, seems to be aspectually limited, with perfective (unaccusative) verbs in the past form of the verb and durative verbs in the present form (Section 7.2). Though the end of the one-word period is primarily characterized by use of lexical categories, there seems to be some evidence that children already have access to the functional system, as shown by the use of closed class items, as well as the aspectually limited use of verbal morphology (Tisimpli 1992).

From the moment that the first word-combinations emerge, the process of acquisition develops along two lines: the DP system and the clause -- the CP system. In some places the two coincide. In acquiring the DP system, Hebrew speaking children have to acquire knowledge (not necessarily in this order) of the gender and number systems (the arbitrary distinctions and their morphological realization), the

determiner system, the nominal agreement system (between the noun, the adjective and some of the determiners) and the nominal case system (genitive and accusative cases), as well as the linear order of the head and the specifier and complement and adjuncts. To acquire the CP system, the child has to acquire the verbal system (tenses as well as patterns), the verbal agreement system (between the verb and the subject) and the order of constituents within the CP (verb raising, negation placement, wh-movement, etc.). These are only partial lists and suggest the task facing the child..

Table 2 presents of an age related comparison of the order in which DP-structure is acquired with the order in which the CP system is acquired by one girl, Lior.

Table 2- Order of acquisition of DP and CP by Lior.

Age	DP	CP
1;06	single nouns	single verbs
1;07	null topic[3]	gender on verbs
1;08	quantified nouns (*od*)	
1;09	possessor - possessed definite article - sporadic [15] pronouns (including *pro*)	tensed verbs wh-questions (limited, without verbs)
1;10	Possessed - possessor	preconjunctionals
1;11	*shel* 'of'-insertion [1;11;00] accusative case marker [1;11;05]	person on verbs wh-questions (extended, with verbs)
2;00	grammatical use of null-subjects	
2;01		wh-question (adultlike)
2;02		subordination

In acquiring the DP, the child starts with bare nouns and as a first step, gradually expands the N to an NP, for quantification, possession and definiteness, still at the NP level (see Clahsen et al 1994). Findings from other children show that during this period some adjectival modifiers might be used. Toward the end of this

3 The term "null topic" is used to indicate that the child makes use of null DPs and not that she knows how they are licensed.

period, pronouns seem to be acquired. The next step is expanding the NP into a DP as is suggested by the emergence of cases, and the extended use of definiteness. Though evidence for knowledge of nominal agreement is missing in the Lior corpus, findings from other children suggest that they seem to know the morphology of nominal agreement during the first step but not the syntax. It is only after DP has been acquired that children are capable of using this system properly.

The acquisition of CP starts with bare verbs and gradually grows with the specification of the verb for gender and number. The next step is the specification of verbs for tense and the use of formulaic wh-questions, both of which happen almost simultaneously. This advance is followed by the emergence of preconjunctionals: subordination without a subordinator. In the next step, children grasp person morphology, but they still do not use it in wh-questions. In other words, the subjects in their questions are limited to third person, the verbal agreement of which is morphological unmarked. While null topics show from the first word-combinations, though not under language specific pragmatic licensing conditions (Austin, Blume, Lust, Nunez del Prado, Parkinson & Proman 1995), and null subject (with *pro*) emerges when other pronouns are used, it is only after person morphology is acquired that children seem to master the use of null-subject. In the use of pronouns and null-subjects the DP system and the CP system interact with each other.

The final step in the acquisition of the simple clause is that of full wh-questions with subjects, verbs inflected for person and, sometimes, negation. This last step seems to open the gate for subordination with complementizer, which marks the transition from the mono-clausal period to the multi-clausal period and complex

syntax. Each of these acquisitions and their interactions with each other will be discussed in the following chapters.

Chapter Six -- The Acquisition of Noun Phrase Structure

The acquisition of the NP and its extended projections, DP (and maybe also some AgrP), is a good example of children's application of the economy principle: do only what you have to, i.e., do as little as possible to generate the smallest tree which converges. In acquiring noun phrase structure they start with the bare noun, that is, a non-branching N which is unanalyzed as to inflectional morphology. The next step is to use NPs which enable quantifiers, numerals and even sporadic use of determiners in [Spec,NP]. At this point checking does not seem to play a role so as long as there is enough “place” within the NP for modification, there seems to be no evidence of the need for an extended projection. Then, motivated by the insufficiency of the NP, i.e., by the lack of “place” to host more than one modifier, they extend the projection. In the free genitive construction, this is first triggered by narrow lexical considerations and later by the realization that when the "computing" mechanism operates the functional head obeys the PF-ban since it is a site for checking. Once this is done, the child extends the number of possible features which are identified. This is manifested by the productive use of the determiner *ha-* 'the' and the appearance of the accusative case marker *et.*

6.1 Hebrew Noun Morphology

Hebrew nouns are constructed in one of various patterns called *mishkal* conjugations, which associate affixal stem elements with a set of root consonants or radicals. In addition to patterns with a "full" or cannonic triconsonantal root, there are

others which have a defective root, that is, they contain one or more "weak" root elements --a pharyngeal, glottal, or glide-- that are not consistently realized across all forms of the nouns constructed from that root. Since lexical gaps and semantic inconsistencies between *mishkal* form and function in the lexicon of contemporary Hebrew set this system in the domain of word-formation (derivational morphology), it is not discussed in this work.

Hebrew nouns are divided into two gender classes: masculine and feminine (but no neutral), e.g., *kaf - kapit* 'tablespoon, ms' - 'teaspoon, fm', and are marked for three number groups: singular, dual and plural, e.g., *yom - yomayim - yamim* 'a day - two days - days'. Since contemporary use of the dual morpheme is lexically limited, nouns (and adjectives) inflected with suffixal agreement markers for number and gender may yield up to four forms per noun: masculine singular with 0 morpheme, to which are added unstressed *-a, -et* or *-it* for feminine singular, stressed *-im* for masculine plural and stressed *-ot* or *-iot* for feminine plural. Use of all four forms for any lexical item is in actuality limited to adjectives, e.g., *xaxam, xaxama, xaxamim, xaxamot* 'clever' and animate nouns, e.g., *tarnegol, tarnegolet, tarnegolim, tarnegolot* 'rooster(s), hen(s).' Inanimate nominals are either masculine or feminine, yielding only two forms, e.g., *tik, tikim* 'bag(s), ms' or *mapa, mapot* 'map(s), fm.' While some of the forms are as regular as the ones above, many involve internal vowel change, e.g., *kelev, kalba* 'dog, bitch,' *sefer, sefarim* 'book(s),' a change which is partially linked to the nominal conjugation.

While zero morpheme is associated with masculine nouns and suffixal unstressed *-a, -et* or *-it* mark feminine nouns, the arbitrariness of assigning each noun to one of these categories creates vast irregularities. Though the gender of a noun is

lexically marked on the singular form, some masculine nouns are inflected with feminine plural, e.g., *aron, aronot* 'closet,' while some feminine nouns are inflected with masculine plural, e.g., *dvora, dvorim* 'bee.' There are even some cases where a noun with a masculine zero morpheme is feminine, e.g., *gader, kos* 'fence, cup,' or both feminine and masculine, e.g., *ruax, shemesh* 'wind, sun..

Children acquiring this system have to learn not only the regular forms, i.e., which noun belongs to which gender category but also the irregularities with the appropriate plural for each noun. Moreover, they have to be able to distinguish the root consonants from suffixes for nouns ending with *-a* or *-t*, e.g., *cava, taskit, sherut* 'army, radio-play, service'. When the *-a* and *-t* are part of the root, they do not imply feminine gender. The complexity of this task is increased by the phonology of contemporary Hebrew, which does not distinguish the *-a* suffix from final glottal stops and so adds seemingly irregular forms, e.g., *cfardea, cfardeim* 'frog, ms,' while hiding other irregularities *matbea-matbeot,* 'coin, ms.' Nevertheless, unlike second language learners of Hebrew, children master the system quite rapidly, achieving control over the regular forms by the age of approximately two and a half and the irregular forms by the age of four or five years. The acquisition of number and gender distinctions is particularly important since they pervade the nominal system and affect the adjectival system. Specifically, adjectives and demonstrative articles, in addition to verbs, agree with the nouns they modify or are predicates of.

Hebrew nouns, however, are also inflected by a person suffix for possession, which indicates that a noun belongs to somebody, e.g., *sali, salxa* ... 'my basket, your basket ....' A person suffix is also added to the genitive case marker *shel* 'of',' which forms a set of possessive pronouns whose role is to indicate who the owner is, e.g.,

sheli, shelxa ... 'mine, yours .....'[1] This form is also used in the double genitive, e.g., *beyto shel ha-more* 'house-his of the-teacher,' in which possession is inflectionally marked on the possessed and syntactically marked by *shel*.

As has already been mentioned in Section 3.2.1, double genitive is not the only way to express possession in Hebrew. Possession is also expressed by free genitive and bound genitive --the construct state-- *smixut*. In the free genitive, the possession relations are marked by the genitive case marker *shel* 'of',' e.g., *ha-bayit shel ha-more* 'the-house of the-teacher.' In the bound genitive, the possessed is morphologically marked by some vowel change and/or *-t* and *ey* suffixes for feminine and plural masculine noun, respectively, e.g., *beyt ha-more, yaldat ha-more, batey ha-more* 'the house of the teacher, the daughter of the teacher, the houses of the teacher.'

While the acquisition of free genitive is structurally oriented, the acquisition of bound and double genitive requires both syntactic and morphological knowledge. The syntactic structure of the free genitive where the full DP is used seems to be a prerequisite for the acquisition of the morphological changes which are required in the absence of the case marker *shel.* As will be shown in the next section the free genitive is a most early acquisition the bound genitive is only gradually acquired at a later stage after the age of three. Therefore, it will not be discussed in this work (But see Berman 1983, Berman and Clark 1992).

In the following sections a syntactic perspective of the way in which children

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[1] This same inflectional pattern also occurs on other case markers, e.g., the accusative *et* as in *oti, otxa* ... 'acc-1st, acc-2nd ..., or the dative *le,* as in *li, lexa* ... 'to-me, to-you ....' Similarly, it is found within the prepositional system, e.g., for *al* 'on' the paradigm is *alay, aleyx* ... 'on-me, on-you... ,' etc.

develop a perception of the nominal system is presented. It shows that the acquisition of all the nominal inflections (not just the bound genitive) crucially depends on acquiring the structure of the extended projections of N. The discussion will be organized around the order of appearance of these phenomena, starting from the first complex NP --the free genitive-- where only case is used but no knowledge of morphology is required, moving up the tree to the use of inflections and definiteness and ending with some notes on the acquisition of noun-adjective agreement.

6.2 Free Genitive -- the Acquisition of the Case Marker *Shel*

It was noted by Bloom, Lightbown and Hood (1975) that possession is one of the first productive semantic relations which are syntactically manifested during the period of early word combinations. The examples in (1.) from Gia's first word combinations (Bloom 1970) demonstrate that English-speaking children start with a construction which resembles the adult free-genitive in (2.), lacking only the genitive case marker:

1. a. Truck wheel
   b. Gia eyes
   c. girl ball

2. John's room

Among others, Borochovsky (1984) and Schlesinger (1982) reported similar structures for Hebrew in (3.) and (4.), respectively[2]:

[2] Borochovsky (1984) report that during the same month (1:6) Ephrat produced both the non-adultlike possessor-possessed order in *hine kelev na'alayim* `here dog shoes` as well as the adultlike possessed-possessor order in *na'alayim yeled* `shoes boys`. Borochovsky does not report which combination comes first. In any case, the questions raised by the reverse order remain as valid even if there's some alternation with the adultlike order.

3. *hine kelev na'alayim*
here dog shoes
'Here are the dog's shoes'

4. *aba (sha)on*
`Daddy's watch`

However, Hebrew, unlike English, has no adult construction exhibiting this constituent order. The only possible word order in Hebrew is the one in (5.), in which the possessed precedes the possessor:

5. a. *pe shel buba*
mouth of doll
'a doll's mouth'

b. *xeder shel ima*
room of Mommy
'Mommy's room'

Free genitive in Hebrew is usually analyzed as involving raising of the nominal head either to some nominal AgrP (Siloni 1994), NumP (Ritter 1991) as in (6.a) or just DP as in (6.b) (Borer 1994), while the possessor remains in [Spec,NP]:

6. a. $[_{DP}$ D $[_{NUMP}$ $[_{NUM}$ *sefer* $_i$ $]$ $[_{NP}$ $[_{DP}$ *shel tmunot*$]$ $[_N$ $t_i]]]]$
a-book of pictures

b. $[_{DP}$ $[_D$ *pe* $_i]$ $[_{NP}$ $[_{DP}$ *shel buba*$]$ $[_N$ t_i $]]]$
mouth of doll

Thus, children's use of the reversed order, in which both the head and the specifier are filled, resembles the adult D-structure word order rather than the adult S-structure.

6.2.1. The data

The following examples from the Hebrew longitudinal corpora demonstrate the developmental route in the acquisition of NP structures. These examples pinpoint the turning point from reversed word order to adult-like word order in the acquisition of free genitive. Examples (7.a-d), from Smadar, girl, aged 1;06;05 - 1;10;00, show

that children start by using the free-genitive with reversed word order in which the possessor precedes the possessed, as in English:

7. a. *Yael sefer* [Smadar 1;06;05]
‘Yael's book'

b. *buba pe* [Smadar 1;06;11]
‘a doll's mouth’

c. *Miryam shafan, shafan Miryam* [Smadar 1;06;14]
`Miryam's rabbit'

d. *ze Miryam sefer* [Smadar 1;06;19]
`This (is) Miryam's book`

In the examples in (8.), recorded two weeks later, we find the adult-like order for Hebrew free genitive, in which the possessed precedes the possessor:

8. a. *sefer Miryam* [Smadar 1;07;07]
book Miryam
`Miryam's book`

b. *klipa bacal* [Smadar 1;07;11]
peel onion
`onion peel`

c. *regel Dada*
foot Dada (name of a doll)
`Dada's foot`

d. *gam na'alayim buba* [Smadar 1;07;16]
too shoes doll
`Doll's shoes too`

e. *type ima* [Smadar 1;08;13]
tape-recorder Mommy
`Mommy's tape recorder`

In these examples the order is correct, but the genitive case marker, *shel* `of’, is not present. Within a month, it appears, as seen in (9.):

9. *Arik shel Miryami* [Smadar 1;10;19][3]
Arik of Miryami
`Miryami's Arik` (=Ernie)

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[3] In the recording of Smadar there is a gap between 1;08;13 and 1;10;19. Smadar started to use *shel* 'of‘ during this period, but there is no recording of the shift.

This developmental route in the acquisition of free genitive in Hebrew from the non-adultlike possessor-possessed order to the adultlike possessed-possessor order and finally some version of *shel*-insertion, was found for all four children. In Table 1, these findings are summarized by age for the four children.

Table 1- Order of acquisition of free genitive (by age)

	possessor-possessed order	possessed-possessor order	shel - insertion
Hagar	--	1;07;2	1;07;17
Leor	1;9;04	1;09;17	1;10
Lior	--	1;10	1;11
Smadar	1;06	1;07	1;10

Several questions are raised by this order :

1) Why do children start with the possessor-possessed order even when it does not exist in the input (the adult E-language)?
2) What triggers the change from possessor-possessed to possessed-possessor order?
3) What triggers the application of some form of of-insertion?

Possible answers to the above questions come from looking at the following data from Leor, boy aged 1;09 - 1;10;24. In the first two recordings of Leor there is no instance of free genitive. The only NPs are of the form *od N* - `more N` as shown in (10.):

10. a. *od ecem* [Leor 1;09;00]
more bone
`another bone`

b. *od sefer*
`another book`

c. *od oto* [Leor 1;09;04]
`another car`

In the third recording, however, utterances with free-genitive also appear, in which the possessed precedes the possessor, just as they did in Smadar's case. This is exemplified in (11.):

11. a. *taxzir tmunot sefer* [Leor 1;09;11]
return picture book = picture album

b. *oy, ima tmuna*
`oh, Mommy's picture`

Notice that the child seems not to distinguish between the real possessor-possessed relation in (11.b) and the modifier-head relation in (11.a).[4] This becomes even more obvious when the free-genitive examples in (12.) from the same recording are considered:

12. a. *od sefer tmunot*
more book picture
`another book of pictures - picture book`

b. *od tmuna ima*
more picture Mommy
`another picture of Mommy`

In the examples in (12.), when the free genitive is preceded by *od - more*, Leor uses adultlike word order in which the possessed precedes the possessor, and there is no syntactic distinction between the semantically distinct free-genitive and modifier-head relationship. In some sense this resembles the similarity in the interface representations of the two structures, both being of the order N *shel* N. The above examples, thus, add a fourth question to our list. Perhaps this question should be asked before any of the others:

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[4] Example (11.b) is a marginal example for a possessor-possessed relationship since it can also mean "a picture which depicts Mommy," i.e., head-complement relationship. Under such an interpretation it is not that distinct from (11.a). The contrast, however, remains between the use of this structure by Leor vs. Smadar, and the question which it raises still calls for an answer.

4) Why do children fail to structurally distinguish the possession relations from the modifier-head relations, e.g., by using different constituent order for distinct semantic relationships?

If we understood why children ignore this distinction we might have the answer to the first question, that is, why do they start in Hebrew with the reverse order. Whatever the answer to these questions might be, the contrast between (11.) and (12.) is most revealing, regarding the question of what triggers the change in order.

Before we try to answer these questions, let us consider two more suggestive contrasts, which come from the records of Leor's acquisition of NP-structure. The first paradigmatic contrast concerns the usage of numeral modifiers, while the more immediately applicable second demonstrates how Leor starts to use the genitive case marker.

In a recording made a week after Leor produced the paradigm in (11.) and (12.), he is already using adultlike word order for the free genitive as in (13.):

13. a. *ish oto* [Leor 1;09;17]
man car
`the man of the car`

b. *mishkafayim doda ogi*
glasses aunt Orly
`Aunt Orly's glasses`

It is important to note here that both come as repetitions of adult utterances without the case marker *shel* `of,' which was, of course, used by the adult. This order becomes predominant in the following sessions.

In the same session, for the first time Leor also uses a numeral modifier, *exad* `one,' which normally follows the noun in Hebrew, agreeing with it in gender and number. Leor, however, locates the numeral modifier before the head noun, as done in

Hebrew for the rest of the numeric system, which he is not using yet, and agreement is missing, which is atypical of adult use of the numeric system. Leor's utterances are shown in (14.):

14. *exad ecba* instead of *ecba axat* [Leor 1;09;17]
one-ms finger-fm finger-fm one-fm

Two weeks later, along with using the possessed-possessor order productively, Leor starts using the numeral modifier in the right order where it, presumably (though there is no overt evidence) agrees with the head noun, as in (15.):

15. *roce* [*balon exad*] [Leor 1;10;03]
want balloon one
`I want one balloon`

This paradigmatic contrast shares some properties with the paradigm in (11.) and (12.). Specifically, the word order switches from numeral classifier preceding the noun to numeral classifier following the noun, which is the most relevant one for this account.

The second paradigmatic contrast appears when Leor starts using the genitive case marker. The examples in (16.), all of which are question-answer pairs, initiated so as to elicit possession forms from Leor, show that the first uses are limited to repetitions, as in (16.a), and to contexts where an omission causes ambiguity, as in (16.b) and (16.c):

16. a. I: *efo ha-gabot shel savta?*
where (are) the eyebrows of Grandma
L: *gabot shel savta* [Leor 1;10;06]
'eyebrows of Grandma'

b. I: *ma ze?*
'what (is) this?'
L: *ze shel saba Xayim*
'this (is)of Grandpa Xayim'

c. I: *shel mi ha-lexi?*
of whom the- cheek
'whose cheek is this?'
L: *shel savta*
'of Grandma'

(16.a) is an instance of repetition, in which, as in both (b) and (c), the omission of *shel* would yield nominative reading, i.e., in (b) *ze saba Xayim* translates as 'this is Grandpa Xayim.' In spontaneous usage, Leor continues to omit the case marker (7 types), as demonstrated in (17.) from the same session (Note the contrast between (16.a) and (17.b).):

17. a. *oxel saba*
food Grandpa

b. *gabot savta*
eyebrows Grandma

In the next sessions, however, Leor starts to use the case marker *shel* 'of' productively, as shown in (18.):

18. a. *na'alayim shel doda Ogi* [Leor 1;10;15]
shoes of aunt Orly

b. I: *ma ze Leori?*
what this Leori
L: *ze shel doda ogi* [Leor 1;10;23]
this of aunt Orly

c. I: *tik shel doda Orly?*
bag of aunt Orly
L: *tik shel aba*
bag of Daddy

The paradigmatic contrast in (16.) and (17.), in which Leor demonstrates partial usage of the case marker, is similar in a sense to that in (11.) and (12.), in which the order of the nouns varied, depending on the syntactic context. At both transition points the child seems to gain new understanding only when he is obliged to believe that a change in his minimalist assumptions is mandatory. This happens either because some functional projection must be used to host a longer string of constituents or because it

makes a difference in meaning, given the discourse context, that he perceives. This causes the appearance of optional usage. Only later, does the child realize that this change is obligatory. Thus, the paradigmatic contrast in (16.) and (17.) gives us some insight about the third question. Interestingly enough, though the use of *shel* is delayed till the child has evidence that it is mandatory, its use as a possessive pronoun is quite robust, particularly in the first person *sheli* 'mine.' This, however, does not seem to help the child is solving the free genitive puzzle.

6.2.2. The analysis

In this section I will try to answer the four questions repeated in (19.) in the order which appears most logical by giving an analysis of the above data:

19. The questions:

1) Why don't children structurally distinguish the possession relationship from the modifier-head relationship?
2) Why do children start with the possessor-possessed order even when it does not exist in the input (the adult E-language)?
3) What triggers the change from possessor-possessed to possessed-possessor order?
4) What triggers the application of some form of of-insertion.

The answer to question (1) stems from Grimshaw's (1984) generalization that nouns, unlike verbs, do not have an argument structure (with the exception of some derived nominals). Thus, the child has no *prima facia* knowledge of the semantic relationships within the NP, which could help her bootstrap the syntactic relations. This suggests that the child has to start from some syntactic trigger, e.g., the genitive dummy case marker *shel*, which does not mark any thematic relations. The above data suggests that the child chooses to treat all NPs which are not clearly marked as

complements, e.g., by a real preposition, as specifiers, which can receive inherent genitive case. The resulting structure for (7.a) in (20.) resembles the adult deep-structure, in which the possessor is in [Spec, NP]:

20. [NP [NP *buba*] [N' [N *pe*]]]

While explaining why the child does not syntactically distinguish the semantic relationships within the NP, we also begin to explain why the child starts with a possessor-possessed order even in a language like Hebrew, in which this structure is not part of the E-language. If the child starts with the adult deep-structure, the question is why there is no movement of the head to D, as is suggested for adults. Maturation of functional heads could have accounted for the sharp transition, we saw for Smadar, but it cannot account for the paradigmatic contrast in examples (11.) and (12.) of Leor.

The alternative account which I would like to pursue is based on the *Minimalist Hypothesis for Language Acquisition* stated in Section 4.1 and repeated in (21.):

21. Assumptions**:**

A. From the beginning children basically have access to the whole tree including functional heads (Clahsen et al 1994, Crain 1991, Rizzi 1994).

B. Nevertheless, children use a minimalist approach: they only do what they have evidence that they have to do (Weissenborn 1993).

Thus, children start with a minimalistic tree, in which they use only the lexical categories and extend their tree to the functional categories only when they are triggered to do so. That is, children use functional categories only when they cannot otherwise generate a convergent tree. Convergent trees with no functional projections seem to be possible (under UG) only at the earlier word combinations when the words

are still unanalyzed forms which are not associated (by the morphology) with interpretable or uninterpretable features.

In our case, what triggers the utilization of the nominal functional projection (DP) is the need for two specifier positions, which the sentences in (12.) raise.[5] As long as the child used only one specifier, as in (10.) or (11.), their was no need to use another level of the tree, but there is no way to accommodate two specifiers within one perfect projection. Similar argumentation has been suggested for the acquisition of DP in German (Clahsen et al 1994, among others).

Once children have evidence for the need of a higher functional category to accommodate another specifier, they move N, the head of the NP, to D, achieving the possessed-possessor order. Such a movement is motivated in the minimalist program by the need to check strong features. At this point, I shall not explain how the child learns that D in Hebrew has strong features since an explanation will be clearer at the end of this chapter when I will discuss the implication of the discussed phenomena to the location of parameters.

To now answer the third question, when the child realizes that she has to use a higher functional projection, she moves N-to-D, achieving the structure in (22.):

22. [DP *od* [D *sefer*] [NP [NP *tmunot*] [N *t*i]]]

During a short transition period, the child uses the functional projection only when it is triggered by the need for a position for an extra specifier. Using the functional head as a landing site for movement, the child realizes that the head has features which do

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5 I assume that *od* 'more, another' is a specifier rather than a head. In addition to the analysis of the acquisition data, in which this assumption is used successfully, *od* seems empirically different from other quantifiers in adult Hebrew which are clearly heads, as suggested by (Danon 1996).

not depend on the existence of a specifier, e.g. agreement features, as might be suggested by the paradigmatic contrast in (14.) and (15.). Thus, the functional projection becomes obligatory, and the minimal tree is extended in all syntactic contexts. Nevertheless, the child still has to learn which other features are associated with this functional projection.

This brings us to the last question. The structure in (22.) is still ungrammatical within the adult language. *Shel,* as a filler of a nominal functional head, could not be used before the child realized the obligatoriness of this head. This explains why it does not show up earlier. The question is, however, what triggers the application of some form of of-insertion or in different words, what triggers the overt realization of the genitive case by *shel*. The answer here emerges from the same principle: do only what you have to do. The child has to have a good reason to start using *shel*. Being semantically empty, *shel* makes the syntactic distinction between NP which is marked for genitive and NP which is marked for nominative overt . Thus, *shel* first appears when there is nothing else in the structure, no overt nominal head, to suggest that the NP is genitive. It is employed to disambiguate the structure, both syntactically and semantically. Since ambiguity is the motivation, it is limited to contexts where ambiguity exists, as shown in (16.) Nevertheless, as in other acquisitions, such as we saw for the utilization of functional heads, once the child starts using *shel* in a limited context, she is ready to extend it to all possible contexts, that is to all contexts where genitive case is not otherwise licensed.

6.2.3. Concluding remarks on acquiring the free genitive

The answers given to the four questions can be summarized as follows. The child starts with the possessor-possessed order for the free-genitive and uses only the NP in what resembles adult deep-structure, making no syntactic distinction between different semantic relationships which look overtly similar. He is guided by a minimalist assumption, i.e., a least effort principle: do as little as possible. Later on, motivated by the insufficiency of the NP, the child extends the tree to the functional projections when newly discovered data need to be accommodated. This is triggered at first by narrow structural considerations, and later on, by the realization that the functional head is a site for checking. Once the child has realized which features are associated with the head of that projection, the functional head becomes obligatory in all contexts. This opens the way for the acquisition of *shel*, which follows the same route; initial partial usage to disambiguate and then extension to all obligatory contexts. Once this happens, the child seems to identify the other possible features of the nominal functional head(s). This is manifested by the productive use the determiner *ha-* 'the' and the appearance of the accusative case marker *et*, to be discussed in the following section.

These findings suggest that children manifest knowledge of the internal structure of the NP in their language, in this case, the setting of the *spec-head* parameter as soon as they start combining words. They need, however, further evidence in order to identify the functional heads as landing sites for movements. Similar evidence comes from the acquisition of sentential word order, which I shall not discuss here (But see Clahsen 1991, Weissenborn 1990 among others who argue that German-speaking children start with SOV order in their early word

combination.). It appears that children know the basic word-order of their language as soon as they start combining words and before they utilize movement rules which evidently make use of the functional system.

The above logic has strong implications for parameter setting (Hyams 1986, Radford 1990). On the one hand, it seems that some parameters, i.e., absolute parameters, in particular directionality parameters, if they exist, are identified and set before word combinations appear since crosslinguistic differences in word order already exist in the early word combinations. On the other hand, the fact that ungrammatical utterances of the initial phase typically emerge from lack of movement suggests that the obligatoriness of functional heads and the features associated with them, which are relevant for checking, are identified at a later stage. This means that parametric differences which are related to relative parameters and emerge from feature-checking of functional heads are acquired later when it becomes evident to the child that she should use these categories.

Two questions remain unanswered. The first is how children identify the value of the absolute parameters, e.g., directionality, prior to the early word combination. The second is how they learn the strong-weak distinction. Based on the process described in this section, answering the first question is not an easy task. On its surface it seems that the above evidence strongly favors Kayne's (1994) uniform projection claim since children seem to know that the specifier precedes the head from the earliest word-combinations. Moreover, it seems that there are hardly any data which children can use for syntactic bootstrapping of the value of the directionality parameters unless they make use of the functional system.

If we do not accept Kanye's claim, as has been suggested earlier in this work, there are potentially three other answers to the first question. One possibility is to stipulate that children can extract the necessary trigger from the functional system, i.e., from the order of functional items. An example is *od harbe yeladim* 'more many children = many more children.'. This answer is problematic if one assumes that children do not access the functional system in their early production of word combinations. A second possible answer, which is more compatible with the *Minimalist Hypothesis for Language Acquisition*, is that children misanalyze the input, assuming that functional items, e.g., *od* 'more, another' or numbers, are specifiers of NP rather than heads or specifiers of functional projections. As discussed earlier in this section, this answer apparently mirrors children's productions at this period, which makes it less stipulative than the first one.

While the first two answers offer a syntactic trigger for the directionality parameters, the third possible answer goes in a rather different direction. Nespor & Vogel (1986) argue that syntactic structures can be characterized prosodically. Specifically, they argue that the cues or triggers for setting directionality parameters are available in the intonation pattern of each language. Thus, a possible answer might be that children set these parameters by prosodic rather than syntactic bootstrapping. I shall not try to decide between the three possible answers, and the reason I present them is simply to show that there are various alternatives to Kayne's uniform projection claim in order to answer the first question.

Answering the second question is a much easier task, which makes use of the computing mechanism and the PF-ban. When the child realizes that she has to use the functional system, she seems not to know which features are associated with the

functional head. Thus, apparently there are no features, hence no empty slots to be associated with the functional head, making it "strong," i.e., a target for movement. As the child acquires more knowledge of the morphological system and the features which it encodes, the status of the functional head within the weak-strong pendulum may vary. This, for example, explains, why children assume that D is a target for movement as soon as the DP becomes necessary. On the other hand, it also explains why it is not immediately used in order to host *shel.* The child seems to go through a period when D is "strong" enough to trigger N-raising but is still unmarked for the feature [gen], which is needed to trigger the use of *shel.* The identification of this feature is triggered, as suggested earlier, by the need to choose the unambiguous derivation from the set of convergent derivations.

Having answered these two questions brings this section to an end. The observation, statable in terms of the two types of parameters, which is supported by the analysis of the developmental route in the acquisition of free-genitive in Hebrew, is that absolute parameters, in particular those responsible for spec-head and head-complement order, will be acquired before relative parameters. If this is so, and with our knowledge of crosslinguistic differences in word order already existing in the early word combinations (Clahsen 1991, Penner 1994b, Weissenborn 1990), we are led to assume that directionality parameters exist. Such an assumption seems to be well motivated by findings from acquisition in other languages (Penner, Scoenenberger & Weissenborn, 1994 among others). The following sections will show that this distinction holds for other phenomena, too.

6.3 Determiners and the Accusative Case Marker *Et*

While indefinite nouns are not marked in Hebrew, definiteness in Hebrew is predominantly marked by a prefixal *ha-* which attaches to the noun, as in (23.):

23. *kelev* vs. *ha-kelev*
    (a) dog the-dog

As in English but unlike German, the definite article *ha-* does not agree with the noun in gender or number. *Ha-* is traditionally analyzed as a definite article which is generated in D (Ritter, Siloni),[6] as in (24.):

24. [DP [D *ha-*] [NP [N *kelev*]]]

As in English, proper names are inherently definite and are not preceded by an article. As in other Semitic languages (e.g. Arabic), modifying adjectives and demonstrative articles overtly agree with the noun they modify in gender, number and definiteness:

25. *ha-kelev ha-katan ha-ze*
    the-dog,ms the-little,ms the-this,ms
    'This little dog'

    ha-kalba ha-ktana ha-zot
    the-dog,fm the-little,fm the-this,fm
    'This little dog'

In addition, the head of the bound construct state, which is inherently [+definite], agrees in definiteness with its modifier in [Spec,NP], which is marked by *ha-* only on the specifier but not on the head, as in (26.):

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[6] Gil (p.c.) and Borer (1995) have recently argued that this prefix is an agreement marker since it spreads from the noun to the modifying adjective like gender and number. In Borer's analysis a noun inflected for definiteness raises to D in order to check its features. For the above analysis, it is crucial that the use of *ha-* is linked to the use of D, regardless of whether it is projected there, or not.

26. *beyt ha-more*
house-gen the-teacher
'The house of the teacher

When a definite NP is a direct object, it is preceded by the accusative case marker *et*.

In addition to the syntactic distribution of *ha-*, children have to learn that it is contracted with the prepositional prefixes *be* ‘in’ and *le* ‘to,’ forming the definite prepositional prefixes *ba-* ‘in the’ and *la-* ‘to the’, as in (27.):

27. a. *ha-kelev xazar la-bayit*
the-dog returned to-the-house

b. *ha-kelev gar ba-bayit*
the-dog lives in-the-house

In her M.A. thesis, Zur (1983) thoroughly studies the development of the definite article for children ranging in age from 1;11 to 12;00. The research was conducted both experimentally and in spontaneous speech. In spontaneous speech, her findings for the youngest age group (1;10 - 3;06) show that the youngest children (MLU 1.7-2.3) used definite articles in only 10% of their NPs, while older children within the same age group marked definiteness on 25% of their NPs. Adults, in comparison, as manifested by the oldest group (12 years), mark 50% of their NPs for definiteness. Regardless of the range of usage, even the youngest group uses the definite article grammatically in 85% of the cases.

Structurally, Zur points out that the early use of the definite article is mostly in subject position, e.g., *ha-kelev noveax* 'the-dog barks,' or together with a prepositional prefix, e.g., *ba-bayit, la-avoda* 'in-the-house, to-the-work.' She argues that since direct objects are hardly used by the youngest age group (19 direct objects vs. 175 subjects), there are hardly any definite direct objects. When direct objects are widely used in the next group (MLU 2.4-2.7), they are preceded by *eta* --a contracted form derived from

et ha- 'acc the,' though sometimes the forms lack either the accusative marker, as in (28.), or the definite article, as in (29.):

28. **hem ohavim ha-kelev* [Age 2;11, MLU 2.6]
they love the-dog

29. **ani ohevet et xamor* [Age 2;4, MLU 2.3]
I love acc donkey

This syntactic ungrammaticality disappears by age 3;06.

Zur also analyzes the various uses of *ha-*. She shows that at all ages 30% of the definite articles are used where a linguistic context exists, for example in (30.):

30. *ze yalda. ha-yalda holexet la-xayot* [Age 1;10]
this (is a) girl. the-girl goes to-the-animals

On the other hand, Deictic and nonlinguistic contextual occurrences each constitute only 11% of the uses (See Zur for other categories.).

She summarizes her findings by dividing the process into four age-related stages. The first stage is characterized by minimal use of the definite article and mostly in concrete situations, in the contracted form with a prepositional prefix, e.g., *ba-avoda* ‘in-the-work = at work’, *la-gan* ‘to-the-kindergarten’, and the system (like other systems at this stage) suffers from a vast amount of syntactic and semantic errors. In the second stage, around the age of three, the use of the definite article is extended both in absolute numbers and in the number of syntactic contexts. The immediate situation gives the semantic context for deictic use, which is grammatical in 75% of the occurrences. In the third stage of the pre-schoolers, the syntactic use of the definite article stabilizes, but the semantics are still fragile and self oriented. Thus, for example, in 20% of their uses of the definite article, children refer to objects which are familiar only to them and do not take into consideration the conversational

situation, i.e., the knowledge of the listener. In other words, they are only partially aware of the pragmatic conditions which license the definite article. The fourth and last stage is adult use, both syntactically and semantically manifested by school-aged children.

The focus of this section is on the earlier period when *ha-* is used sporadically and the beginning of the robust use, prior to the first stage that has been studied by Zur. It outlines the way in which children acquire the definite article *ha-*, showing that this process is similar to the acquisition of the genitive marker *shel*, which precedes it. It is not merely the switch from rote-based knowledge to rule-based knowledge (Berman 1986), which characterizes this similarity but also the use which the article makes of D and the triggers for it. The account here is limited to the use of *-ha* in simple NPs, which are the first place where it is used, rather then in complex nominal constructions, such as the construct state, which is itself, acquired later.

Descriptively, *ha-* is never used at the one word stage, not even as a part of a rote-learned form. However, the first use of *ha-* might occur as soon as children start to use more complex NPs and even before *shel* is used for free genitive. This early use is typically lexically limited to a number of items, e.g., *ha-mayim* 'the-water' for the bottle of water that the child wants or with prepositional prefix, as in *ba-avoda* 'in-the-work, at work.'

A productive, robust rule-based use of *ha-* in a variety of syntactic contexts is manifested only after *shel* has been used. Nevertheless, it seems that some sporadic use of *ha-* precedes the emergence of *shel*. In these first occurrences, *ha-* is usually used where no overt case marking is required, i.e., in the default nominative. This is

done with deictic intention, accompanied by some gesture, using one or two words utterances, as in (31.):

31. *ha-katar po. hagalgal*
    the-fire-engine here. the-wheel [Yuval 2;01;00]

32. *ha-galgal. efo galgal*
    the-wheel. where (is the) wheel [Yuval 2;01;00]

(31.) suggests that the definite article appears in contexts where Case-checking is not required rather then in contexts where nominative is checked. The contrast in (32.) is between overt deictic use of the definite article, which is attached to the noun in a single word utterance where no checking takes place, and the pragmatically ill-formed absence of that article in a syntactic context which requires Case checking.

This could be explained under the assumption that Case is checked at the functional level. For Case checking the child must use the extended projections of N, that is D and K. In such case, D is available for the definite article, but since the child does not associate the definite article with particular features of D, it is not used. The question is what prevents the child of using the definite article within the NP, as is done in single word utterances. This should not come as a surprise if we remember that the use of the definite article is [Spec,NP] is motivated by the minimalist hypothesis for acquisition, which supports the use of smallest convergent trees. In structures in which the tree is extended for Case checking, there is no reason to use the definite article in [Spec,NP]. These examples further support the claim that children initially use only the NP rather than a full DP, where *ha-* is in [Spec, NP].

The next step is using the definite article in subject position, as in (33.):

33. *ha-mayim raxok*
    the-water far
    'The water is far away' [Yuval 2;01;28]

This use is still sporadic and becomes productive only after the genitive marker *shel* is acquired. Similarly, definite prepositions, e.g., *ba-* 'in-the' and *la-* 'to-the', might be used sporadically before *shel* is acquired, as in (34.), but the productive use crucially depends on the expansion of the DP, i.e., it happens only after N-to-D and *shel* appear:

34. *sim (b)a-kis*
put in-the-pocket [Yuval 2;01;07]

In object position definiteness might be marked sporadically by *ha-*, as in (35.), which is ungrammatical since the accusative case marker *et* is missing:

35. **kumi asha (lexa)pes (h)a-mayim*
get-up now (to-)look-for the-water [Yuval 2;01;10]

However, it is only after *shel* is acquired and the DP is used productively that definiteness becomes productive too and accusativity is marked when necessary.

The discussion of the acquisition of *ha-* quite naturally leads to the acquisition of the accusative marker *et*. In Hebrew, accusativity is overtly marked by *et* only for definite NPs while indefinite NPs are never preceded by *et*, as in (36.):

36. *raiti kelev* vs. *raiti et ha-kelev*
I-saw (a) dog I-saw acc the-dog

It is logical to assume that the acquisition of *et* is crucially related to the acquisition of *ha-*. In this section it will become evident that the acquisition of *et* depends on the acquisition of *ha-*, just as the acquisition of *ha-* depends on the acquisition of *shel*. Moreover, Berman (1993), in her paper on transitivity, shows that Hebrew speaking children acquire the accusative case marker *et* in a manner which is also reminiscent of the acquisition of the genitive marker *shel*. Her findings are summarized in Table 2, for Smadar, Hagar and Leor (from Berman 1993):

Table 2- Steps in early acquisition of the direct object marker *et*:

	No suitable context [no +def Object NPs]	Omitted in context [except formulaic]	Initial usage [sporadic]	Well established [most oblig contexts]
Hagar	1;10	1;11	2;00	2;01 - 2;02
Leor	2;00	2;01-2;02	2;03	2;05
Smadar	1;07	1;08	1;10	1;11

As seen in Table 2, *et* is initially absent for over a month, even when the context requires it, that is, when definite NPs are found in object position. Then it is used sporadically, and only after a few more weeks is it used in a robust manner wherever it is required.

A detailed analysis of the earliest use of *ha-* and *et* was conducted for the children in our corpus. The question, as always, is in what contexts new knowledge emerges first. As has been observed in Yuval's diary for *ha-*, both *ha-* and *et* are used sporadically with sentence fragments for over a month before productive use in argument position (i.e., subject or object) is achieved. Moreover, there is a clear gap between the initial use of these fanctors and the robust use which Berman (1990) reports. The findings are summarized for *ha-* in Table 3, and for *et* in Table 4.

Table 3 -Phases in the use of the definite article

	one word	sentence fragments	subject position	object position (ta-)
Hagar	1;07;03	1;07;17	1;07;24	1;09;03
Leor	1;09;11	1;10;03	1;11;22	1;11;12
Lior	--	--	1;09;15	1;10;13
Smadar	--	--	1;07;07	1;10;19

The findings summarized in Table 3 show that two of the children (Hagar and Leor) start, like Yuval, by using the definite article in single word utterances and in sentence fragments before they use definite NPs as arguments. The other two (Lior and Smadar) seem to skip the first phase and use definite NPs in argument position from the very beginning. What is more notable is the gap between the use of the definite article in subject position and object position, also noted for Yuval.

The use of the accusative case marker *et*, as shown in Table 4, follows similar lines. Table 4 gives a description of the earliest use of the accusative marker *et* , unlike the description in Table 2, where Berman (1993) refers to use in 90% of required contexts. For each change, age is given both for the use of *et* in answers to adult questions (A) and for independent use as a complement to a verb (C):

Table 4 - Phases in the acquisition of the accusative marker *et*

	Formulaic *eze*		**Analyzed *et ze***		**Preceding a definite NP**		**With a definite article**	
	A	C	A	C	A	C	A	C
Hagar	1;07;03	1;07;17		1;07;22	1;10;18	1;10;22	1;09;03	1;09;6
Leor	1;09;00	1;09;04		1;11;15		1;11;13	1;09;11	1;11;04
Lior	1;05;29		1;09;15	1;10;04		1;07;05	1;10;13	1;11;05
Smadar	1;06;11			1;07;02	1;10;19		1;10;19	

Children use *et* from their earliest word combinations in the contracted, formulaic form *eze* (= *et ze* 'acc-this'). This form seems to be analyzed, at least phonetically, about a month later and usually occurs after children use the DP for N-to-D but before *shel* is used. The last step is the one in which *et* is used with full definite DPs, i.e., with proper names or DPs which are marked for definiteness by the definite article, and critically awaits the appearance of *shel.* Notably, at each of these stages, there is a clear age-related gap between the use of *et* in question-answer pairs and its use as a complement following a verb, which parallels the situation in which *shel* is initially used in Leor's data {examples (16.b) and (16.c)}.

The initial use of the fanctor in sentence fragments resembles the initial use of *ha-* in positions where Case need not be checked. Once again, it seems that children avoid structures in which checking is required before they master the features of D. This initial use appears during the period when the structure of the possession is still reversed, i.e., when the possessor precedes the possessed, and occurs approximately during the same time span. Similarly, productive marking for definiteness in

argument position seems to depend crucially on the use of *shel*. The period in which objects are marked for definiteness but not for accusativity clearly resembles the intermediate period in which *shel* is absent though the order of the free construct state is already adult-like. For both Cases, there seems to be an intermediate period, in which the environment for the use of the case marker is available, but it is not used. It is as if the child is trying to figure out whether the related features are "strong" in her language, i.e., must be associated with an overt item or not. In other words, only once the projection is accessible, can the computing mechanism operate and the effect of the PF-ban show up. Initial use of *et* in argument position seems to immediately follow the productive use of *shel*, as has already been shown for *ha-*. It takes, however, two more months for this knowledge to become well established, i.e., for the children to figure out which features are associated with D (or maybe K. See Ritter 1991.) and when these features are all specified.

6.4 Nominal Agreement Morphology and Noun-Adjective Agreement

Levi (1980), in her Ph.D. dissertation, thoroughly discusses the way in which children acquire the nominal gender and number morphology. In her work she studied longitudinal data of one child aged 1;10 to 2;10, as well as cross-sectional experimental data of children aged 2;02 to 2;11. She argues that children first acquire productive plural marking for masculine form, while plural feminine shows up later. She divides the development into four phases. The first phase, from 1;10 to 2;00, is characterized by use of the masculine plural morpheme *-im* both for masculine and feminine plurals, e.g., *paratim* instead of *parot* 'cows, fm'. In the second phase, from 2;00 to 2;02, children use the feminine plural morpheme *-ot* for nouns ending with *-a*. At the same time, however, there is not yet standard internal vowel changes, and

children continue to use, for example, *gezerim* instead of *gzarim* 'carrots.' During the third phase, from 2;03 to 2;05, nouns ending with *-at* , e.g., *calaxat* 'plate,' are also marked in the plural with *-ot*. In the fourth and last stage of her research, children aged 2;05 to 2;10 use the feminine plural morpheme for nouns ending with *-et* and *-it*., e.g., *sharsheret* 'chain', *mapit* 'napkin.' During this last period, children start changing the vowels and stress when necessary. Though, by this age, they seem to have mastered the plural rules, Berman (1981) shows that pattern mixing leads to errors even beyond the age of 3;00. Prado (1980) found that even after the nominal agreement system has been acquired, children use the suffixes rather than the actual gender as clues for noun-adjective agreement. This yields, even beyond the age of 4, combinations like *shulxanot gedolot* instead of *shulxanot gedolim* 'tables big-pl-ms.'

Levi's (1980) findings, which are supported by other works (Kaplan 1983, Berman 1981), also show in the present longitudinal data. This section concentrates on the way in which the acquisition of nominal inflectional morphology and noun-adjective agreement interacts with the acquisition of the internal structure of DP, discussed earlier. Thus, the focus of this section is on what children know and what they have to know before the nominal agreement system is acquired rather on the order in which gender and number are acquired.

In acquiring noun-adjective agreement, children seem to move from lexical knowledge of the nominal-morphological system to syntactic knowledge of the relevant structure where it is checked. This is a process that Berman (1986) defines as a transition from rote-learned knowledge to rule-based knowledge. The following dialogue in (37.), between Yuval and his mother while they were looking at a picture book is typical of what children do before this system is acquired:

37. Y: *(x)ayo(t) (g)dolim* [Yuval, 2;01;02]
animals,fm big,pl,ms

M: *ken, xayot gdolot*
yes, animals,fm big,pl,fm

Y: *dubim (g)dolot*
bears,ms big,pl,fm

Y: *(xi)pushit (g)dolo(t)*
beetle,fm big,pl,fm

M: *naxon, xipushit gdola*
yes, beetle,fm big,fm

Y: *(xi)pushit (g)dola*
bug,fm big,fm

Y: *dag (g)dola*
fish,ms big,fm

During the period which precedes the acquisition of noun-adjective agreement, the child seems to grasp the morphology and make morphological distinctions between masculine and feminine, singular and plural. This knowledge is available since it is part of the nominal system. What seems to be missing at this point is the syntax of noun-adjective relation, which forces agreement between the two, i.e., checking.

Earlier, in Section 6.2 of this chapter, , in the discussion of the acquisition of the genitive marker *shel* 'of',' it was suggested that the acquisition of agreement is related to the acquisition of *shel.* That is, only once the D system becomes accessible, when *shel* is used, does agreement seem to emerge. Examples (14.) and (15.) which were given there are repeated below in (38.) and (39.), respectively:

38. *exad ecba* for *ecba axat* [Leor 1;09;17]
one-ms finger-fm finger-fm one-fm

39. *roce* [*balon exad*] [Leor 1;10;03]
want balloon one
`I want one balloon`

Ignoring for the moment the difference in word order, we observe that in example (38.) the number does not agree with the head N while in example (39.) it does. Interestingly, as has already been pointed out in Section 6.2, (38.) was recorded just before Leor used the genitive marker productively, while (39.) was recorded two weeks later after Leor has been using the D system for the genitive marker.

This data, however, seems to be insufficient for three reasons. The first reason is that though the numeral system always agrees with the noun it modifies, numbers larger than 'one,' e.g., 'two, three,' etc. precede the verb rather than follow it, as 'one' does in (38.). Moreover, and this is the second reason, there is no evidence at the period when Leor uses *exad* 'one,ms' that he also knows the feminine form *axat*. There are also no evidence that this happens with other modifiers since it is the only modifier he uses which carries agreement marker. The third reason is that, unfortunately, Leor is the only child in the longitudinal corpora who uses a modifier (numeral or adjectival) during this period, while the other children use adjectives only after *shel* has been used.

The longitudinal findings for Leor are supported, however, by the diary data of Yuval. The dialogue in (37.) from Yuval's diary precedes the acquisition of *shel* while two months later, when *shel* has already been used, albeit in a limited context, nominal agreement seems to emerge, as shown in (40.):

40. Y: *Yuvali gadol* [Yuval 2;03;14]
Yuvali (ms) big-ms
M: *ve ma Gali?*
and what (is) Gali?
Y: *Gali gdola.*
Gali (fm) big-fm
M: *ve ha-dagim?*
and the-fishes (ms)?

Y: *ktanim.*
little-pl-ms
M: *ve ma ze po?*
and what (is) this here?
Y: *xipushiyot.*
beetles
M: **xipushiyot ktanim?*
beetles(ms) little-pl-ms?
Y: *xipushiyot ktanot*
beetles-fm little-pl-fm

In this question-answer context it is clear that Yuval has grasped the syntax of agreement to the extent that he is not only producing grammatical NPs but can also observe ungrammaticality and correct it. This, as noted before, happened only after he started using *shel.*

Similar findings are reported by Clahsen et al (1994) for the acquisition of nominal agreement in German. Clahsen et al show that German speaking children initially use NPs which consist of a nominal head which is preceded by determiners, adjectives or possessors in complementary distribution. Within these NPs, Clahsen found a vast number of agreement errors in which the determiner or the adjective did not agree with the nominal head as they should have. He shows that this changes when the genitive case appears.

Clahsen argues, as I did for Hebrew, that children use only the head and the specifier of the NP in their early word combinations. That is why the early NPs are limited to two words, and all modifiers compete for the same node, i.e., [Spec, NP]. Moreover, since agreement is checked at the DP (or AgrP) level, this argument also explains the agreement errors they make since there is no place where agreement could be checked earlier, i.e., no functional head which carries agreement features. He argues that D become accessible only when children start using the genitive case

marker *'s*. In other words, the genitive triggers the use of D, and after D is used for *'s*, children realize that the determiner should head the DP rather than occupy [Spec,NP]. Finally, this enables the use of more complex nominal phrases simultaneously containing determiners and adjectives. Since D is now accessible, checking takes place and agreement errors disappear.

Similarly, in Hebrew, in line with the analysis given for the acquisition of *shel*, children can specify the agreement features of D only after they have used them for *shel*. As is suggested by Clahsen et al, it seems that *shel* specifies D. One possible explanation is to stipulate that while N-to-D in early word combinations is actually N-to-F, i.e., movement to an unidentified functional category, the emergence of *shel* specifies this category and distinguishes D from K or D from AgrN.

However, recalling the account given earlier for N-to-D in early word combinations, in which it was argued that children initially use D with no features and that *shel* shows up only when they realize that D is associated with some features, an alternative explanation emerges. It seems that once D is accessible, children first specify its head-features, starting with *shel*, and only later, its spec-features. This order results from the need to combine knowledge of the language specific morphological paradigm in identifying the relevant features and specifying them with spec-head checking, for which there is no earlier use within the nominal system.

This last explanation, which makes use of the "computing mechanism" for checking, is compatible with the minimalist hypothesis for acquisition, which posits moving from a partial tree to an extended tree and from local head-head checking to spec-head checking. It will be empirically supported in the following chapter which

will demonstrate that the time gap between children's use of head-features and their use of spec-feature is a phenomenon which pervades the process of acquisition.

Chapter Seven -- The Acquisition of VP Structure

Just as the noun is the extended head of the DP, the verb is the extended head of the whole sentence, i.e., the CP (Grimshaw 1991). Thus in addition to acquiring the nominal system the child must also work her way through the verbal system, the structure of VP and the extended projections of V. This section addresses a few of the processes that the child undergoes in acquiring the verbal system.

Knowledge of the verbal system shows up as soon as children use verbs during the one word stage. The analysis of early verbs in Section 7.2 indicates that though children's early verbs show only partial knowledge of the verbal system, it is not an arbitrary set of verbs used in an arbitrary manner but rather a limited set used in an aspectually limited manner (See also Tsimpli 1992.). Once children start combining words, they have to disentangle several structures.

First is the acquisition of the verb-argument structure, which determines the arguments which each verb takes and how they are mapped onto the syntax. Even under an assumption of a universal mental lexicon (Williams 1994), the linking rules from the lexical-semantic representation (Rappaport & Levin 1988) to the syntactic representation seem to vary crosslinguistically (Randehl 1992, van Hout, Randall & Wiessenborn 1993), causing a verb like '*run away'* or *'roll away'* behave like an unaccusative verb in Dutch, but like an unergative in German. These rules have to be acquired by the child. Moreover, there is also a question of which argument-structures, i.e., which verb classes, are acquired first. This issue will be addressed in

Section 7.3, suggesting that although children already use a variety of verb classes in their early verbs, they gradually extend their use of argument, starting from a single argument (subject or object) and gradually enlarging the number and type of arguments.

Another important task is the acquisition of verbal morphology, which in Hebrew marks tense (past, present or future) as well as person, number, and gender for almost every verb. The order in which verbal morphology is acquired will be thoroughly discussed in Section 7.4, showing that it mirrors a manifestation of a bottom-up tree as is predicted by the *Minimalist Hypothesis for Language Acquisition* presented in Chapter 4. In this section, the same mechanism which applies to NPs, will beapplied to VPs, and the timing gap between head-feature and agreement features will again become apparent. These findings lead to the issue of root infinitives in Section 7.5 where it will be argued that they are not a homogeneous phenomenon but rather a number of phenomena, each of which requires a different explanation.

The last issue addressed in this section, which actually runs through all its parts is how children learn what constitutes a strong feature in their language, that is, how children learn when movement is triggered. In Section 7.6, verb raising will bediscussed, and the possible triggers reviewed.

7.1 Hebrew Verb Morphology

Hebrew verbs are marked for tense (but not aspect); in the past and future they are also marked for person; and --like nouns and adjectives-- they take agreement markers for number and gender. The inflectional categories of tense, person, number

and gender agreement are marked by prefixes and suffixes as well as by vowels interdigited with root consonants, and these alternate across a restricted set of vowel patterns or conjugations.

Hebrew verbs are constructed in one of five morphological patterns called *binyan* conjugations, which associate affixal stem elements with a set of root consonants or radicals. Examples of such alternations are given in Table 1 for the two roots *g-d-l* 'grow' and *k-t-v* 'write'. Verbs are listed in the morphologically simple form of 3rd person masculine singular in the past tense; a broken line '---' indicates a lexical gap, and alternations between the stop *k* and the spirant *x*, which are allophones in this situation, are irrelevant for present purposes.

Table 1 - Distribution of two verb roots across five verb patterns:

Pattern	***g-d-l***	**Gloss**	***k-t-v***	**Gloss**
P1 *pa'al*	*gadal*	'grow, Intr'	*katav*	'write'
P2 *nif'al*	---	---	*nixtav*	'be/get written'
P3 *pi'el*	*gidel*	'grow, Trans'	*kitev*	'captionize'
P4 *hitpa'el*	*hitgadel*	'self-aggrandize'	*hitkatev*	'correspond'
P5 *hif'il*	*higdil*	'enlarge'	*hixtiv*	'dictate'

Lexical gaps and semantic inconsistencies between *binyan* form and function in the lexicon of contemporary Hebrew set this system in the domain of word-formation (derivational morphology), not germane to this work, rather than grammatical inflection[1]. However, alternations between the different *binyan* patterns interact with syntax, since they are critically relevant to the expression of valence relations in Hebrew, including the dimensions of transitivity and voice. For

1 Productive command of *binyan* alternations like those illustrated in (1) generally emerges between ages three to four years after children have mastered the basics of inflectional morphology (Berman 1993, 1994).

example, verbs in P2 and P4 are typically intransitive since they never govern an accusative direct object, and they have transitive alternants in P1 or P5 and in P3.

The major inflectional paradigms in the Hebrew verb system are of mood/tense --in the distinction between nonfinite (infinitives and imperatives) and finite (present, past and future). These are illustrated in their 3rd person, singualr, masculine form for morphological simplicity in Table 2 for verbs in the three *binyan* patterns with the highest frequency of usage in Hebrew for adult as well as child speech. The first example for each pattern is a verb with a "full" or canonic triconsonantal root; the others have a defective root, which means they contain one or more "weak" root elements --a pharyngeal, glottal, or glide-- that are not consistently realized across all forms of the verbs constructed from those roots.

Table 2 - Alternation of verbs across five categories of mood/tense

			Irrealis Forms		Participial		Tensed
Root	**Pattern**	**Gloss**	**Infinite**	**Imperative**	**Present**	**Past**	**Future**
g-m-r	P1 *pa'al*	'finish'	*ligmor*	*gmor*	*gomer*	*gamar*	*yigmor*
s-t-y	P1 *pa'al*	'drink'	*li-shtot*	*shte*	*shote*	*shata*	*yishte*
b-w-?	P1 *pa'al*	'come'	*la-vo*	*bo*	*ba*	*ba*	*yavo*
t-q-n	P3 *pi'el*	'fix'	*letaken*	*taken*	*metaken*	*tiken*	*yetaken*
n-q-y	P3 *pi'el*	'clean'	*lenakot*	*nake*	*menake*	*nika*	*yenake*
g-d-l	P5 *hif'il*	'enlarge'	*lehagdil*	*hagdel*	*magdil*	*higdil*	*yagdil*
y-r-d	P5 *hif'il*	'lower'	*lehorid*	*hored*	*morid*	*horid*	*yorid*
b-w-?	P5 *hif'il*	'bring'	*lehavi*	*have*	*mevi*	*hevi*	*yavi*

As can be seen from the above, children have a choice of five mood/tense categories every time they use a verb. As shown in Table 2, infinitives are marked by a prefixal *l-*, which takes a different vowel (either *li*, *la*, or *le*), depending on the nature of the following syllable. The imperative forms in Table 2 are of the

historically, normative type, based on future-tense stems. Children generally use the forms common in everyday colloquial usage, a future stem either with or without the 2nd-person *t-* prefix, depending on the vowel-pattern conjugation (Berman 1985, Bolozky 1979).

Present tense verbs are also participial and are marked only for number and gender, yielding four forms per verb: masculine singular --as in Table 2-- to which are added three different suffixes unstressed *-et* for feminine singular, stressed *-im* for masculine plural and *-ot* for feminine plural. Past tense verbs have even more forms since they also take suffixes for person, added to the masculine singular stem as follows *-ti* 1st singular, *-ta* 2nd masculine singular, *-t* 2nd feminine singular, *-a* 3rd feminine singular, *-nu* lst plural, *-tem* 2nd masculine plural, *-ten* 2nd feminine plural and *-u* 3rd person. Future tense verbs are similarly inflected for number, gender and person but by means of prefixes, e.g., *ti-, ta-* or *te-* for 2nd person as well as suffixes for number and gender.

7.2 Early Verbs

This section examines the early verbs of six Hebrew-speaking children. Here, "early verbs" are defined as different verb forms that are among the first to appear in the naturalistic speech of children at the one-word stage and in the transition to word combinations. The issues addressed here are the word-forms children initially select for verbs which express activities, changes-of-state and other kinds of predications and whether there is any evidence for the accessibility of functional heads at this early stage. The central hypothesis is that, in a highly inflected language like Hebrew,

children's earliest use of verbs will manifest some kind of affixation to the verb stem or root. However, these forms are typically rote-learned and unanalyzed and will not give evidence of a productive command of grammatical inflection (Bowerman 1982, MacWhinney 1978).

Tomasello (1992) assumes that "first verbs" play an important role in children's early grammar and in the interface between the development of syntax, morphology, semantics and the lexicon. Early verbs also figure in different explanations for the general process of language acquisition. For example, very different interpretations are proposed for the data as well as for the theoretical framework in Tomasello's study of his daughter's early learning of English (Deuchar 1995, Pine 1995 and Shatz 1994, Tomasello 1995).

Tomasello defines "first verbs" as those which occur in the child's speech in the early stages of her language acquisition until around age two years. In other discussions of "early verb usage," researchers have considered the verbs used by children at several different phases of development, from the one-word stage via early word-combinations and on to a command of simple clause structure and a broad array of verb-argument relations. One aim of this section is to define precursors to these latter phases, by confining our analysis to children who seem not to have yet demonstrated overt command of syntax.

To achieve this aim, this section will examine the effect of target language typology on the nature of children's very early use of verbs. This question was not of major concern in earlier studies of language acquisitionbecause of ananglo-centric

bias in this area of research until quite recently.[2] In English, children can use an uninflected basic or stem form as the default for verbs (as well as for nouns and adjectives), reflecting the "underspecification of functional heads" (Hyams 1995). Children acquiring English and other Germanic languages like German or Swedish can also talk about activities and endstates by using particles like *down* or *off* (Clark 1993, Plunkett and Stromqvist 1992). That is, they can make use of options available to speakers of "verb-satellite" languages (Talmy 1985).

In contrast, children acquiring a "verb-framed" language like those in the Romance and Semitic families will use plain verbs rather than their associated satellite particles or prepositions (Berman & Slobin 1994, Chapter III, Slobin 1995). In Italian, for example, "Verbs never appear as unmarked forms, but always bear inflectional affixes" (Pizzuto & Caselli 1993, p. 137). One consequence of this is that in Italian children's speech, "several inflections (and major inflectional paradigms) are present from the earliest ages" (Pizzuto & Caselli, 1992, p. 525). In other words,, when a language requires major inflections and paradigns, children evidently use inflected forms of verbs from the very start of their speech production.

However, and this is the crux of this section, the status of these forms is not entirely clear. Is it, in fact, the case, as argued by Pizzuto & Caselli (1992, *op cit.*) and as, we have hypothesized, that "only few of these (inflections) achieve productive, adult-like use" at the early phases of acquisition? Or can children be credited with some level of productive knowledge from very early on? Guasti (1994)

2 There were several early diary studies on languages with richer verb inflection than English {e.g., ones included in Bar-Adon and Leopold (1971) and Ferguson and Slobin (1973)}, but these early studies were largely confined to descriptions of child language data without a priori hypotheses about the nature of grammatical development.

takes into account the syntactic criteria of word order rather than only verb morphology to argue that Italian-speaking 2-year-olds are able to distinguish finite from nonfinite verbs in their early word combinations (See Verrips & Weissenborn (1992) for similar arguments for French and German.). A third possibility is that children invariably adopt an initial default option of some stemlike base to which inflections are then added, regardless of the typological characteristics of the target language, i.e., whether it is a “verb-satellite” or “verb-framed” language.

To answer these questions, this study will examine the first 20 verb-forms recorded in the longitudinal corpora of Leor, Lior and Smadar, in addition to diary studies of Keren (Dromi 1986), Shelly (Berman 1978) and Yuval, ranging in age from 14 to 25 months. Included are all forms that could be unequivocally treated as "verbs," as defined in Section 7.1 for Hebrew. We have disregarded any forms which were clearly imitative, i.e., produced contiguous to a caretaker version of the same verb-form. The forms are listed for each of the six children in Appendix I.

The methodological difference in data-collection for the two groups of children reflects a developmental difference. Data for the first three children were recorded from a slightly later phase of language development, as follows. Verb-forms are listed over a period of one month for the two girls, Lior (child #1) and Smadar (child #2), aged 17 to 18 months and 18 to 19 months, respectively, when they were in a transitional stage from single-word to multi-word utterances. The third child in this group, the boy Leor (child #3), had already moved beyond the single-word stage when his "early verbs" were recorded (age 21 to 22 months). In contrast, data for the three diary-based samples are taken from the earlier, one-word stage of development, and they were recorded over periods of more than a single month, as follows: age 14

to 16 months for the girl Keren (child #4), 16 to 21 months for the boy Yuval (child #5) and 23 to 25 months for the girl with bilingual input, Shelly (child #6).

A major problem in analyzing the data was possible ambiguity of children's output forms at this early phase of language development. Forms were interpreted on the basis of linguistic context, e.g., parental expansions or explanations as well as the extralinguistic situation, such as the kind of activity being engaged in or the pictures or toys being talked about. Nonetheless, around one half of the items in our sample (and no less than one quarter of those listed for each of the six children) were unclear or "stemlike."

Some cases of ambiguity can be attributed to perceptual difficulties of the child. Another kind of ambiguity, more accessible to resolution by context, occurs when the child (apparently) uses the same surface form for more than one target form,e.g., Keren's *pes* for both the verbs *le-xapes* 'to-seek' and *le-tapes* 'to-climb.' which are phonetically and semantically quite distinct in adult language. More importantly, children's early articulation of verbs, like other words in their repertoire, is still far from the target. This leads to two difficulties of analysis: first, it is not always clear whether the child's deficit is morphological (i.e. grammatical) or articulatory (i.e. phonological); second, even with the rich contextual information which we used to interpret the children's utterances, it was often hard to decide whichtarget form a child was attempting to reach. This problem proved particularly acute in the case of the stemlike "stripped forms" (See Section 7.2.2, which follows.).

Having stated the difficulties, we will present the results of our analysis of the data along the following three dimensions (as detailed in Appendix I): lexical and

semantic distribution of the items analyzed (7.2.1); inflectional alternations (7.2.2); verb-pattern distribution and valence alternations (7.2.3). Individual differences in initial verb usage will be pointed out when relevant.

7.2.1 Lexical distribution of early verbs

This section concerns the breakdown of different lexemes across the six children in our sample. Here, "lexeme" has the highly specific sense of a given verb root, irrespective of the inflectional form it occurs in out of those surveyed in Section 7.1. The notion of lexeme for Hebrew verbs further takes into account the particular *binyan* morphological pattern in which a root occurs (listed by n-1 through n-5 in Appendix II). For example, transitive *li-lbosh* 'wear, put on (clothes)' in the P1 pattern and reflexive *le-hitlabesh* 'dress (oneself), get dressed' in the P4 pattern are counted as two distinct lexemes though both are from the same root *l-b-sh*. On the other hand, the following inflected forms of P1 *li-lbosh* would all come under the heading of a shared lexeme: past tense 1st person *lavAshti* 'I wore,' present tense plural *lovshim* 'are wearing,' future tense 2nd person feminine *tilbesh* 'you+Fem will-wear.'

The list in Appendix I shows that the total of 120 verb-forms analyzed for these six children include only 58 different lexemes. That is, there is a large shared lexical repertoire for these children of different sexes from different locations in Israel, with different home backgrounds and family constellations. Of these 58 verbs, half were "idiosyncratic," that is, they were recorded for only one of the six children in our sample although all are typical of children's early vocabulary (They refer to familiar activities such as drinking, drawing, writing, cutting, playing (music) and hitting) and

they appear in the repertoire of the other children in the following months. 20 more verbs were used by two or three of the six children, and the rest were used by as many as four or five of them.

Semantically, "most favored" verbs share features known to be highly salient to young children. They include the transfer-of-location verbs for ‘giving’ [*ntn1*] and ‘taking’ [*lqx1*], as well as the verb for ‘putting’ [*sym1*], used by three children. They also include mainy verbs of motion and posture, specifically those referring to direction of movement such as ‘getting up’ [*qwm1*], ‘going down’ [*yrd*] or ‘going out’ [*yca*], the latter two both in their intransitive and transitive-causative versions. ‘Sitting’ [*yshv1*] and ‘moving’ [*zwz1*] are also common. Far less common are verbs that describe manner of motion, e.g., ‘running’ [*rwc1*] and ‘flying’ [*iyf1*]. This inventory matches that which has been found for verb-framed languages like Hebrew and Spanish: speakers favor reference to direction rather than to manner of motion, in contrast to speakers of verb-satellite languages like English and German (Berman & Slobin 1994, Slobin 1995 in press).

The general semantic classes which these children's verbs cover are shared by all children. The bulk refers to activities, both transitive and intransitive (In this connection, see Section 7.2.2.), carried out by an animate actor or agent, e.g., those that refer to crying, sleeping, eating or throwing. A few refer to changes-of-state, particularly the intransitive verbs for ‘falling’ [*npl1*], ‘ending’ [*gmr2*] and ‘breaking’ [*shbr2*] or ‘bursting’ [*pcc4*]. And a few are statives, usually modal in meaning -- the verbs meaning ‘want’ [*rcy1*], ‘manage’ [*clx5*], and ‘be able’ [*ykl1*] as well as the physical state of ‘hurting’ [*kav1*]. The verb for 'see' [*ray1*] is used by half the children, not to express stative perception, but as an attention-getter in the imperative

form with the sense of ‘take a look! lookit!’ To conclude, there is nothing particularly "Hebrew" about the semantic content of the verbs used by these children.

7.2.2 Inflectional alternations

The inflectional paradigms considered above refer to the five verb categories of mood and tense listed in Table Two of Section 7.1, together with markings for number (if plural), gender (if feminine) and/or person (1st or 2nd compared with 3rd). They do not include lexically ambiguous, stemlike forms. “Stemlike” or “stripped” forms are ones which could morphologically be interpreted as standing for more than one grammatical mood/tense category. Examples include: (a) *pes*, (b) *kax*, (c) *zuz and* (d) *(r)id*. *Pes* 'seek, look for' for the verb-root *x-p-s* in P3 *pi'el*, used by Lior, Smadar and Keren, could theoretically stand for infinitival *le-xapes* as well as for the masculine singular forms of the other four categories listed in Table Two above: imperative *xapes*, present tense *mexapes*, past tense *xipes* and future *yexapes* (Also see note (b) in Appendix I as to how forms were interpreted and, hence, glossed.). *Kax* 'take' for the verb-root *l-k-x* in P1 *pa'al*, used by Smadar, Leor, Keren and Yuval, could stand for infinitival *la-kAxat*, imperative *kax*, past tense *lakax* and future *yikax*. *Zuz* 'move [Intransitive]’ for the root *z-w-z* in P1, used by Lior, Leor and Yuval, could stand for infinitival *la-zuz*, imperative *zuz* and future *yazuz* (*R*)*id* causative 'make-descend' = 'take down, lower' for the root *y-r-d* in P5 *hif'il*, used by Leor, Keren and Yuval, could stand for infinitive *lehorid*, imperative *torid*, present tense *morid*, past tense *horid*, and future *yorid*.

These examples and other stripped forms like them, irrespective of verb-pattern or root-type, all take the shape of the second, stem-final syllable. This is typically the

stressed syllable and, hence, most salient in the input language (Berman 1977, Faingold 1990, 1994). Such forms can be disambiguated in the children's usage if they include, in addition to the stem element, some overt marking of the relevant grammatical category: prefixal *l-* marking of the infinitive or a suffixed feminine ending --stressed *-i* in imperative or unstressed *-et* in the present.[3] Plural suffixes might also disambiguate these stem forms, specifically stressed present tense *-im* and past tense *-u*, but these are few and far between in our sample.

Against this background, the five mood/tense categories listed in Table 2 with the addition of an unclear "stripped" category were distributed across the six children, as shown in Table 3.

Table 3 - Percentage of verb-forms by stripped stems and mood/tense [N = 120 forms]

Stripped	Infinitive	Imperative	Present	Past	Future
46	6	19	10	15	5

The breakdown in Table 3 shows that less than a third (30%) of early verb forms are clearly marked for present, past or future tense. This confirms findings for Hebrew from earlier, cross-sectional studies (Berman & Dromi 1984, Kaplan 1983) as well as numerous other studies of early tense-aspect usage (summarized in Aksu-Koc & von Stutterheim 1994, Weist 1986). The favored forms are the ones we have called "stripped" --nearly half of all forms used by the six children. The next highest frequency form is imperative, which account for less than 20%, if we apply the

3 The stressed feminine suffix -a in past tense does not always disambiguate in the same way; it may incur vowel reduction in the preceding, stem-final syllable and yield forms that are ambiguous for other reasons. For example children's surface *Afa* could stand for feminine *nafla* = past tense `fell,' as well as for *Afa* = femine present or past tense `fly, flew', and *Axa* could stand for feminine past tense *halxa* `went' or *lakxa* `took.'

strictly formal criterion of an isolated, decontextualized surface form with an overt affixal marker specifying it as imperative in person (prefixal *t-*), number (suffixal *-u*) or gender (feminine *-i).*

Let us now consider what we have termed *"stripped" forms,* that is, stem syllables with no overt affixal indication of mood/tense category. The strategy adopted in such cases is to produce a CVC syllable based on a stressed syllable in the target language. The vowel of this syllable often mirrors the stem-final element of the different *binyan* patterns, e.g., *o* for P1, as in *gor* 'close, shut'; *e* for P3, as in *pes* 'climb' or 'seek, look for'; and *i* for P5, as in *(r)id* 'descend+Causative' = 'take down, take off'.' However, there is no one-to-one correspondence between the stressed vowel of these stripped forms and a given verb pattern. One reason is that the P1 *pa'al* pattern --semantically and syntactically the most basic verb pattern, with the highest frequency in child and adult Hebrew-- has three different stems. The vowel *o* marks its stem in irrealis forms (infinitive, imperative and future) but not in the past or present, which have different sets of vowels. The second reason is that multisyllabic P4 *hitpa'el* shares the same stem-final *e* vowel with its transitive *pi'el* counterpart (Compare intransitive *hitpocec* with transitive *pocec* 'burst' in the past and *mitpocec*, *mefocec* in the present.). The third reason is that many of the most frequent, familiar verbs are constructed out of morpho-phonologically defective or "weak" roots and they show even more variable alternations between stem vowels and consonants.For example, P1 y-r-d 'go down' yields juvenile *Ede* for both the infinitive *la-rEdet* and the feminine present tense *yorEdet*, and P1 *kam* 'get up' present is identical to past tense *kam*.

As seen from Table Three, these unclear, stripped forms account for nearly one half of all forms listed in our sample. They range from a high of 13 and 14 of the 20 items listed for Smadar and Yuval (i.e. between 66% to 70%) to Leor's 7 and Shelli's 5 (i.e. at least 25% of all forms). This finding contradicts the assumption that children acquiring a highly inflected language like Hebrew would avoid a "stemlike" strategy (Pizzuto & Caselli 1993). On the contrary, some of these children rely heavily in their initial verb production on forms that are superficially uninflected. To do so, they isolate a stem syllable which is phonologically salient and semantically more informative than the associated affixes of the verb-form or morphology. For example, there were only 4 instances of the highly frequent and obligatory prefixal *l-* marker of infinitives and three of these came from Leor, the child who was at a more advanced stage of language development than the others. Leor was also the only child to use a clear prefixal *t-* to mark future tense in the second person (See below.).

Affixes marking agreement for the categories of gender, number and person could also, in principle, disambiguate otherwise "stripped" forms. However, the only one of these which was at all common was that marking feminine gender. There were 32 such occurrences, over 70% stressed *-i* in feminine imperative, and half of these were from one child, Shelly. Several of these *-i* forms (5 out of a total 23) co-occurred with the masculine, stem form of the imperative in a single child's usage. Additionally, there were only 3 clear instances of unstressed *-et* in present tense (from Lior) and 4 cases of stressed *-a* --two from Keren marking past tense and two from Shelly marking present tense forms.

Suffixes marking plural number were very rare, only four in all: two 1st person plural past tense, unstressed *-nu* on the same formulaic item *gamArnu* 'we've finished'

= 'it's done, over,' one, also used formulaically, in the expression *sagArnu* 'we've closed the light' = 'the light's off'‘ and one imperative with plural *-u*, in *kxu* 'take!' The last two were both used by the most advanced of the six children, Leor. Moreover, there were no markers of person at all, although these are required in past and future tense. An occasional *t-* prefix for 2nd person in future was used, mainly by Leor, and by other children on the verb *tavi* 'bring', but these could all be interpreted as imperatives rather than as future forms (Berman 1985, Bolozky 1979). An even rarer *n-* 1st person plural prefix on future stems was used only with a hortative sense, as in English ‘let's,’ in keeping with the general extension of future-tense forms for general irrealis modality in current Hebrew (Schwarzwald 1981).

To summarize, feminine gender appears to be the most salient and the earliest marking to emerge in children's usage. On the other hand, however, these early data show **no** instances of productive alternation for either number or gender with the exception of 5 alternations between stem-like imperatives and their feminine counterparts with *-i*. And even these few cases did not appear well-motivated: Smadar, who has two older sisters who were often present during recordings, used a feminine imperative only twice, whereas Shelly, who used such forms in over half her 20 early verbs, used them indiscriminately when addressing her mother and father, her sister and her uncle.

The general picture which emerges, then, is of minimal alternation across inflectional forms within and across the children in our sample. This finding of a lack of formal alternations accords well with what has been shown for early phases of verb acquisition in other languages. For example, Tomasello found that in the early verbs of his English-acquiring daughter, nearly half had no inflectional ending at all, while

the rest were predominantly (about two-thirds of the cases) in either past or present -- i.e., had an *-s* suffix-- and there were only a few rare instances of the child using both past and present for the same verb.

For the Hebrew data base, it is not clear how to interpret those few instances when children do use more than one surface form of a single verb lexeme. Examples include Smadar's stemlike *gOax ~ gor* for *lisgor* 'to-close,' followed by a later form, *nigor* for *nisgor* 'we'll close' = 'let's close' and Leor's *kax* for stem or imperative 'take' alternating with *kAxat* for infinitive *lakAxat* or present tense feminine *lokAxat*. In contrast to clearly alternating forms like present versus past tense verbs (marked by a *m-* prefix or special vowels), which indicate productive use of morphological knowledge, these alternations (i.e., *gor-nigor, kax-kaxat*) may represent no more than articulatory improvements of initial "stemlike" forms. On the other hand, these could be indicative of some initial, incipient knowledge of grammar. That is, according tothe lexical learning hypothesis (Clahsen 1992), such early, limited alternations could represent highly familiar items which provide a basis in child-language for subsequent productive mastery of a grammatical system such as verb-inflection. This would be consistent with a gradual, step-by-step model proposed by Berman for the acquisition of different facets of linguistic knowledge, i.e., grammatical morphology (Berman 1986), and subsequently extended to the domains of word class distinctions (Berman 1988a), syntax (Berman, 1987, 1990) and narrative construction (Berman, 1988b).

The general lack of alternation of inflected forms across the same lexeme relates to a notion that has been variously defined in crosslinguistic studies of acquisition as the "aspect before tense" or the "defective tense hypothesis" (Weist 1984, 1986;

Tsimpli 1992). It also accords with the "one-form/one-function" theory of early acquisition (Berman & Slobin 1994, Budwig 1991, Slobin 1973). These proposals all share the idea that children's initial use of a given linguistic form has a restricted range of application --semantically, syntactically and pragmatically. On the whole, this has been confirmed in our data. The few cases of past tense forms occur with unaccusative or semantically change-of-state, achievement verbs. For all the children, the verb meaning 'fall' [*npl1*] took a form of the past tense *nafal*, and this was true, too, of intransitive 'break' [*shbr2*] and 'burst' [*pcc3*], as well as the formulaic 1st person plural ending in *gamArnu* 'we've finished' = 'it's done, over'. An occasional present-tense form was reserved for verbs with modal meanings of 'want' and 'be able' or durative activities like those meaning 'cry'. Future forms were used with modal intent, as imperatives in the 2nd person and as hortatives in the 1st person plural. The rest, primarily general activity verbs and motion verbs, were used in some unclear, stripped form or in irrealis mode --imperatives or infinitives-- with no evidence for productive alternations of different inflectional forms being used with the same verb. This lack of alternation between different inflectional forms reflects a general developmental tendency in the initial phases of acquisition of any system to mapping of a particular form onto one restricted meaning.

7.2.3 Verb-pattern distribution

This facet of early verb usage is relevant to valence distinctions and, hence, to verb-argument structure. In Hebrew, a change in transitivity or voice is typically marked by a change in morphological form, in addition to permutations in the position and/or number of arguments. Thus, English ‘break’ is rendered by the P1 form *shavar*, if transitive, P2 *nishbar*, if intransitive, and by the passive participial

form *shavur* to express resultant endstate (Berman 1994b). Moreover, a morphological change marks the difference between an intransitive motion verb in P1 like *yarad* 'go down, get down,' *yatsa* 'go out, exit,' *nafal* 'fall' and their P5 transitive-causative counterparts, *horid*, *hotsi* and *hipil* meaning 'take down, lower,' 'take out, extract' and 'make-fall, drop,' respectively.

In our sample, about half the verbs (55%) are in the basic P1 *pa'al* conjugation, with another 30% in the two typically transitive patterns, P3 *pi'el* and P5 *hif'il*. The remaining 15% are in the two intransitive patterns, P4 *hitpa'el* and P2 *nif'al*. This breakdown closely parallels findings from cross-sectional studies for verb-pattern distribution in Hebrew child language (Berman 1994a). In addition, it confirms the special status of P1 as having the highest frequency of usage for both type and token, in adult as well as child Hebrew.

Lack of verb-pattern alternation is a second finding which accords with previous, cross-sectional studies of Hebrew-speaking children's command of verb pattern alternations (Berman 1980, 1982). Within and across children, there is almost **no** alternation of more than one verb-pattern for the same verb-root. Of the 58 verb lexemes listed in Appendix I, only 6 share the same root in two patterns. Two children used the root [*bwa*] both in P1, meaning 'come' and in P5 for its causative counterpart 'bring;' three used the motion verb root [*yrd*] 'descend = go, get down' in intransitive P1 and causative P5 'take, bring down,' and two used the motion verb root [*yca*] 'exit = go, get out' in intransitive P1 and causative P5 'take, bring out.' The verb root [*lbsh*] 'dress' was used transitively in P1 by one child, causatively in P5 by two children and intransitively as a reflexive in P4 by a fourth child. This finding suggests that verbs have a single form that is initially favored by children in their

speech output (and maybe in parental input as well). For example, a verb like the one meaning 'break' is used first in its intransitive P2 form and only later in its transitive P1 form. In contrast, a verb like the one meaning 'throw' is used first in its transitive P1 form and only subsequently in the P2 sense of 'get / be thrown.'

The choice of these initial forms is related to a variety of possible factors. The determining features might be pragmatic salience and frequency of usage, as well as form/function associations, such as the relation between perfectivity (Hebrew past tense) and unaccusative verbs like intransitive P2 versions of 'break' or 'tear.' It might also be that the initial inaccessibility of passives leads to the avoidance of P2 forms of verbs like those meaning 'throw', 'take.' A full discussion of this issue lies beyond the scope of the present study. It is clear, however, that children cannot yet be credited with any kind of general, structural basis to the association between verb root and verb pattern. Motion verbs may, as noted, sometimes be used both in their intransitive P1 and causative P5 forms from the start, but there is no reason to suppose that children have as yet extracted any generalized form/function connection between such forms as *bo('i)* 'come!' and *tavi* '*bring*!' and (*lar)Edet)* '(to) get down' and (*lehor)id* '(to) take down.'

Concerning transitivity, P1 *pa'al* is the only pattern which is equally accessible to both transitive and intransitive verbs. In our sample, about one third of the P1 verbs used are transitive, requiring a direct object (e.g., those meaning 'open,' 'put,' 'give' and 'take'), several others take optional objects (e.g., those meaning 'eat' or 'write') and the rest are intransitive, mainly verbs of motion. Transitive and intransitive verbs show up about equally in the sample of early verb usage. A developmental implication is that these children have a lexical basis, i.e., a hold of the lexical-

semantic representation, which enables them to use different types of argument structure when they move into the early word combinations.

On the other hand, the children didnot rely on morphological clues for the transitivity distinction, as shown by their general favoring of verbs in the transitivity-neutral P1 and the relatively low number of verbs in P2 and P4, the two patterns which are clearly marked as intransitive. This accords with explanations that have been proposed to account for the fact that in their early clause construction, Hebrew-speaking children mark transitivity distinctions syntactically but not morphologically as required (See, for example, Berman 1994a, Pinker 1989, Pye 1994.). Thus, it is suggested that Hebrew-speaking children at this early phase are like children speaking typologically quite distinct languages, including English: they use both transitive and intransitive verbs, without this having any associated morphological consequences.

We saw that children have a large repertoire of verbs even before they start combining words and that these represent a range of predicate-types: syntactically -- both transitive and intransitive-- and semantically --verbs which express activities, events and even states. The items we analyzed were identified as verbs on semantic and formal grounds. They are formed by a combination of consonantal roots and affixal patterns associated with the Hebrew verb system. However, our findings show that these forms are best viewed as "precursors" to the adult verbs for three reasons. First, they lack overt syntactic marking of argument structure. Second, they fail to make productive use of inflections for alternation of tense/mood and agreement affixes. Third, they show no ability to use morphological verb-pattern alternation for distinguishing different classes of predicates along the axis of transitivity. In other

words, children use both transitive and intransitive verbs, but they seem not to be able to associate transitivity or intransitivity with a particular verb-pattern.

The prediction that "early verbs" will be largely rote-learned or morphologically unanalyzed is, thus, strongly confirmed. However, our expectation that from the start Hebrew-speaking children would use only inflected, morphologically complex forms proved unfounded. Rather, these children appear to rely quite strongly on stemlike elements in their initial productions. Their early use of verbs is not yet strongly impacted by the typology of the target language.

When these Hebrew-acquiring children do produce forms which bear a clear marking for inflection, these are predominantly in the nonfinite, nontensed, semantically irrealis categories of infinitive and imperative. Where they do use tense-marked verbs, these are restricted to encoding aspectual values of durativity or perfectivity. In these respects, the findings for our children also accord very closely with what has been found for children acquiring typologically distinct languages.

In conclusion, it must be stated that we thus found no clear evidence for "morphological bootstrapping" (Behrens, Harris, & Cartwright 1995) at the early phase of language development with which we are concerned. Very soon afterwards, around age 2 years for inflectional affixation and from age 3 for verb-pattern alternation, morphological cues interact critically with the acquisition of syntax in a language like Hebrew.

We could speculate about the implications of this early repertoire of verbs for the subsequent acquisition of grammar. On the one hand, children clearly have a strong basis for moving into the expression of a variety of semantic roles and the syntax of a

range of different verb-argument structures. On the other hand, we hope to have demonstrated that children still need to add a large amount of language-particular knowledge in order to encode such relations explicitly.

7.3. The Internal Structure of VP

In their early verbs, children use both transitive as well as intransitive verbs. There is no way to test whether they distinguish the two types nor is there evidence that one of the two precedes the other. Similarly, from the earliest word combinations, Hebrew speaking children show knowledge of the internal structure of the VP, placing the subject before the verb, and the object(s) after it. This suggests that unless Kayne (1994) is right, children set both the complement-head parameter and the spec-head parameter before they start combining words, as expected from absolute parameters.

The focus of this section is not on the question of whether children know the internal structure of VP but rather on the use they make of it. I particularly want to discuss the order in which the various arguments of the verb are acquired. This discussion will take a descriptive direction since the analysis does not involve parameter setting but rather makes use of the two assumptions of the minimalist hypothesis of acquisition which receive further support from the findings. Our discussion will focus on the syntactic (Glietman 1989) and semantic (Pinker 1984) aspects of the acquisition of verb-argument structure.

The prediction is that semantic as well as syntactic simplicity will effect the order of acquisition, the implication being that intransitive verbs will be acquired before transitive, transitive before ditransitive, etc. This might follow from the theta-

roles hierarchy (Jackendof 1977), as well as from the lexical complexity which is enforced by raising the number of arguments. Although this prediction was shown to be false for the order in which early verbs are acquired, suggesting that semantic complexity is not a relevant variable, there is still the question of syntactic complexity and whether it has any influence on the order in which verb-argument relations are acquired. If syntactic simplicity is a factor, we can expect that intransitive and transitive verbs which make use of the specifier and the complement will be used before bitransitive verbs which require a more complex structure (See Larson 1988 among others.). In other words, assuming that children use only complete functional complexes, we predict that subject (agent) and object (patient) will be used before indirect objects of goal, direction, etc.

To test this assumption, two types of analysis, based on the longitudinal data, were conducted. One type was the analysis of the acquisition of specific verbs, showing how their argument structure develops. For this purpose, I chose three verbs which had already appeared at the one word stage: 'want' which selects both an NP and a CP, 'give,' a bitransitive verb which selects for NP or non-finite CP and a dative PP, which may be substituted by a clitic which follows the verb, and 'fall,' an unaccusative verb. The second type of analysis, which was first conducted on Yuval's diary and then checked against the longitudinal findings of Lior and Hagar, involved going through all the multi-word utterances where verbs were used and locating the first occurrence of each verb-argument structure.

The order in which the complements of *roce* 'want,' *noten* 'give' and *nofel* 'fall' are acquired is shown in Appendix II, Tables One, Two and Three, respectively, for Hagar, Leor, Lior and Smadar. The first use of 'want' is either for negation *lo(ro)ce*

'no-want,' meaning 'I don't want' or with modalic interpretation, taking a nonfinite verb, e.g., *(ro)ce (lar)edet* '(I) want to get down.' The negated form is used neither with a subject nor with an object. The nonfinite verbal complement is identified as nonfinite based on its vowel pattern since it is not prefixed by *le-* 'to'. NP object appearsa month or two later, and only later, usually when 'want' is being used affirmatively, is the subject used. There are individual differences regarding the use of both arguments in the same utterance. Hagar uses sentences with both subject and object before she has used the CP complement, whereas Smadar uses such sentences only after she has used the CP complement. All the children, however, use the CP complement only after they have used the NP complement with a nonfinite complement preceding the finite one., This phenomenon usually makes its appearance around their second birthday, which is not surprising since it is only after their second birthday (and sometimes even half a year later) that children use embedded clauses in any context (See Chapter 9.).

The verb 'give' is initially used in a frozen unanalyzed form together with a dative clitic *li* 'to me': *(t)nili* 'giveme!' though some children start with *ten/(t)ni eze* 'give ms/fm this.'[4] Then, the frozen form might select for an NP complement, either a referential expression, e.g., *(t)nili mayim* 'give me water,' or a deictic pronoun, e.g., *(t)nili eze* 'give me this-ACC.' During this period the dative clitic is not analyzed. There are individual differences regarding the use of 'give' without arguments since it requires analysis of the frozen form. Thus, Hagar uses the verb with no complement only when she learns the nonfinite form of the verb *latet* 'to give' almost a month after

4 While some children use *tnili* for 'giveme,' other might use *tenlax*' give you' but also meaning'give me.' There are even cases when *tenlo* 'give him' is used with the same intention. These forms vary across children, but only one form is used by each child.

she has used the frozen form and a week after she has used the direct object, while Lior takes more then two months for this task, which precedes the use of direct object. The use of the PP indirect object follows and does not seem to rely on productive use of the dative clitic. Last to be acquired is productive use of the dative clitic, e.g., *tni lo lexem* 'give him bread,' which is almost simultaneous with the use of the nonfinite CP complement, e.g., *tni li la'avor* 'let me get through.' By the age of two, about half a year after the first frozen use, children seem to grasp the full argument structure of this verb, including the subject, e.g., *aba natan li bananot* 'Daddy gave me bananas' (Hagar 2;01;23).

The third verb which was checked, the unaccusative 'fall', is used from the early word combinations with a NP subject, which can either precede or follow the verb. Later, when the use of dative *li* 'to me' is extended beyond the frozen forms, it is also used with 'fall', e.g., *nafal li* '(it) fell to me,' but it is only round the age of two that it becomes productive. In addition to the use of subject and dative, children also indicate location or direction of falling prior to their second birthday, but only after they have used the two other arguments. As for the other verb, early in their third year children seem to maker use of the full structure, e.g., *ze nofel lexa* 'it is falling to you' (Hagar 2;02;25), *Shauli nafal me-ha-kise* 'Shauli fell off the chair' (Hagar 2;01;23).

The data for these three verbs show that the major part of the acquisition of verb argument structure is carried out before the age of two, with some complex structures appearing after this age. In this process, less complex argument structures are used before the more complex ones, which suggests that structural complexity and the use of partial trees are reflected in the order of acquisition. Appealing to structural complexity can explain why the bitransitive use of 'give' is last to appear. The partial

tree hypothesis explains why NP rather than any XP is more accessible as a complement for 'want' as well as for 'give' since NP is the smallest subtree available, whereas PP, IP and CP all involve additional projections. Moreover, under the assumption that non-finite clauses can be construed to be IPs but finite clauses with a complementizer are CP, the partial tree hypothesis explains why non-finite CP precedes the finite one.

Interestingly, the bottom-up learning strategy which is used in construing partial trees can also explain the finding that complements are generally used before subjects for all three verbs. It seems that the “most local domain” (Chomsky 1993) is accessible from the earliest use of these verbs, whereas the specifiers which are in the “local” but not “most local” domain, are used later. This follows the same line of reasoning of *Bare Phrase Structure* (Chomsky 1994), introduced in Chapter 2, by which the head is obligatory, being the terminal node which projects and gives its name to the projection and the specifiers are optional, marking local (but not "most local") relations between the head and other XP.

The diary for Yuval support these conclusions. Yuval starts using frozen verbal forms, among which are *loce* 'don't want' and *tnili* 'give me.' When arguments are first used, either the subject or the object appears, but never both, ordered in an adult-like manner. For example, one would hear either *(ti)kra (si)pu(r)* 'read a-story' or *Ga(l) (hir)bi(ca)* 'Gal hit.'. At the next stage, verbs are occasionally used with more then one argument, e.g., *ima (o)sa e* [=*ra'ash*] 'Mummy makes noise.' Most of these utterances are SVO with some SOV exceptions. This is also the period when indirect objects are used though without a preposition, e.g., *(lar)ede(t) (me) ima* 'to get off (of) Mummy,' and more verbs are used in a frozen manner with some

prepositional clitic, e.g., *tavi li, tni li, aba bo ela(y)* 'bring me, give me, Daddy come to-me.' Though unaccusative verbs are already used during the one word stage, they are used with without an argument, i.e., subject, and only after transitive verbs have been used with both arguments do the unaccusative verbs acquire arguments. Bitransitive verbs also appear around this time, and the frozen verb+clitic form is followed by an NP, e.g., *bi [=tavi] li no [=halo=telefon]* 'bring me phone.' This use is productively extended to other verbs but not to other persons, e.g., *ed [=lehorid] li (sanda)lim* 'take-off me sandals' meaning 'take off my sandals.' At this point preconjunctionals, other then nonfinite complements of 'want' appear(See Chapter 9.). However, a month later bitransitive verbs are used with three arguments, e.g., *ima da [=natna] maim li* 'Mummy gave water me' (Note the misplace clitic.).

This most detailed description for Yuval, which is paralled by data from the other four children, supports the findings about individual verbs (See Appendix II.). The gradual use of more complex argument structures along with the use of more complex arguments is in line with the partial tree hypothesis while the grammaticality of the order in these utterances supports the earliness of absolute parameters.

Though this account seems descriptively sufficient, it is worthwhile thinking about these findings in light of Borer (1995), who, following Ouhalla (1991), argues that VP has no internal structure. The way in which the arguments are ordered mirrors the structure of the functional extended projections of V, in which the subject moves to [Spec,AgrSP], the object to [Spec,AgrOP], the indirect object to [Spec,AgrIOP], etc.[5] Combining this model with the minimalist view, by which only the necessary

5 I ignore here the use that Borer makes of the aspectual nodes and their correlation with Agr phrases.

parts are projected, might explain the transition from one argument to two arguments and from two arguments to three arguments. These transitions will be viewed as gradual extentions of the tree, adding another Agr projection only when the available ones are insufficient. This view does not conflict with the minimalist hypothesis for language acquisition but suggest that more functional categories are available from the first word combinations. The reference is to categories for which the evidence is the syntactic structure rather than the morphological paradigms which will be discussed in the next section.

7.4 The Acquisition of TNS and AgrS

While the former sections were devoted to the early verbs and the acquisition of argument structure, in this section the focus will be the acquisition of the inflectional paradigms, and in the next sections the parametric value of these paradigms will be considered. To start, consider again the first 20 verbs that Dromi (1986) reports in a case study of her daughter Keren, aged 1;02 to 1;04, as listed in Table 4.

Each item on the list contains a phonetic transcription of the form used by the child (Capital letters indicate stressed vowels.), the corresponding Hebrew adult form, and a gloss, in which infinitives are marked with ‘to,’ imperatives with an exclamation mark ! and past tense with the past form of the verb. In addition each form is analyzed

for tense/mood: INF stands for infinitive, IMP for imperative and PAS for past. Agreement is marked only when it is different from the default masculine singular (2nd person in imperative, 3rd person elsewhere):

Table 4- First 20 verbs of Keren Dromi (1;02 -1;04):

Child's Form	Corresponding Adult Form	Gloss	Tense/Mood Morphology	Agreement Morphology
ito	*lishtot*	'to drink'	INF	
cet	*lacet*	'to go out'	INF	
nIli	*tni li*	'give me!'	IMP	sg, fm
kax	*kax / kxi*	'take!'	IMP	sg, ms/fm
Ede	*larEdet*	'to decend'	INF	
ines	*lehikanes*	'to enter'	INF	
ibar	*nishbar*	'broke'	PAS	
pes	*(le)tapes*	'to climb'	INF	
Evet	*lashevet*	'to sit'	INF	
ipose	*hitpocec*	'burst'	PAS	
Uax	*liftOax*	'to open'	INF	
pes	*(le)xapes*	'to look for'	INF	
Afa	*afa*	'flew'	PAS	3, sg, fm
ala	*nafla*	'fell'	PAS	3, sg, fm
Usi	*rUtsi*	'run!'	IMP	sg, fm
id	*lehorid*	'to put down'	INF	
usi	*lehotsi*	'to remove'	INF	
abis	*(leh)albish*	'to dress'	INF	
lalot	*la'alot*	'to go up'	INF	
nake	*lenakot*	'to clean'	INF	

This list of verbs raises several observations regarding Keren's knowledge of the verbal system at this early period (See also Berman 1978.). Phonetically, most forms are not adultlike: Keren omits most prefixes, reducing the verbs to monosyllabic and bisyllabic forms. Syntactically, these forms fall into three tense/mood classes: infinitives without the infinitival morpheme *le-* 'to' (N=13, 65%), imperatives (N=3, 15%) and past forms, used only with a perfective sense for unaccusative verbs (N=4, 20%). This child has no present or future tense forms. Morphologically, all forms (except the infinitival forms which do not take agreement marking) are singular with some variation between masculine (3) and feminine forms

(4). Yet note that these forms were used both with masculine and feminine addressees, regardless of the morphology (Dromi 1986). Though the imperative forms are second person (3) and the past forms are always third person (4), these are the default forms and there is no other overt person morphology.

These findings suggest that Keren starts with a verbal stem, which is marked for either mood or aspect but not for tense. Since tense and aspect in Hebrew are not morphologically distinct, they are manifested by tense morphology with limited aspectual meaning. Keren gives no evidence of knowing the agreement morphological paradigm of Hebrew since she does not apparently distinguish masculine and feminine forms.

7.4.1 Data and methods of analysis

These findings for Keren at the one-word stage are supported by Berman's (1978) findings for her daughter Shelly as well as by an analysis of longitudinal samples of three Hebrew-speaking children aged 18 months to 3 years. I have analyzed all verbs in the children's speech to examine how Hebrew speaking children acquire the verb system of their language.

In Appendix III, the results are summarized for Smadar (girl), aged 1;06 - 1;11 in Tables 1-3, for Lior (girl), aged 1;05 - 1;09 in Tables 4-6 and for Leor (boy), aged 1;09 - 2;02 in Tables 7-9. For each child, there are three tables, covering the first four to six months of recordings, starting at the period of the first word-combinations and ending when person, the last category to be acquired, has been used productively. The first table shows the distribution of tenses over this period. The second and third tables show the distribution of the use of person morphology and number and gender

morphology, respectively, over six months. For each table it is noted when there is evidence for productive use, tested by productive contrasts.

The first table, which shows the distribution of tenses is divided into six categories: the five inflectional categories of mood/tense and a sixth category for unclear forms. The Hebrew speaking children's tense/mood categories are defined as follows:

1. **Unclear forms**: Ambiguous truncated forms --partially pronounced forms which can be interpreted in various ways, e.g., *pes* for either infinitive *letapes* 'to climb', present tense *metapes* 'climbs, ms,' *metapeset* 'climbs, fm,' future tense*yetapes* '(will) climb' or mispronounced forms in which the tense is unclear.

2. **Infinitives**: Verbal forms which are either marked with *le-* 'to' and/or clearly have the internal vowel pattern of the infinitival form.[6]

3. **Imperative**: Forms which are inflected with imperative morphology as well as future forms used for imperative in colloquial speech.

4. **Present**: Present participial forms, called *benoni* or medial, which indicate present tense (either by vowel pattern and/or suffixes for gender and number).

5. **Past**: Forms inflected by past tense morphology (either by vowel pattern and/or suffixes for person, gender and number).

6. **Future**: Forms used to describe an action in the future, inflected by future morphology (person prefixes).

The second and third tables show the distribution of the use of person, number and gender morphology. Hebrew marks person, gender and number on past and

6 Some of these interpretations are also context based.

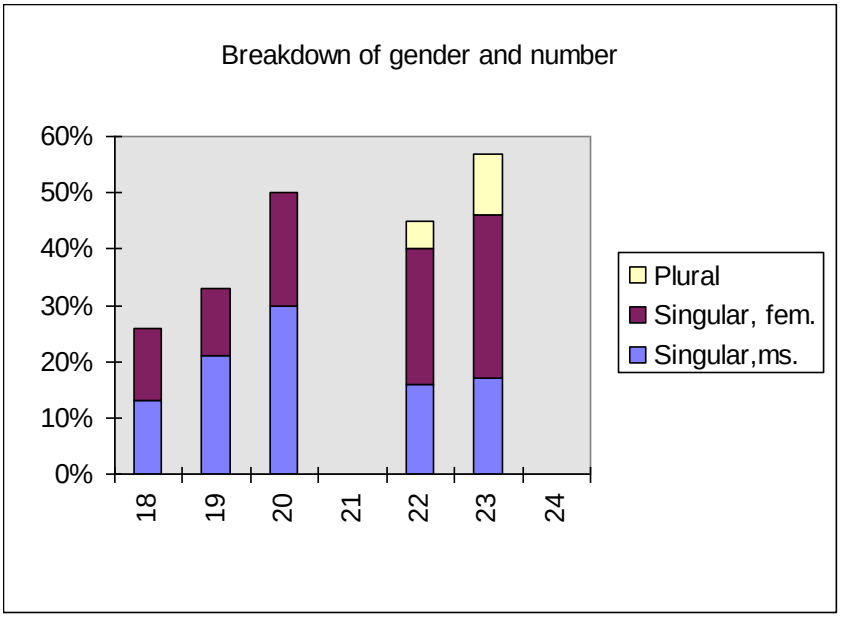
future forms but only gender and number on the present participial *benoni* form. The imperative is restricted, as in other languages, to second person, but in Hebrew it also varies in gender and number. For each month of the children's development, all tokens are divided according to person, gender and number categories (with the exception of feminine plural which is rarely used by young children), indicating the tense/mood category in which the various tokens occurred. These two tables, however, include all distinct types of the same token, in order to represent the whole range of inflections used by the child.

7.4.2 Children's acquisition of inflectional morphology in Hebrew

The longitudinal findings for Smadar, Leor and Lior support Dromi's (1986) analysis for the one-word stage as well as the cross-sectional study of children aged from 1 to 3 years (Berman and Dromi 1984). Initial verb usage is mostly in infinitival and imperative forms. This is supported by the findings for Smadar 1;06, Lior 1;05 and Leor 1;09;0 - 1;09;11. There are some cases of past and present tense forms, but these are largely limited to aspectual usage (Tsimpli 1992, Weist 1984, 1986). The past forms are used for verbs which indicate perfectivity, e.g., *nafal* 'fell,' *nishbar* 'broke' and *nigmar* 'finished,' whereas the present forms are used either in the progressive sense to indicate durative activity, e.g., *oxel* 'eating' and *boxe* 'crying,' or to express modality, e.g., *roce* 'want' and *yaxol* 'be able to.' Each verb has only one form, which is used in all contexts. Verbal forms at this period are frozen. For example, children do not mark syntactic gender anduse feminine forms for both feminine and masculine subjects and vice versa. Moreover, infinitives are used with a modal sense of 'I want to do it.'

The first morphological knowledge children manifest is subject-verb agreement in gender (and sometimes number). This is limited to third person forms in the present tense and second person in the imperative. Figure One gives the breakdown for gender and number agreement in Smadar's verb usage from 18 to 23 months (The family was out of town when she was aged 21 months). The number of verb-forms analyzed for Smadar comes to 212 in all, ranging from a low of only 10 in one month to well over 100 verb-forms in the last month of analysis (age 23 months).

Figure One



As seen in the first column of Figure One, Smadar at age 1;06 starts using gender marking, equally for masculine and feminine. This is mostly in the imperative (N=5), with one past form in the default 3rd person masculine. The only productive alternation is *sim/simi* 'put, ms/fm,' which occurred in the last session of that month when Smadar was 1;06;20. In (1.) we see how this extended in the next month to five imperative forms:

1. *sim/simi* 'put!' ms/fm, *kax/kxi* 'take!' ms/fm, *vi/abi'i* 'give (me)! bring!' ms/fm, *ten/tni* 'give!' ms/fm and *shev/shvi* 'sit!' ms/fm, all of which are imperative forms. [Smadar 1;07]

In addition to similar alternations in the imperative, the second girl, Lior 1;06;13, has one possible alternation in the present form *pes(?)/peset* 'climbs' ms(?)/fm, and a month later (Lior 1;07;16) we also find *boxe/boxa* 'cries' ms/fm, though it is unclear from the context whether she makes the gender distinction. It is only at 1;08, that Lior makes gender alternations productively, e.g., *koes/koeset* 'is angry with' ms/fm.

Since person is not marked in the Hebrew present tense, children appear to use these forms properly at this point. However, the forms they use are still aspectually limited, i.e., the same verbs do not occur in the past form. For example, in (2.), Lior 1;06 uses the present tense with the following verbs:

2. *koev* '(it) hurts,' *boxe* 'crying,' *(meta)peset* 'climbing' and *(mitnad)nedet* 'swinging.'

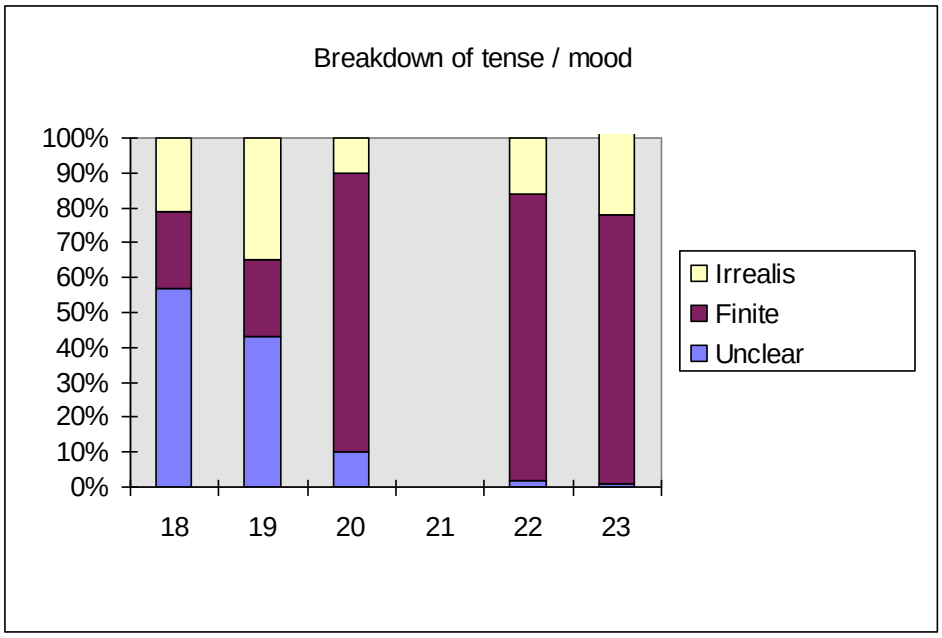
The first verb *koev* '(it) hurts' is stative, and the other three are durative. Similarly, Smadar 1;07 uses the present tense only once for the verb (*o)xelet* 'eating,' which also has a durative reading rather than present tense interpretation. In the imperative, where there are no possible alternations in person, children seem to use the paradigm properly, e.g., Lior 1;07 says *zuz/zuzi/zuzu* 'move!, sg,ms/sg,fm/pl.'

Figure One also points to a clear age-related difference in the acquisition of gender and number. While gender is used from the first sessions, number occurs only at age 1;10. These findings, however, were not the same for the three children; Leor, the boy, whose records start at 1;09, used plural forms from the very first sessions.

The next step, about a month later, is an explosion of past and present forms. Figure Two gives the breakdown for tense/mood categories in Smadar's verb usage at the latter step for the three major classes of forms she used: **unclear** forms, **irrealis**

forms which combine infinitives and imperatives and **finite** forms which combine present, past and future. Figure Two reveals an explosion of finite forms (mainly present and past) in months 20 to 22.

Figure Two



For example, at age 1;07 tensed forms are only 22% of Smadar's verbal forms, and they are aspectually limited, whereas by age 1;08, and especially 1;10, tensed forms constitute 80% of her verbal forms (45 out of 55 in Smadar 1;10). These verbs indicate tense rather than aspect. This increase in tensed forms correlates with a decrease in the percentage of unclear forms. This begins when Smadar is aged 1;08, but only at 1;10 do we find past/present contrasts. For example., for the verb 'eat' we find, in (3.):

3. *le'exol* 'to eat,' *oxelet* 'eating' sg,fm, *axa(l)ti* 'I ate,'
   toxli 'you (fm.) will eat,' used also for imperative in adult spoken Hebrew.

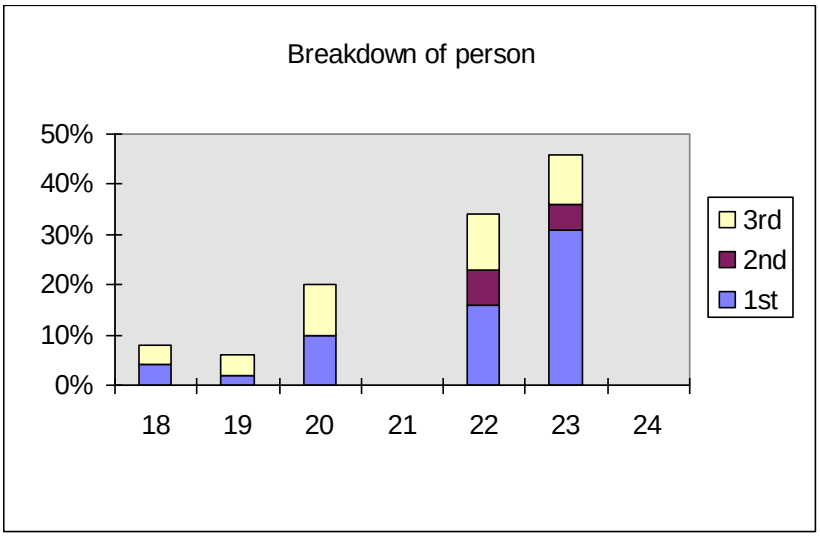
The transition for Leor between 1;09;00-1;9;11 and 1;09;17-1;09;24 demonstrates a similar pattern. The present forms expand beyond the aspectual boundaries, from *roce* 'wanting' and *ose* 'doing' to *yoshenet* 'sleeps' and *mitxabe* 'hides,' in whichpresent

tense interpretation is added to the durative aspectual sense. Similarly, in the past, verbal forms expand from *gama(r)nu* '(we) finished' and *nigmar* 'ended, finished', to *halxa* 'went' and *barxa* 'ran away.' These later forms are not limited aspectually, and there is variability in usage between several forms of the verb.

Figure Two also points to a clear age-related difference in the distribution of **unclear** compared with **finite** forms. On the one hand, these two categories account for 80% of all verb forms produced by Smadar across the period in question, with only 20% being what we have termed irrealis, i.e. infinitives and imperatives. The major developmental change in her verb usage is that unclear forms are replaced by productive finite forms. Again, as was the case for number and gender, this pattern of unclear giving way to finite verb forms holds not only for Smadar but for all the children in my sample.

The last acquisition during this period is of first and second person. Figure Three gives the breakdown for first, second and third person in Smadar's verb usage during the same period. Though verbs are inflected for number in Hebrew, for ease of presentation, I have combined the categories of number and person, neutralizing for number so that person applies to both singular and plural (the equivalent of both English 'I' and 'we, and so on for 2nd and 3rd person, as well. This seemed legitimate since the children generally used few plural forms and the pattern is not substantially affected by separating out the category of number.

Figure Three



The first three columns reflects Smadar's sporadic use of first person singular in the past, once per month in what looks like rote-learned forms (Berman 1986), whereas in Smadar 1;10 it has become a robust phenomenon which occurs for seven different tokens within one session. This also applies to second person in the past and first and second person in the future. From the last two columns in Figure Three, it is evident that second person for non-imperative forms is acquired only after person has become robust. The relation between the use of person verbal inflection and the existence of these concepts in the pronominal system are discussed in Section 8.2, where I will show that personal pronouns are used after tenses are used but before person inflection is used.

Smadar's pattern is not necessarily typical of the other children. Lior aged 1;07 and 1;08 uses just one verb in second person in the past tense: *asit* 'made,' which appears in the frozen utterance *asit kaki* 'you dirtied your pants.' Only at age 1;09 is this form of the verb used productively in *(na)falt* 'fell, 2,sg,fm.' She uses both forms *asit* and *(na)falt* , which have second person morphology and refers to herself in a first

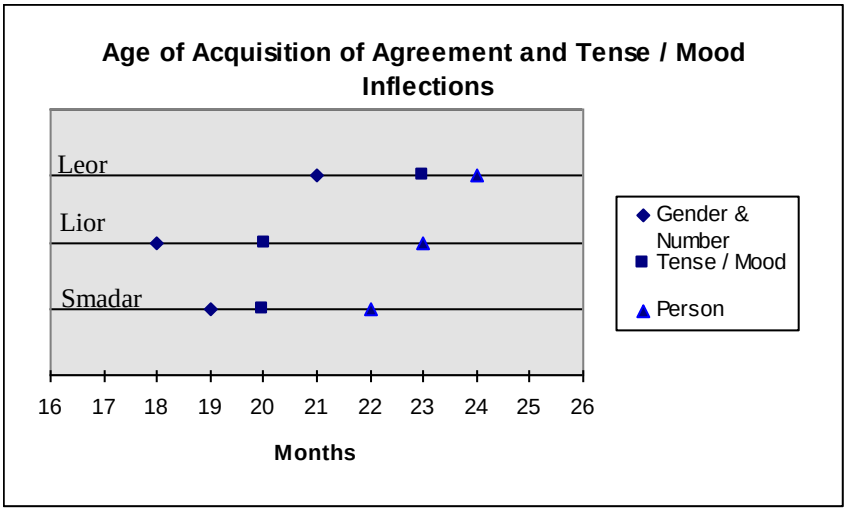
person sense. In Lior 1;08, there is also some evidence for productive use of 1st, pl in the past *bikarnu* 'visited.' However, it is only at age 1;11, that person becomes a robust phenomenon, and secondperson is used with the proper referent, as shown in (4.) for the verb 'finish':

4. *gamarti* 'I finished,' *gamarta* 'you (ms.) finished,' *gamart* 'you (fm.) finished,' *gamarnu* 'we finished.'

For Lior, as for Smadar, the acquisition of person morphology is later than the sporadic use of past/present during 1;07 and the explosion of tense/mood at 1;08.

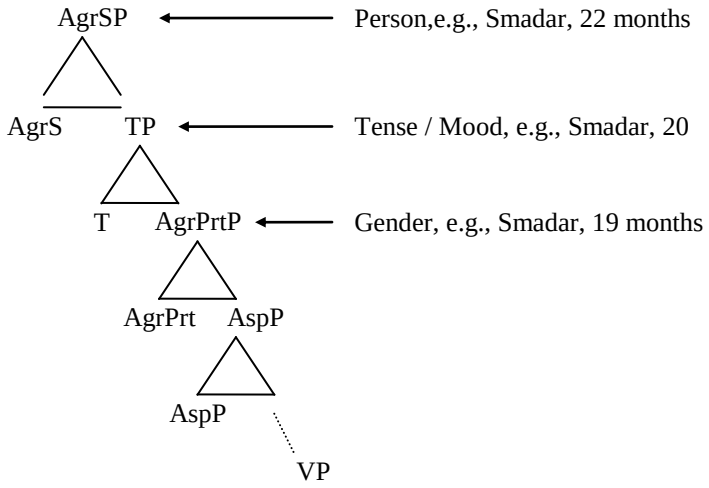
Figure Four shows the order of acquisition of the three inflectional categories which are morphologically marked in Hebrew verbs --gender/number; tense/mood and person.By "acquisition" I refer to usage that is clearly robust and productive rather than occasional, sporadic, inappropriate or rote-learned. The same order of acquisition is revealed for each of the three children: Gender (and to a lesser extent number) marking is the first to emerge. This is followed by tense/mood distinctions while suffixes and prefixes marking first person in contrast with second and third person are the last to be acquired.

Figure Four



This order of acquisition, as summarized in Figure Four, is very suggestive. In recent discussions of the universal structure of x-bar trees (Kayne 1994), it has been argued that agreement, tense and aspectual categories are ordered as in the tree in (5.):

5.



My data suggest that children's acquisition of verbal morphology mirrors this tree, on which person is a feature of AgrS while gender and number are features of AgrPrt (Shlonsky 1995, Siloni 1994).

The assumptions of the minimalist hypothesis for acquisition, which are repeated in (

6. (i) Children basically have access to the whole tree, including functional heads, from the beginning(Clahsen et al 1994, Crain 1991, Rizzi 1994);

(ii) Nevertheless, children use a minimalist approach: do only what you have evidence that you have to (Weissenborn 1993).

From these assumptions and in view of the order in which inflectional morphology is acquired, it appears that children use minimalist bottom-up trees, starting with a VP

or a low aspectual phrase (Borer 1995) and gradually building up the tree, using AgrPrt for gender and number, then TNS, and only later AgrS for person agreement. These findings provide evidence which support the assumption that children have initial knowledge of the whole set of functional categories rather than learning them one by one, following a maturational agenda. If the full projection were not "known," the bottom-up manifistation would be difficult to make sense of.

To conclude, I have shown in this section that Hebrew speaking children acquire the verbal inflectional paradigm of their language in a way that reflects a bottom up utilization of the universal X-bar tree. I have argued that since all the functional nodes are overtly manifested by Hebrew morphology, we can detect the building of partial trees until the child manifests a full usage of IP, followed by employment of C.

7.5 Root Infinitives in a Morphology Rich Language

Root infinitives, known also as optional infinitives, have been the subject of intensive research in acquisition studies for the last few years (Rizzi 1994, Weissenborn 1993, Wexler 1994). It has been argued that children continue to use the infinitival form of the verb in root declaratives up to the age of three, long after they form sentences and show knowledge of some aspects of the verbal morphology of their language. Some have said that in English, root infinitives constitute as many as half of the utterances of the children studied (Wexler 1994). Rizzi (1994), on the other hand, points out that infinitival forms constitute only 5% of corresponding Italian data (from Guasti 1994). This has led to the suggestion that the use of root infinitives correlates with non-null subject languages, as in English.

This section will discuss the topic of root infinitives from a rather different perspective. I suggest that analysis of the order in which verbal morphology is acquired in a language like Hebrew with a rich morphology as presented in the previous section, may help to account for the root infinitive phenomenon. Along with the increase in children's use of verbal morphology (for number, gender, tense and person) there is a gradual decrease in their use of root infinitives, to the point where they are almost totally abandoned after person morphology is acquired. Further, Hebrew-speaking children manifest knowledge of the CP system for both subordination and questions only after they start using the full inflectional system. It seems that the decrease in the use of root infinitives correlates with either the emergence of CP (Rizzi, 1994) or the elaboration of morphological paradigms which replace the declarative use of root infinitives.

In order to determine which of the two explanations is more appropriate for the Hebrew data, note that adult Hebrew does allow root infinitives in certain environments. Specifically, in Hebrew, unlike in English, root infinitives are used in neumerous irrealis contexts when the clause is not specified for tense, e.g., in irrealis questions as in (7.), in the imperative as in (8.) and as answers to modality questions as in (9.):

7. Irrealis Questions: (a) Yes/No Question and (b) Information Questions

	Adult Use	**Child Use (Lior 1;08)**
(a) Yes/No Questions	*la'azor lax?* to-help to-you,sg,fm 'Should l help you?'	*lenakot?* (1;08;21) to-clean 'Should I clean up?'
(b)Information Questions	*ma la'asot im ze*? what to-do with it 'What should I do with it?'	

8. Imparatives: (a) Negative Imperatives and (b) Affirmative Imperatives

	Adult Use	**Child Use (Lior 1;08)**
(a) Negative Imperative	*lo laga'at* not to-touch 'Don't touch!'	*lo lashevet* (1;08;0l) not to-sit 'Don't sit down!'
(b) Affirmative Imperative	*lashevet bevakasha* to-sit please 'Please sit down!'	*od liftoax* (1;08;03) more to-open 'Open again!'

9. Answering Modality Questions

Category	**Adult Use**	**Child Use (Lior 1;08)**
In Answer to Modality Questions	*a at roca la'asot ha-yom?* 'What do you want to do today?' A: *lalexet le seret* to-go to a-movie 'I want to go to the movies'	M: *ma at roca la'asot*? 'what do you want to do? L: *lashevet* (1;08;10) to-sit 'I want to sit down'

This last example seems to be merely a case of ellipsis not a true case of "root infinitives," but since such clauses constitute part of the input children receive and are often used by young children, I have chosen to add it to the set of grammatical structures, which are parallel to adult use of "root infinitives."

In adult Hebrew root infinitives are ungrammatical in purely declarative contexts. as in (10.):

10. Declarative Context

Adult Use	**Child Use (Lior 1;08)**
a ata ose/asita? what you do/did 'What are/were you doing?' A: **(ani) lalexet le seret* (I) to-go to movie 'I go/went to the movies'	M: *ma at osa*? what you do 'what are you doing?' L: *tapuax lishtot* (1;08;08) apple to-drink 'I drink an apple'

As shown, Hebrew-speaking children use root infinitives in all the above grammatically licensed environments. Only their declarative use of root infinitives is ungrammatical by adult standards. They also use root infinitives in another irrealis

context with the same modality sense which is grammatical as an answer to questions in adult Hebrew. For example, Lior (1;08;0l) says *lishmoa* 'to-hear,' meaning 'I want to hear,' without being asked what she wants (to do). This example indicates that children make use of what looks like non-elliptical root infinitives in both indicative and irrealis clauses. Thus, any account of root infinitives in Hebrew should include this particular irrealis use and the use of root infinitives as indicative (tensed) forms.

As noted by Rizzi (1994) for Italian, declarative root infinitives are a sporadic strategy rather than a robust phenomenon. Following Guasti (1994), Rizzi reports that for Italian speaking children root infinitives constitutes only 5% of their verbal forms. Though some Hebrew-speaking children seem to initially use many infinitival forms (Keren - 65%, Smadar - 10%, Lior - 30%, Leor 14%), most of these forms are used with a grammatically irrealis sense. For example, at age 1;08, just before she has mastered tense, Lior uses infinitives in 18 out of her 56 verb forms (32.5%). Three of these forms (5%) --*la'azor lax* 'to-help to-you,' meaning 'help me!,' *lesaper lax* 'to-read to-you,' meaning 'read to me,' and *lehavi lax* 'to-bring to-you,' meaning 'bring me'--have imperative (rote learned) sense. Only one of the 18 forms has an indicative reading. At age 1;11 and 2;00, the breakdown of Lior's infinitives is still the same (5% imperative and up to 4% indicative sense) Similar data have been found for the other children.

Thus, the important question seems to be, not so much why root infinitives are a robust phenomenon in languages with no null-subject (e.g., English) as compared with a sporadic strategy in null-subject languages {e.g., Hebrew or Italian (Rizzi 1994)}, but rather why Hebrew licenses root infinitives in various environments where they are a grammatical option while English does not. The second question

does not eliminate the first one but shifts the focus of the answer. The answer might lie in a correlation between the grammaticality of non-declarative root infinitives and the richness of the morphological paradigm since these ungrammatical uses seem to disappear once the morphological paradigm is acquired.

The variation in the uses of root infinitives in the acquisition data suggests that the answer should relate to the three different manners in which they are used:

(a) pre-morphological us of root infinitives
(b) modal-like irrealis use of root infinitives
(c) indicative use of root infinitives

Since the pre-morphological unclear root-like forms have already been considered in the previous section, I shall turn to the second type: root infinitives with an irrealis reading.

Hebrew has no syntactic class of modals, so grammaticality of the modality of root infinitives could be attributed to the existence of a null modal in TNS. This implies that English-speaking children will use root infinitive with a modality reading until they master the syntactic class of modals as a set of items which makes this category overt in their language. This knowledge does not neccessarily correlate with the early acquisition of the inflectional paradigm. On the other hand, if the distinction between root and embedded clauses is determined by the content of C, declarative root infinitives, which have no modal reading, might remain an option untill the content of C is mastered. Under the minimalist hypothesis for acquisition, this last acquisition depends crucially on the acquisition of lower nodes of the tree. The Hebrew data support this assumption, showing that even when Lior's use of indicative root infinitives is reduced at age 2;03 (to less than 1%) she continues to use

the “ungrammatical” modal like forms (4%). This will be further discussed in Chapter 9 and will focus on the relevance of the acquisition of C to the use of indicative root infinitives.

One implication of children's partial bottom-up use of X-bar trees suggested by the acquisition of verbal morphology in Hebrew is that children may use trees which lack all or part of the tense features associated with T and C. In this case, as long as partial trees are legislated by the child, root infinitives are a convergent option. In a language with rich morphology, the evidence for constructing the tree is more accessible than in one with a weaker paradigm. Since the disappearance of root infinitives depends on the construction of a full tree, one could argue that the obligatory use of the full tree might be delayed in a language which presents less evidence for maximizing the tree.

It is, however, not neccessarily the construction of the tree which is delayed. Rather, it could be that the unmarked forms are not infinitives at all but finite forms which are not as yet marked morphologically, just like the **unclear** forms in Hebrew (See Fig. 2 in the previous section.). In Brown (1973) it is argued that English-speaking children first acquire the progressive *-ing* and then the perfective *-ed.* They use the third person marker *-s* only after auxiliary verbs appear. This order seems to mirror the tree in (5.). An application of the above analysis to English, in which infinitives are marked with *to* but root infinitives are not, suggests that these forms are not infinitives at all but rather **finite** verbs which lack AgrS features or even some of the features of tense. In any case, these unmarked forms are not specified as infinitives.

The major questions are when and why partial trees stop being an option. I argue, following Rizzi (1994), that partial trees are not available once CP becomes obligatory both in matrix and embedded contexts. Due to the bottom-up manner in which children construe their trees, the use of CP depends on the obligatoriness of the lower inflectional heads. The evidence for the inflectional heads, i.e., Tns, AgrS, etc., is more accessible in a language with a unified (strong) morphological system (Jaeggli & Safir 1989) such as Hebrew rather than a language with a non-unified (weak) morphological system such as English. Since the phenomena in both types of languages are related to the richness of the inflectional paradigm, the apparent correlation between null subjects and the sporadic use of root infinitives is explained.

To conclude, the grammaticality of modal root infinitives in Hebrew is attributed to a possible null modal, which is subsequently replaced in English but not in Hebrew by the overt category of modals. This predicts that a modality reading of root infinitive should disappear once English-speaking children master the category of modals. As for the more interesting case of indicative root infinitives, which are ungrammatical in both languages, I have argued, following Rizzi (1994), that their disappearance crucially depends on the acquisition of C and its content. The gradual building of trees, which is overt in a language with a rich morphological system like Hebrew but covert in a language with a weak morphological system like English, results is what seems to be a huge gap in the percentage of root infinitives in the two languages. The point I have tried to make is that many of what look like declarative root infinitives in English are not infinitives at all (They are not marked with *to*.) but rather **finite** forms with no overt morphology since are items on partial trees. The apparently different distribution of declarative root infinitives in the two languages is,

therefore, a consequence of the covert vs. overt inflectional morphology in the two languages, and this, in turn, is related to the null-subject phenomenon.

7.6. Concluding Remarks on the Acquisition of the Syntax of Verbs.

Chapter 6 ended with the observation that there is a timing gap between children's use of head-features and their use of spec-feature in the acquisition of the nominal system. There, it was suggested that this phenomenon penetrates the process of acquisition. Is this true for the verbal system too?

In Section 7.4 it was suggested that the acquisition of verbal morphology reflects a bottom-up construction of phrase markers, starting from the VP and adding AspP, AgrPrtP, TP and, finally, AgrSP. Is it true that the head features precede the spec-features for each of these phrases? In fact, in the discussion of the data in Section 7.4, no distinction was made between spec-features and head-features. This distinction seemed irrelevant there, since the discussion focused on the gradual acquisition of verbal morphology rather than on the gradual acquisition of the features of the extended functional projections.

There is a way, however, to accommodate the findings in this chapter, with the observation that there is a timing gap between children's use of head-features and their use of spec-feature. For this purpose, I shall adopt Speas' (1994) and Borer's (1995) view of functional heads as semantically motivated heads. Thus, in line with Chomsky (1995), there should be no Agr nodes since agreement under spec-head relations is a purely syntactic notion.

Could such an approach account for the acquisition findings? I would like to argue that the bottom-up specification of functional heads seems to hold even in the absence of agreement nodes. Particularly, under semantic bootstrapping (Pinker 1984, 1989), it is arguable that children are first triggered at the interface to use functional heads as syntactic representations of semantic properties, e.g., aspect or tense. Only after the use of these heads is semantically motivated, are syntactic operations, such as the computing mechanism and checking applicable.

Agreement, being an overt manifestation of the computing mechanism, should, thus, follow the semantic use of each functional head. To return to the data, within the NP system, this semantic before syntactic use of functional heads explains why quantifiers trigger the use of DP whereas case and agreement follow its use. Similarly, within the IP system, it explains why participial agreement in number and gender is separate from agreement in person and follows the acquisition of aspect rather then the acquisition of tense. Clearly, agreement for aspectually participial but tenseless forms should be checked under spec-head agreement within AspP while agreement of tensed forms, which are marked for person in Hebrew, is possible only after tense has been acquired.

Thus, the findings of this chapter seem to show the same timing gap which was noted in the previous chapter. The two systems differ in the way this timing gap is manifested in the acquisition process. In the acquisition of the nominal system, the majority of the evidence comes from movement, whereas in the acquisition of the verbal system, evidence come from the acquisition of the morphological paradigm which reflects this gap.

A most desirable step here would have been to look for this timing gap in the acquisition of verb movement, but it is debatable whether verbs raise in Hebrew. On the one hand, Hebrew, like Italian, as has already been noted, has a rich morphological system. This rich morphology is what identifies null subjects. Richness of morphology is usually identified with verb raising for checking. However, it is difficult to find overt evidence for verb raising in Hebrew since word order does not distinguish, for example, finite from non-finite verbs. In Hebrew, negation, which in many languages serves as a window to the structure of adult as well as child grammar (Weissenborn & Verrips 1989), does not distinguish richly inflected verbs from non inflected forms. Negation always precedes the verb and any other constituent which is negated. This is known to children from the beginning, and they seem to use negation in an almost errorless manner (Kfir 1989, Schachter 1995). Clitic placement, which seems to distinguish strong forms from weak forms in Italian (Guasti 1994), does not make such a distinction in Hebrew. The dative clitic *le*, inflected for person, gender and number, always follows the verb also makes no distinction between weak and strong inflections.

Shlonsky (1995) assumes that the verb in Hebrew moves in order to check strong features. He accounts for the rigid position of the negation by assuming that negation in Hebrew is a clitic which cliticizes to the verb and moves with it. Moreover, some adverbs, e.g., *adayin* 'yet,' *bevaday* 'certainly,' *kamuvan* 'naturally' and *kanir'e* 'presumably,' seem to indicate that the finite verb is outside the VP while the finite verb is inside. This, together with the fact that the distribution of null-subject in Hebrew correlates with the strength of AgrS (See Chapter 8.), leads, by

analogy to other richly inflected languages to the assumption that the verb does raise in Hebrew.

In view of the difficulty in showing that the verb raises in Hebrew, it becomes clear why the timing gap is not found with respect to verb movement. There is no evidence for verb raising for checking of inflectional features at a young age since children do not use S-adverbs, which are almost the only criteria applicable for Hebrew. Nevertheless, if we assume that verbs raise in Hebrew, children do have to learn when to raise the verb, that is, when all the head-features of a functional head are specified with a value, and trigger movement to satisfy the PF-ban.

Since the acquisition of the verbal system in Hebrew does not help us in this respect, one could stipulate that the process is the same as for the nominal system. Once children are triggered to use Asp or Tns, they initially use the head with no features and gradually associate it with the relevant head features. Only later do they turn to the spec-features, i.e., the agreement features, and associate each paradigm with the corresponding semantically motivated head. It seems, however, that the bottom-up order is kept. Only after children have identified both the head-feature and spec-features of Asp, can they farther project Tns.

To conclude, the acquisition of the verbal system gives further evidence for the way in which the minimalist hypothesis for acquisition guides children in acquiring their language. The acquisition of subjects and their ordering with respect to the use of the verbal system will be discussed in the next chapter. We will demonstrate the same timing gap, observed in the acquisition of verbal morphology.

Chapter Eight -- The Acquisition of Subjects

While Chapter 6 concentrated on the structure of DP and Chapter 7 on the structure of IP, this chapter refers to the crucial point where the two come together. The use of DP subjects, in [Spec,VP] or [Spec,IP], brings together these two major categories. It also brings together the minimalist hypothesis for acquisition, which obtained strong evidence from both structures, and the computing mechanism for checking, which makes it possible to account for the use of null-subjects by children. After a short discussion of characteristics of the subject (and the null-subject) in Hebrew and a brief overview of the order in which this knowledge is acquired, this chapter will focus on two topics: the acquisition of pronouns, and the acquisition of null subjects.

8.1 The Use of Subject in Adult and Child Hebrew

Hebrew is a null-subject language. The subject of a sentence can be either a full NP, e.g., *yeled* 'a boy,' *ha-yeled* 'the boy,' *Dan* ‘Dan’ and *ha-yeled shel Dan* 'Dan's son,' a pronoun, e.g., *ani* ‘I,’ *ata* 'you,sg,ms' and *at* 'you,sg,fm' or empty, i.e., *pro*. Hebrew also allows for *PRO* in infinitives and for null topics in answering questions. The child has to learn which type of subject is used where. This is a task that children face universally. Specific to Hebrew is the distribution of the different types, in particular, the distribution of *pro*.

Hebrew is usually referred to as a partial null-subject language, since *pro* is licensed only with the tensed forms of the verb: the past and the future (Berman 1978, Borer 1984). Referential *pro* is never licensed with the present participial form, though in plural masculine, this form licenses pro_{arb}. Moreover, even in the past and the future, in very colloquial Hebrew, *pro* is not licensed in all persons. It has been argued that in the past tense, *pro* is licensed only for first and second person, both singular and plural, but not for third person. In normative Hebrew, the same is true for the future. In very colloquial Hebrew, first person singular is nondistinct from third person singular, and thus, *pro* is licensed in the future only in first person plural and second person singular and second plural. Thus, acquiring the use of null subject in Hebrew requires, in addition to the understanding of the term subject and its possible manifestation in the language, a strong grasp of the morphological system.

Once children start combining words, the notion of subject becomes relevant. As noted earlier, when discussing the acquisition of argument structure, the earliest two word combinations that contain a verb also contain a lexical subject, i.e., bare nouns and proper nouns. Examples are *xatul nafal* 'cat fell' [Hagar 1;07], *gaga halax* 'duck went' [Smadar 1;06], *Hagar tesaper* 'Hagar will tell,' [Hagar 1;07], *Gal hirbica* 'Gal hit' [Yuval 1;10] and *doda Ogi yedafdef* ‘Aunt Orly will turn the page’[Leor 1;09]. At the same time they also use utterances without a subject, in a context based manner, reminiscent of topic-drop (See Section 7.3.). Gradually other types of subjects are added. On the one hand, children start using nominal sentences with a deictic *ze* 'it, this,' as in *ze anan* 'this (is a) cloud' [Smadar 1;06], and on the other hand, sporadic use of pronoun also become

evident, e.g., *hi shota mic* 'she drinks juice' vs. **holex ba-na'alayim shel doda Ogi* 'walks in-the-shoes of Aunt Orly,' i.e., 'wearing Aunt Orly's shoes' [Leor 1;11].

Longitudinal transcripts for Hagar (1;07-2;00), Leor (1;09-2;02), Lior (1;08-2;00), Na'ama (1;07-2;07) and Smadar (1;04 - 1;10) were analyzed and four developmental phases in the usage of nominative personal pronouns, the impersonal pronoun ze 'this, it', full NPs and null subjects (Armon-Lotem & Kfir 1989, Berman 1990) were identified, as follows:

a) A wide range of subjectless utterances with uninflected verbs as well as a few inflected forms which are clearly formulaic and do not meet the requirements of productive mastery of inflections, e.g., *ba kan* 'come/~come here,' *sagarnu* 'closed-1st-PL [Leor 1;09], *(lar)edet* '(to)-go-down' and *nafal* 'fell' [Na'ama 1;07].

b) *Ze*-subjects and lexical subjects, e.g., *Hagar tesaper* 'Hagar will tell,' *xatul nafal* 'cat fell' [Hagar 1;7] and *ze anan* 'it (is a) cloud' [Smadar 1;]. Both types of surface subjects occur at the same time, but there are as yet no personal pronoun subjects.

c) Pronoun subjects alternating with subjectless utterances with inflected verbs, which are usually ungrammatical present tense verbs --the *benoni* (which does not allow null-subject in Hebrew), e.g., well-formed *hi shota mic* 'she drinks juice' vs. **holex ba-na'alayim shel doda Ogi* 'walks in-the-shoes of Aunt Orly' [Leor 1;11].

d) Productive use of pronouns and correct alternations between null and non-null subjects. That is, null subjects are manifested where they are syntactically obligatory, i.e., in impersonal situations as in *lo mecayrim (al) ricpa* 'not draw+PL (on) floor = people don't draw on floors' [Hagar 1;09] and where they are optional, e.g., both *ani shabarti* 'I broke' with a pronoun subject and *kibalti maka* 'got+1st hurt' with a null subject [Na'ama 1;11].

In the following sections, two of these stages will be discussed: the acquisition of pronouns (8.2) and the setting of the null subject parameter (8.3). These processes will be discussed from a descriptive perspective followed by an analysis which will try to locate

the "new" knowledge on the tree. The acquisition of null-subject further supports the computing model for checking, showing once again how it is acquired.

8.2 Pronominal subjects

There are two major classes of pronominal subject in Hebrew: personal pronouns, e.g., *ani* 'I,' *ata/at* 'you ms./fm.,' *anaxnu* 'we,', etc. and deictic pronouns, e.g., *ze* 'this, ms.,' z*ot/zoti* 'this,fm.,' *ele/elu* 'these.'[1] While in colloquial Hebrew, personal pronouns are used both in verbal and nominal clauses, e.g., *at halaxt* 'you-sg-fm went-sg-fm' as well as *ata more* 'you-sg-ms (are a) teacher-sg-ms,' the deictic pronouns, also agreeing with the predicate, are primarily used in nominal clauses, e.g., *ze sefer* 'this-ms (is a) book-ms,' *zot tmuna* 'this-fm (is a) picture-fm,' *ele sfarim* 'these-ms (are) books-ms' and *elu tmunot* 'these-fm (are) pictures-fm.' The deictic pronouns are also used to mark specificity, as in *ha-yeled ha-ze* 'this boy' and, as throughout the nominal system, agreement in gender and number is required. In addition, *ze* is used as an optional semi-expletive, e.g., (*ze) mati'im li meod* 'it suits me well.'

The acquisition of these two pronominal systems seems to be independent, though both are at the DP level. The major reason is apparently the different distribution of the two systems in nominal vs. verbal clauses as well as the different knowledge of morphology that the two systems require. While the use of the pronominal system crucially depends on the person agreement system associated with AgrS, the deictic impersonal pronouns are marked only for gender and number and can, thus, be checked at

[1] For a different, more innovative categorization of pronouns in Hebrew, see reference to Ritter (1995) (fn.2).

AgrPrt[2]. Similarly, while a verbal clause necessarily makes use of Tns, it is optional for nominal clauses. Recalling the minimalist bottom-up order in which the tree is put to work, it is predicted that the less complex deictic system will be acquired before the more complex pronominal system. Moreover, it is expected that the early use of the deictic system will not be marked for gender and number, just as we saw for early verbs.

The overall order in which pronouns are acquired is as follows. The first pronoun is the impersonal deictic *ze*. The term impersonal is used here to indicate that it is not marked for gender and number, as it is in adult language. In contrast to adult, children do not usually distinguish gender and number and use *ze* for masculine as well as feminine and for singular as well as plural, e.g., *ze sefer* 'this-ms (is a) book-ms,' *ze tmuna* 'this-ms (is a) picture-fm,' *ze sfarim* 'these (are) books-ms,' *ze tmunot* 'these (are) pictures-fm.' *Ze* is used only deictically with nominal predicates, e.g., *ze kapit* 'this (is a) teaspoon' [Leor 1:09:04), *ze Ugi* 'this (is) Ugi = Cookiemonster' [Smadar 1:06:02].

The following outlines a general progression use of *ze* in different contexts (Armon-Lotem & Kfir 1989):

a. Formulaic *ma ze*? 'what ('s) that?'

b. *ze + N* [Leor 1;09, Hagar 1;07]

c. *ze + Adj* [Leor 1;11, Na'ama 1:11] and *ze + NP* [Leor 1;11, Na'ama 1:11]

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[2] Ritter (1995) argues that the proper distinction is not between personal pronouns and deictic pronouns but rather between 1st and 2nd person pronouns, which are DPs which contain only the head D, marked for person, gender and number, and 3rd person pronouns, which have a more complex structure in which D is marked only for person, while AgrN (Num in Ritter's terminology) is marked for gender and number. This distinction which is clearly reminiscent of the distinction between AgrS and AgrPrt in Chapter 7 groups 3rd person personal pronouns with the deictic pronoun. Though this hypothesis is very attractive, it finds no support within the acquisition data.

d. *mi ze*? 'who ('s) that?' (occasionally only), *ze+ Color, ze +NP*? [Leor 2;00, Hagar 1;08]

e. *ze + (S) VP*, e.g., *ze shaon ose tuktuk* 'it/that (is a) clock goes ticktock'[Leor 2;01],

ze koev ledubi 'it hurts to (the) teddy' [Hagar 1;09]

During the earliest period such utterances constitute about a quarter of child utterances.

Two independent developments follow the impersonal *ze*. One is limiting *ze* to singular and using *ele* for plural. Gender is not yet specified and might be delayed till school age since the gender distinction of deictic pronouns is blurred in colloquial Hebrew. The major development is, however, the robust use of personal pronouns, which also depends on acquisition of inflectional morphology, i.e., the use of verbs inflected for person.

Acquisition of personal pronouns goes from the closest to the farthest and from the speaker to the addressee (Waryas 1975), first in the singular, usually before the age of two and only later in the plural. In a cross-sectional study, Maoz (1976) found that children master the first person pronoun between 28 - 34 months. This is followed by mastery of second person pronouns (both feminine and masculine), plural pronouns, and finally third person pronouns (masculine, feminine plural). Full mastery is achieved by the age of 40 months. The longitudinal findings, summarized in Table 1 below, show that the same semantic characteristics are typical of the earlier use of pronouns. Table 1 shows the first occurrence of the pronoun for each of the children in our corpora. The table does not include feminine plural pronouns since gender distinctions in the plural have been almost abandoned in colloquial speech and are not manifested by the children:

Table 1 - First Occurrence of Personal Pronouns in Three Hebrew Speaking Children to Age 2;06

	Hagar	**Leor**	**Lior**
1st, sg *ani*	*ani lo roca kola* I not want Coke (1;09;21)	*ani roce kariyot* *I want pillows* (1;10;05)	*ani roca tiyul* *I want a-walk* (1;09;15)
2nd, sg, ms *ata*	*ata roce le'exol*? you want to-eat (1;10;01)	*ata roce et ze*? you want ACC this (2;01;15)	*ma ata ose?* what you doing? (1;10;26)
2nd, sg, fm *at*	*at lokaxat oti la-gan* you taking me to-the-kindergarten (2;01;14)	*ma at holexet*? what you going (2;04;12)	*ma at osa?* what you doing (1;11;00)
3rd, sg, ms *hu*	*hu yored* (1;09;26) he gets-down	*hu roce lesaxek* he wants to-play (1:11:00)	*hu palat* (1;10;27) he threw-up
3rd, sg, fm *hi*	*le gan Meir hi holxet* to garden Meir she going (2;01;05)	*ma hi osa*? what she doing (2;02;05)	*hi yafa* (1;09;17) she beautiful (single use before 2;00)
1st, pl *anaxnu*		*anaxnu nashir* *we shall-sing* (2:03:00)	
2nd, pl *atem*	*atem rocim*? (1;10;03) you want-pl		
3rd, pl *hem*	*hem nos'im* (1;11;09) they travel-pl	**hem hevi* (2:01:15) they brought	*hem mitaxat la-mita* they under to-the-bed (2;03;18)

As shown above children start with first person pronoun and extend their use of pronouns to second and third person masculine pronouns before the age of two. Though all three persons are available, the first person pronoun constitutes more than 90% of the pronouns used. Plural and feminine pronouns usually emerge during the first few months of the third year, with plural pronouns preceding feminine ones. This order mirrors Levi's (1980) findings for nominal morphology, which were discussed in Chapter 6. The present findings are very similar to Maoz's (1976) cross-sectional findings regarding the mastery of these pronouns.

The emergence of pronouns strictly correlates with the productive use of tense and precedes the mastery of the person inflectional paradigm. Thus, for example, as shown in Chapter 7, Leor makes productive use of tense when he is 1;11, but uses person inflections productively only when he is 2;01. Nevertheless, he uses pronouns as soon as he uses tense, at around 1;11. This behavior is mirrored by the other children. These findings suggest that while the acquisition of AgrS is crucial for the use of person inflections, that is not the case for personal pronouns. The acquisition of the personal pronouns depends on the availability of a specifier of a Case checking functional head, i.e., Tns[3].

This order reflects the way in which the computing mechanism and the PF-ban operate and gives further support to the proposal that all functional heads are semantically motivated, while agreement, being a purely syntactic relation, is not a head. First, Asp is triggered by the lexical semantics of the verbs, as shown in Section 7.4. Once its head-features are specified, its participial agreement spec-features appear. Being specified with a value for gender and number it can host a lexical subject and the impersonal deictic pronoun *ze* 'it, this.' Using the bottom-up strategy, which the minimalist hypothesis for acquisition predicts, as soon as both the head-features and the spec-features are specified with a value, the child moves one node higher to Tns.

When Tns is triggered by semantic bootstrapping, it has no features. Then, based

[3] Speas (1994) argues that by an economy principle, AgrS, being a semantically contentless category, must have phonetic content either for its head or for its specifier. Under such assumptions, one might suggest that children acquire AgrS, first by phonetically filling its specifier and only later, by filling its head by the agreement features, which,then lead to the use of null-subjects.

on the verbal morphology, the child associates the head with the tense head-features and with Case spec-features which are linked to the tense morpheme. Since the head is specified for one spec-feature, the specifier must be lexically filled to satisfy the PF-ban. Of course it could host a lexical subject similarly to [Spec,AspP]. What seems to be unique to [Spec,TP] is that it can also host pronouns. Since AgrS is not a head, the universal set of features of AgrS, including person, is available for Tns. According to UG, Tns is the only node where uninterpretable person features could be checked. This is why, once the semantically motivated head-features of tense are specified and at least one spec-feature is specified, pronouns appear at the only position where they could participate in checking. Moreover, it seems that the emergence of pronouns does not require full specification of the spec-features of Tns. Rather, agreement features which mark the syntactic spec-head relation emerge later. When all the agreement spec features of a particular language are also specified with a value, *pro* becomes an option, as will be discussed in the next section.

Again, the minimalist prediction is supported by the longitudinal data, with one reservation. Though personal pronouns are usually acquired later than the deictic impersonal *ze* 'this,' it is not the whole impersonal system which is acquired. As noted earlier, the deictic system is usually limited to the impersonal *ze*. Moreover, there might be individual variations with respect to rote-learned forms, e.g., the rote- learned *gam ani* 'me too' [Yuval 1;10;25] and *zoti* 'this' [Yuval 1;11;15] before *ze* 'this' [Yuval 1;11;22] and certainly before *ani* 'I" is used as a productive subject.

8.3. Null Subjects

The null-subject parameter has already been discussed for adults, from a crosslinguistic perspective, in Chapter 3. In this section we will return to this relative parameter from an acquisition perspective rather than a crosslinguistic perspective. In addition to the literature mentioned in Chapter 3, there is an extensive work on the acquisition of null-subject. Hyams (1986) proposed that since children from different languages all start with a grammar that allows the use of empty subjects, the null-subject parameter is set to [+Null] in UG, by default. Hyams' proposal, though very innovative, has attracted considerable criticism both on empirical and theoretical grounds. Empirically it was argued by Valian (1991) that while English speaking children use empty subject in only 30% of their utterances, Italian speaking children use it in over 70% of their utterances, with Chinese lying in between (Wang et al. 1992). If the English speaking children suppose that their language is a null-subject language, such differences should not exist.

Bloom (1990) attacked Hyams on theoretical grounds, arguing that there is no need to assume a default setting for the null-subject parameter in order to account for the use of empty subjects by English-speaking children. He proposes that the distribution of empty subjects in child speech is due to processing limitations. In particular, he suggests the “VP length criterion,” by which, due to memory span, children will avoid using the subject when the VP is longer, i.e., in transitive verbs. As the child grows older, his memory span extends and he can use longer utterances which involve both subjects and objects. This argument is carefully answered by Hyams and Wexler (1993), who argue

that had this been the relevant criterion, we would expect it to also hold for Italian children but not for Italian adults. However, there is clear cut evidence that this change does not apply to Italian speakers. Rather, there is almost no difference in the use of null subject by children and adult speakers of Italian. Since it is unreasonable to suppose that adult speakers of Italian suffer from limited memory span this argument is defeated.

Another argument against Hyams' model is that the grounds for positing a null subject in child language is pragmatic. Greenfield and Smith (1976) propose that the omission of grammatical subjects follows from a "principle of informativeness," i.e., old information is omitted more readily than new. Since the subject is usually old information, it is more readily omitted. This should account for the subject-object asymmetry which has been observed, i.e., many null subjects but only a few null objects. Hyams and Wexler argue that once this hypothesis is checked in contexts where only old information is available both for the subject and for the object, the asymmetry predicted by this hypothesis should disappear. However, they show that even in such situations the asymmetry remains with a vast number of null-subjects.

Hyams and Wexler, however, take all these reservations into consideration and propose that UG has parameters both for null-subject and for null-topic. A language can have null-topic (Chinese, Dutch), null-subject (Italian), both (Hebrew) or none (English). Under this account English-speaking children start with a null-topic grammar, rather than a null-grammar, while Italian children use a null-subject grammar from the beginning. This latter view is supported by Haegeman's analysis of null-subject in child language as

having similar properties to null-subject in diary writing, where the use of empty subjects is pragmatically guided (Ariel 1990).

More recently, economy considerations raised by the minimalist program (Chomsky 1993), have given rise to some rather different analyses of the use of null-subjects by children and adults. Roeper and Rohrbacher (1994) propose, following Speas' economy principle for functional categories (1994), that English-speaking children are like Japanese adults, not in their use of a null-topic grammar but rather in their use of Agr-less grammar. Particularly, they argue that in English child language, as in Japanese, *pro* subject is licensed in [Spec,TP] by the semantic (and later phonetic) content of T, which makes the phonetic content of [Spec,TP] redundant. Under this assumption, once English-speaking children learn that AgrS is used in English but with no phonetic content, they realize that [Spec,AgrSP] must be phonetically filled and abandon the Japanese strategy.

Hyams (1995) and Rizzi (1992, 1994) offer two additional, rather different views of this issue. Hyams (1994a) and Sano & Hyams (1995) propose that due to *The Underspecification of Functional Categories in Early Grammar* (Hyams 1995) I may be left underspecified, and, thus, [Spec,IP], not being governed, can host PRO. This should account for child use of null-subjects, which crucially differs from the adult use of *pro* in a languages like Italian or Hebrew. Rizzi (1992), on the other hand, suggests that when null-subjects are not identified clause internally under c-command, they are licit only when identified clause-externally, that is, in the specifier of the root, where, by stipulation, root = CP. Following a theory of clausal truncation in early grammar, Rizzi

(1994) argues that children start with a truncated tree, in which root = IP, which makes root null-subjects legitimate in [Spec,IP].

Within the framework presented in Chapter 3, null-subject in Hebrew is a *pro* which is checked by a strong AgrS, i.e., by a "relatively rich" AgrS. The licensing conditions for pro that rely on the notion of "relatively rich" AGR raise several acquisition questions. First and foremost, how is the notion of relativity acquired or, in other words, how do children know whether their AGR system is "relatively rich" or "relatively poor?" Another question relates to order of acquisition. Is there an initial setting for the richness of AGR as was suggested by Hyams (1986) for the Null Subject parameter? These questions which have been addressed several times in this work, are again relevant here.

The major premise of the theory of relative richness of AGR as the key to the identification of null subject is that AGR is basically rich in all languages. At the initial state, when children know nothing about AGR in their particular language, they assume an empty AGR, as in Swedish, for example. This means that though this AGR is relatively rich", it cannot identify *pro* since it is not specified with a Case feature.[4] Thus, it is to be expected that in children's early word combinations the subject is syntactically obligatory, though it might be omitted for other cognitive reasons, such as processing constraints (Bloom 1990, Valian 1991), or on pragmatic grounds (Austin et al. 1995, Levi & Vainika 1996). This conflicts with Hyams' (1986) proposal, but there is strong evidence which suggests that the default setting cannot explain the acquisition data.

However, and though this solution radically departs from Hyams (1986), it is in line with more recent solutions, such as Hyams & Wexler's (1993) or Rizzi's (1994), which assume that null subjects in English are null-topics. It is also compatible with Hyams' model of *The Underspecification of Functional Categories in Early Grammar* (1995), where she proposes that the empty subject is PRO rather than *pro*.

As children start to discover which features are realized in the AGR of their language, they might, theoretically, waver between a null and non-null subject in an inconsistent fashion until end-state knowledge is achieved, all the features of AGR are identified and the relativity notion is consolidated. However, consideration of the order of acquisition reveals that this wavering cannot be merely random. Acquisition of cases, which apparently follows the acquisition of word order, seems relevant to the identification of *pro* only as far as it triggers the projection of [Spec,IP]. The emergence of early inflections might signal a period of instability, until the child discovers which features are uniform (Jaeggli & Safir 1989) and form a paradigm and which are not, thus forming a rule. But only after children have mastered the full range of inflections in their language and discovered what the maximal set of agreement features is, can they decide whether and where it is "relatively rich." Stated differently, though the computing mechanism and the PF-ban are operative throughout the process of acquisition, utterances with a null subject which are ungrammatical in the adult language may converge in the child grammar until the full inflectional paradigm has been mastered.

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[4] See Chapter 3 for case checking in Swedish.

Though there is no such a thing as initial setting of a parameter in Hyams' sense, the model proposed here does yield predictions regarding the initial state. Since AGR is initially "relatively rich" but not a Case assigner, it cannot identify *pro* and the child starts by using overt subjects or null-topics. *Pro* is used only when the licensing conditions on *pro* are satisfied, that is, once it is Case checked and identified by AGR. This seems to conform with the intuition that subject omission can be discussed once the child has established the notion of subject and its syntactic identification. Two more consequences of the above solution are that the acquisition of the notion of a "relatively rich" AGR is gradual and that its intermediate phases can vary cross-linguistically, according to the balance between the identification of the full set of features and the specific set identified at each point in the acquisition.

Moreover, in view of the minimalist hypothesis of acquisition, AgrS is accessible for checking only a few months after the child starts combining words, i.e., when the child has acquired the inflectional paradigm for person. In the course of acquisition the child starts with little or no utilization of the functional system and is, thus, being able to avoid all processes which involve the functional system, particularly checking. Accordingly, during the earliest period the child cannot check *pro*. Guilfoyle and Noonan (1988) argue from a maturational perspective that the inability to access the functional system at the earlier stages implies that in child language *pro* converges in places where it might crash in adult language. In their system they do not refer directly to *pro* but rather to the *Extended Projection Principle* (EPP), which applies to IP and cannot apply when IP has not yet matured. Since the EPP effects are achieved in the minimalist program

(1993) by checking, this should apply to checking, with the argument that checking applies vacuously. Similarly, within the current model, it applies to the PF-ban and Checking at LF. Though this work argues that maturation cannot be the source of the gradual bottom-up acquisition of the tree, vacuous application of UG rules explains the lack of agreement between the verb and the subject, discussed in Chapter 7. The question is whether it can account for the distribution of null-subject during this period.

Pro, being a null pronoun, should behave like other pronouns. Consequently, the emergence of personal pronouns only after Tns has been accessed might be generalized to *pro*. This assumption dictates that *pro* is not available during the early word combinations; therefore, null subjects during this period before Tns has been mastered in Hebrew (And this might be extended to other categories in other languages.) require a different account. This line of thought continues the idea, presented earlier in this chapter, that the discussion of null subject becomes relevant only when it is clear that the child has acquired the notion of subject, both on the basis of argument structure (Section 7.3) and on the basis of agreement (Section 7.4). If this is true, the question of the status of missing subjects, before *pro* is used, is left open. We shall return to all these questions, after the descriptive analysis of the data.

The above predictions are consistent with the analysis of the longitudinal data. It further turns out that not only do children start by using overt subjects before they have manifested empty subjects but that the latter coincides with the acquisition of verbal inflection rather than of cases. That is, while pronouns are used as soon as Tns is

accessible, null subjects are mastered only when the inflectional paradigm for person is also established, as shown in Table 2.

Table 2- Phases in the Acquisition of Functional Items and Grammatical Subjects (with mean age-range marked for each phase)

Phases	Mean Age-range	Functional Items	Subject Realization
1	1;00 - 1;06	One-word utterances. No functional items	Uninflected subjectless utterances
2	1;06 -	Multi-word utterances	
	1;06 - 1;08	(a) Few functional items: negation, quantifier. No tense or agreement.	Lexical subjects & deictic *ze* 'it, this'
	1;08 - 1;10	(b) Partial usage of determiners, prepositions and cases. Misused inflections (usually formulaic).	Nonproductive pronoun usage. Mixed usage of null (generally incorrect, in 3rd person and present tense) and non-null subjects.
	1;10 - 2;00	(c) Grammatical use of determiners, prepositions, and cases. Partially productive tense and agreement inflections.	Productive pronoun usage. Mixed usage of null and non-null subjects.
3	2;00 - 2;03	Well-formed and productive use of a full range of functional categories at the IP level.	Productive employment of null subjects

Table 2 summarizes the correlation between the phases in the acquisition of grammatical subjects and the use of the functional system, with particular focus on pronouns, null-subjects and the inflectional system. For each of these phases a mean age range for the longitudinal corpus is given.

As seen in the previous chapters, the model proposed here makes empirical predictions which turn out to be correct for the acquisition of Hebrew (and hopefully for other languages too). But the question remains as to whether the child can really calculate the "relative richness" of AGR and if not, how this notion is acquired.

Taking the calculation of "relatively rich" vs. "relatively poor" Agr to be the basis for the checking process, the question is how children learn the parametric values of the functional head which carries the agreement features in their language. If we assume that the "computing mechanism" and the PF-ban which differentiates strong and weak manifestations of a functional head are an innate part of UG, the question is reduced to how children learn which features constitute the maximal set of agreement features in their language. Once this has been acquired, all the child has to check is whether there is a match between the maximal content of AGR in her language and the subset used in each syntactic context. A mismatch means that AGR is "relatively poor."

Determining the maximal set of features in AgrS, as in any other functional head, has two interrelated prerequisites. First, by the minimalist hypothesis for language acquisition, once children have acquired tense, they must be able to access the evidence for the abstract realization of AgrS, and second, they must learn the morphological paradigm which specifies the features of AgrS and their values. These two processes are interrelated in a language like Hebrew, in which the strongest evidence (trigger) for the use of AgrS is the complex manifestation of the inflectional paradigm. In a language like German, on the other hand, where the evidence for the obligatoriness of the functional system comes from word order differences in the position of the verb in matrix and

embedded clauses, the evidence for abstract realization of AgrS precedes the overt realization. Nevertheless, in German too, both prerequisites must be satisfied before children conclude that null subject is not a convergent option in their language (Clahsen 1986).

Two questions are still left open. One is specific to Hebrew while the other is universal. Hebrew is referred to as a partial null subject language since it allows null subject with some inflections but not with others (See above.). How do children identify such mixed systems or, being more specifically, how do they learn that null subject is possible with some inflections but not with others. Obviously, they have to learn that some tense forms contain person specification and other don't, but this is not instantaneous. Moreover, there is a question about whether there is a period during which children acquiring Hebrew think that they are using a non-null subject language (e.g., English) or a full null-subject language (e.g. Italian) and what their grammar looks like at such a period. This question leads to the more universal question. How can the above model account for the use of null-subjects in early stages of acquisition in non-null-subject languages?

The use of null subjects was analyzed for Hagar and Leor in order to answer the first question (Ohev-Zion 1995). This analysis was later extended to Lior and Smadar. Ohev-Zion checked two questions. One is whether children acquiring Hebrew use a null-subject model or a null-topic model (Hyams and Wexler 1993), and the second is whether, if they use a null-subject model, these children are aware of the grammatical context for *pro* in Hebrew.

Hyams & Wexler (1993) use the distinction between null-topic and null-subject languages to account for the use of empty subjects by English-speaking children. They argue that if English-speaking children initially assume a null-subject model in which *pro* is used instead of overt pronouns, the empty subjects should be replaced by pronouns when they realize that their language is a non-null subject language. On the other hand, if they assume a null topic model, then the empty subjects could be replaced by lexical subjects. They suggest that English-speaking children use a null topic grammar, assuming that a topic is any NP which is outside the scope of VP.

Ohev-Zion found that Hagar seems to know from the beginning that she is suing a null subject language, in which *pro,* which is used in around 70% of her +verb utterances, substitutes for personal pronouns. Starting at 1;07, Hagar uses null subjects in 80% of her utterances, pronominal subjects in 2% and nonpronominal lexical subjects in the remaining 18%. By the age of 2;00, null-subjects are used in 63% of her utterances, pronominal subjects in 20% and nonpronominal lexical subject in the remaining 17%. This division is typical of a null-subject grammar, in which *pro* substitutes for pronouns.

Leor, on the other hand, seems to start with a null-topic model. At the age of 1;09, he does not use the subject in over 95% of his utterances, and this is basically still the case at 1;10 with only 8% overt subjects. At 1;11, however, his grammar seems to change radically and resembles the earliest findings of Hagar, with 77% null subjects, 2% pronominal subjects and 21% non-pronominal lexical subjects. This changes gradually along the lines seen for Hagar, till by the age of 2;03, null subjects are only 66% of his utterances, pronouns are 17% and non-pronominal subjects are 17%. These findings

suggest that while from 1;11 on, Leor realizes that he is working within a null subject language, at the earlier period, he shows a preference for some sort of model of null-topic language.

Similar findings are found for Lior, who seems to move from a topic drop model to a null subject model around 1;09. This shift seems to correlate with the age of Lior at the emergence of pronouns (Section 8.2) and her productive use of tenses (Section 7.4). Thus, it seems that children identify their language as a null-subject language only once the functional node T has been accessed. Prior to this point, they seem to avoid subjects in what resembles a null-topic strategy, as is evident from the fact that initially they replace the empty subjects by lexical subjects rather then pronouns.

These findings support the prediction that *pro*, being a pronoun, cannot be identified before pronouns are acquired, a process which correlates with the emergence of the tense inflectional paradigm in Hebrew. Since *pro* is not available before Tns has been mastered, there is no reason to assume that checking applies to *pro* vacuously at earlier stages and makes it available everywhere. On the contrary, it seems that since the reduction in null subject is initially in favor of non-pronominal subjects, this period should be characterized as a pre-pronominal period and, consequently, a null-topic, truncated tree period.

The above conclusion leads to the second question of whether the above model can account for the use of null-subjects in early stages of acquisition in non-null-subject languages. The answer reflects the two phases found in the use of null-subjects in

Hebrew. Prior to the acquisition of Tns, the lack of subjects in all child languages might be attributed to preference for null-topic (Hyams & Wexler 1993). Once Tns is acquired, *pro* as are other pronouns, becomes an option. *A priori*, it might be at this point, before AgrS has been acquired, that a child acquiring a non-null-subject might assume that her language allows null-subjects. However, since the minimalist child needs evidence for each decision and since such evidence does not exist in her language, there is no reason to predict a situation like this within the suggested model (But see Roeper and Rohrbacher 1994.). Moreover, as Hyams (1986) claims, in a language like English, the emergence of modals, which are the overt manifestation of Tns, correlates with the end of the null-subject period. In our model, the use of Tns, which is characterized by the use of modals, opens the pronominal period and ends the child's null-topic period.

To conclude, in the acquisition of subjects, in particular, the acquisition of null-subjects, in Hebrew, there is an interaction between the setting of the relevant relative parameters, i.e., identifying the set of features which exist in Tns and AgrS and the minimalist hypothesis for language acquisition which determines the transition from a null-topic to a null-subject model. This does not mean that null-topic is incompatible with null subject. It only means that in a null-subject language, once *pro* is available null topic stops being the only empty subject.

Carrying this logic to other languages might account for the use of subjectless utterances in early child language in non-null-subject languages as use of null-topic in the pre-pronominal phase. Once Tns and pronouns are available, children have the tools to

decide which language they are exposed to and use the computing mechanism for checking, assuming that evidence is needed for any decision.

The computing mechanism enables children to figure out which set of AgrS spec-features is maximal in their language, based on the maximal morphological paradigm available within the verbal system. In Hebrew the maximal paradigm is available in the past and future, whereas in English the maximal paradigm is that of the auxiliary verb 'be.' This does not mean that each language should have some null *pro* subjects since the licensing of *pro* requires, not just agreement features but also Case, which parameterizes crosslinguistically. The analysis of this process ends our analysis of the IP level (Chapters 7 and 8). In the following chapter, the same principles are applied to the next level, --the CP.

Chapter Nine -- Beyond the IP: The Acquisition of CP Structure

To this point, we have discussed acquisition at the DP and IP level. In this chapter we will move higher on the tree to the CP. In line with the minimalist hypothesis for acquisition, CP, the highest category of the clause,[1] is the last to be overtly manifested and, so, the last to be discussed. In this chapter, two major processes are discussed: the acquisition of subordination and the acquisition of Wh-questions. Though the two phenomena are fully manifested during the fourth year of the child's life, their precursors, the "preconjunctionals," are found at the early word combination stage, and their strength increases after the inflectional system, i.e., IP, is acquired. Consequently, in this section, after a short introduction on the particularities of the CP system in Hebrew, children's use of preconjunctionals, subordination and wh-questions will be discussed, in that order.

9.1 Subordination and Questions in Adult Hebrew

CP in Hebrew, as in other languages, is used both for marking subordination by a complementizer or other subordinating conjunctions in C and for the formation of Wh-questions by A-bar movement to [Spec,CP]. There are no differences in clause structure, i.e., word order between root and embedded clauses. As noted by Berman (1986), all

[1]In the following discussion I do not refer to the *Split CP Hypothesis*, discussed in earlier chapters since it is not that relevant at the early stages of acquisition. Presumably, what is said about the early stages of the acquisition of CP, will hold at later stages, too.

three types of structures in Hebrew --complement clauses as in (1.) with the exception of subordinated questions as in (1.b-c), adverbial clauses as in (2.) and relative clauses as in (3.)-- make use of the same subordinator *she* 'that,' with or without a sentential preposition:

1. Complement clauses
   a. *Dani amar she aba ba*
      'Dani said that Daddy came'
   b. *Dani sha'al im aba ba*
      'Dani asked if Daddy came'
   c. *Dani sha'al mi ba*
      'Dani asked who came'
2. Adverbial clauses
   a. *Dani samax kshe aba ba*
      'Dani was-happy when-that Daddy came'
   b. *Dani samax ka'asher aba ba*
      'Dani was-happy when Daddy came'
   c. *Dani barax lifney she aba ba*
      'Dani ran-away before that Daddy came'
   d. *Dani samax biglal she aba ba*
      'Dani was-happy because that Daddy came'
   e. *Dani samax ki aba ba*
      'Dani was-happy because Daddy came'
   f. *Dani barax kedey she aba yavo*
      'Dani ran-away in-order that Daddy will-come'
3. Relative clauses
   a. *ha-ish she natan li et ha-sefer. . .*
      'the-man that gave to-me ACC the-book . . .'
   b. *ha-sefer she natati (oto) la-ish. . .*
      'the-book that I-gave (it-ACC) to-the-man. . .'
   c. *ha-ish she natati lo et ha-sefer. . .*
      'the-man that I-gave to-him ACC the-book. . .'

The order in which these three types are acquired will be discussed at length for both the preconjunctionals and real subordination.

In free relatives, Hebrew seems not to obey the doubly filled Comp filter (Reinhart 1981). Sentences like (4.) are grammatical:

4. a. *Dani amar li ma (she) hu roce le matana*
‘Dani told to-mi what (that) he wants for a-present’

   b. *ma she titen lo yihiye beseder*
‘what that you-will-give to-him will-be okay’
'whatever you give him is okay'

In addition to the use of C for subordination, C may host a raised verb in V1 and V2 utterances which are optional, stylistic structures:

5. a. *kivsa barxa etmol min ha-mixla’a*
‘a-sheep escaped yesterday from the-pen’

   b. *etmol barxa kivsa min ha-mixla’a*
‘yesterday escaped a-sheep from the-pen’

   c. *barxa etmol kivsa min ha-mixla’a*
‘escaped yesterday a-sheep from the-pen’

In spite of these stylistic variations, there is neither obligatory subject verb inversion, as in V2 languages (German, Dutch, Swedish) nor any obligatory subject auxiliary inversion, as in question formation in English. Moreover, examples (5.a-c) which manifest V1 and V2 can all be used as complements in embedded clauses, as in (6.a-c):

6. a. *Mimi toenet she kivsa barxa etmol min ha-mixla’a*
‘Mimi claims that a-sheep escaped yesterday from the-pen’

   b. *Mimi toenet she etmol barxa kivsa min ha-mixla’a*
‘Mimi claims that yesterday escaped a-sheep from the-pen’

   c. *Mimi toenet she barxa etmol kivsa min ha-mixla’a*
‘Mimi claims that escaped yesterday a-sheep from the-pen’

[Spec, CP] is the target for overt Wh-movement both in matrix and embedded clauses, as in (7.a-b) and (8.a-b):

7. a. *ma ra'a ha-yeled?*
‘what saw the-child?’

b. *ma ha-yeled ra'a?*
‘what the-child saw?’

8. a. *ha-mora sha'ala ma ha-yeled ra'a*
‘the-teacher asked what the-child saw’

b. *ha-mora sha'ala ma ra'a ha-yeled*
‘the-teacher asked what saw the-child’

Since both the a. and b. sentences in (7.) and (8.) are grammatical, evidence for the functions of the CP system in Hebrew is not available by cannonic triggers (Penner 1994b), i.e., by differences between matrix and embedded clauses. Note again, that although in normative style, verb raising to C is required under certain conditions in colloquial speech, both orders are equally well-formed with preference for the uninverted order.

The acquisition of subordination seems to involve learning about an item specific component, i.e., a non-paradigmatic component for which syntactic or morphological bootstrapping cannot be applied. Children have to undergo a process of lexical learning of the features ,e.g., +/- operator, +/- predicate, +/-finite, etc., as was the case for other systems in Hebrew. Unlike the other systems, however, there is no morphological paradigm which supports these features.

When children start using what Penner and Mueller (1992) term "preconjunctional subordinate clauses" (Section 9.2), there is hardly any evidence that the two clauses are linked by a CP or that the children know something else about the way to relate clauses. The only thing that seems to play some role at this point is verb-argument structure, i.e., only verbs which take sentential complements are used with complement

preconjunctionals. Preconjunctionals are used sporadically as soon as Tns is used productively, but it is only after AgrS has been mastered that they are used extensively.

When subordination appears in children's language (Section 9.4), regardless of their order, it is almost uniquely marked with *she* 'that' without taking into account the adult form. Slow lexical learning gradually limits *she* to its standard grammatical functions by adding other subordinators, and sentential prepositions. The emergence of *she* strongly correlates with two phenomena: the disappearance of declarative root-infinitives and the use of wh-questions. The first phenomenon has already been mentioned and is, therefore, discussed only briefly in this section, and the second will be extensively discussed in Section 9.3 with focus on the order in which the various questions appear and a reasoned argument to motivate this order by the minimalist assumption**.**

9.2. Preconjunctionals

Preconjunctional subordinate clause (PSC) is a term used for subordinated clauses which lack the target language complementizer. That is, they are multi-clausal utterances in which one clause is subordinated to the other without subordination, i.e., without any evidence that CP has been put to use. This phenomenon is a later development in the period of early word-combinations. Its sporadic use follows the use of Tns, and it is used productively once AgrS has been used but prior to the use of subordination. This suggests that on the one hand, preconjunctionals require knowledge of the features of I, but on the other hand, preconjunctionals indicate a lack of knowledge of the features of C. In other

words, while at least some of the features of I must be specified before preconjunctionals are used, C is still underspecified at this point.

Preconjunctionals take basically two forms: (i) an adult-like structure in which the subordinating verb subcategorizes for a subjectless nonfinite clause as in (9.) and (ii) a non-adult-like structure in which the subordinating verb which could be expected to select for a finite clause with a subordinator is followed by a non-finite verb with or without a subject as in (10.) or by a finite verb with no subordinator as in (11.):

9. *lo roce lalexet (lishtof) yadayim*
no want to-go (to-wash) hands
'I don't want to go to wash my hands' [Yuval 1;11;24]

10. *lo roce ledaber* for *lo roce she tedabru*
no want to-speak no want **that** you-will-speak
'I don't want you to speak' [Yuval 1;11;23]

11. a. *roce Yuvali yiftax xashmal*
want Yuvali will-open light
'I want **that** Yuvali will turn on the light' [Yuval 2;01;00]

b. *roce niftax*
want we-will-open
'I want **that** we will put it' [Leor1;11;13]

The verb *roce* 'want,' which is used in all the examples, subcategorizes in Hebrew for subjectless nonfinite clauses and for subordinated finite clauses, but it is not an ECM verb (See Section 7.3.). Thus, while the English counterparts of (11.), which lack 'that' might be grammatical, this structure is ungrammatical in Hebrew.

Preconjunctionals are also used in ungrammatical relative clauses as in (12.) and in grammatical adverbial clauses as in (13.):

12. a. **ze regel koevet lax*
this foot-fm hurts-fm you
'This is the foot **that** hurts you' [Lior 1;10;08]

b. **ze shaon ose tuktuk*
this clock does ticktock
'This is a clock **that** goes ticktock' [Leor 2;1]

13. *ani holexet lehavi oto le Avishay*
I go to-bring car to Avishay
'I'm going to bring a car to Avishay'

While the grammatical non-finite structure seems not to draw any attention, the non-grammatical structure certainly requires some explanation. This explanation should, of course, also hold for the grammatical forms.

Along lines suggested in Section 7.3, the use of verbs like 'want' with a complement clause is a natural extension of the argument structure of these verbs. However, this extension, like the others discussed there, crucially depends on the tree-structure available to the minimalist child. A verb can, therefore, select a clausal complement, whether IP (for ECM verbs) or CP, only when IP or CP, respectively, are accessible to the child.

Penner (1992) argues that the phase when children use preconjunctional subordinate clauses lacks the features of the C system, as is evident from various phenomena. It is not only that overt complementizers are not attested to in subordinate clauses. During the same period, children seem to miss several other distinctions, all of which relate to the differences between root and embedded clauses. One of these distinctions relates to the use of root infinitives, which has already been discussed in Section 7.5. Children seem to use root infinitives as long as they use preconjunctionals.

Another phenomenon relates to the use of Wh-questions. Penner (1994a) argues that root constituent questions at this initial stage deviate from the corresponding adult questions. In particular, root questions, in English, lack subject auxiliary inversion. Deprez and Pierce (1993), also argue that this later evidence does not indicate that CP is missing but rather that C is not fully specified. In Hebrew, since subject-auxiliary inversion is not obligatory, this cannot serve as evidence. Nevertheless, as is thoroughly discussed in Section 9.3, root questions during this period do not involve productively inflected verbs, and they certainly do not show optional verb raising.

Moreover, as has been argued in Section 8.3, at the same period, subject (topic) drop displays an indecisive value ("diary" value for Haegeman 1990). *Pro* is used after Tns has been accessed, but the stabilization of null subjects in Hebrew is achieved after AgrS is productively used. Thus, the unstable use of null-subjects correlates with the use of preconjunctionals, which emerge after Tns has been accessed, are most productive after AgrS has been accessed and disappear only when C has been accessed as evidenced by the productive use of the complementizer *she* 'that.'

These correlations suggest that while children may know that subordination is licensed by UG, they do not know its language specific application. Thus, when a verb like 'want' subcategorizes for CP, it is initially followed by a CP with underspecified C, i.e., C which is phonetically null since its features are not specified with a value. Similarly, the structure of relative clauses is made available by UG, but the manifestation of C is language particular. At this point, two questions need to be asked. Why are

preconjunctionals not used before Tns is used, and how do children move from preconjunctional subordinate clauses into adult knowledge of subordination.

Penner and Mueller (1992) argue that preconjunctionals are best analyzed as constituting "full fledged CP projections with a gap in the complementizer position." In particular, Penner (1995) refers to underspecification for the feature [Infl-in-C], which makes it impossible for the child to determine how C is filled. In German, this is a reasonable explanation since verb raising to Infl and to C plays a crucial role in the language and its acquisition. It is not obvious that this feature can be generalized to account for the same phenomenon in other languages, in which verb raising is not a dominant feature. Infl-to-C, however, is strongly linked with finiteness, which seems to be a universal property of C. Infl-to-C might be merely a language particular manifestation of [Finiteness] (See Section 3.2.2.). Penner also argues that while the Infl-to-C feature is underspecified, the operator feature of C is partially specified in order to license the gap in C and determine the type of the embedded clause.

I suggest that we now approach the question from the opposite direction, again using the enumeration mechanism for checking and the minimalist hypothesis for acquisition. Infl-to-C strongly correlates with finiteness, while finiteness correlates with Tns. Thus, it is reasonable to assume that before Tns is used productively, the finiteness feature is underspecified or even inaccessible. By the minimalist hypothesis, once Tns is used and [finiteness] has been identified as a feature of C, C is accessible and can be used for subordination. However, since this feature as well as others, which are associated with C, e.g., [Operator], [Wh], [Reference], etc., has no value, by the enumeration

mechanism, C does not appear to be a lexical head and, therefore, need not be lexically filled. Nevertheless, it can be syntactically used. It is only when all the features of C have been identified and specified, a short while after their second birthday, that children start using complementizers in subordination.

9.4. Wh-Questions

Another phenomenon which correlates with the use of preconjunctionals and precedes the use of complementizers is the use of Wh-questions. In adult Hebrew, yes/no questions are marked only by rising intonation without overt syntactic change in word order. In formal speech, yes/no questions are preceded by a question mark *haim* 'whether' but never in colloquial speech. Information questions are formed by movement of the wh-word to [Spec,CP], but no verb raising or subject-auxiliary inversion occurs. In addition, since Hebrew makes use of nominal clauses without an auxiliary verb, some of the questions have no verb at all. Thus, the acquisition task might seem to be easier than in the Germanic languages.

In the acquisition of questions in English, the following phases have been noted (roughly from Klima and Bellugi 1966). During the first phase, children use neither modals nor auxiliaries, yes/no questions are marked only with rising intonation and the wh-word appears sentence initially in wh-questions without inversion. The use of wh-words is limited to a small set, ‘what,’ ‘where’ and ‘why,’ which are used non-productively in only a few routines, e.g., ‘where (NP) go?,’ ‘w(NP) doing?’ Moreover, as noted also by Radford (1990), children do not seem to understand wh-questions and their responses are often inappropriate. The second phase is characterized by the emergence of

auxiliary verbs, which are used in subject auxiliary inversion for yes/no questions but not for wh-questions. Wh-questions involve quite productive use of an extended set of wh-words, but, as mentioned earlier, there is no inversion. During the last phase, children make adult use of question formation, which involves subject-auxiliary inversion.

In Hebrew, questions do not involve subject auxiliary inversion. Moreover, as mentioned in Section 9.1, verb raising to C, though an option, is less frequent in colloquial speech. Nevertheless, the spirit of the phases found in English is true for the Hebrew data, as well, with the exception of subject-auxiliary. In a cross-sectional study of children aged 1;09-2;07, Eyal (1974) found that most questions produced by children at this age are well-formed and the order of progression is determined by the semantic type of the questions rather then by syntactic complexity. Dromi & Berman's (1986) cross-sectional study of children aged 1;01 to 5;06 shows that younger children use a high proportion of verbless questions, e.g., *efo ima* 'where (is) Mommy' and the use of questions with a main verb increases with age.

The longitudinal findings support the cross-sectional findings, giving a more detailed picture of the order in which wh-questions are acquired (See also Goral 1990.). The examples in (14.), (15.) and (16.) show the development of one child from formulaic questions, in which no movement is observed, to productive use of adult-like questions. At the age of 1;09, Lior uses only formulaic forms:

14. a. *ma asit?* [Lior1;09;25]
what you-did
'what have you done?' (limited to dirtying her pants)

b. *ma kara?* [Lior 1;09;16]
'what happened?'

These formulaic questions correlate with her acquisition of the gender and number distinctions (AgrPrt) and lack of overt knowledge of Tns. Though both utterances involve a question word which refers to object in adult use, it is not at all clear that the child really means to get the object as an answer.

At 1;11, Lior is already using Tns and to certain extent AgrS. Her questions become non-formulaic:

15. *lama ata boxe?* [Lior 1;11;00]
why you-sg-ms cry-sg-ms
'Why are you crying?'

The questions contain productively inflected finite verbs. Moreover, at this point. there is clear evidence, with two reservations, that the wh-word have really moved. The first reservation is that all verbs used at this point do not need person inflections, which suggests that the verb need not reach AgrS [Shlonsky 1995]. The second reservation is that the question refers to an adjunct, so it is not yet obvious that the question word moved from within the VP by substitution rather than by adjoined to a higher projection. It is possible that the question word has not moved at all but was generated where it is found.

At 2;01, however, it is evident that the verb rises to AgrS, where *pro* is licensed by it, and at the same time, the wh-word, which refers to an object, i.e., originates inside the VP, clearly moves to a higher position, namely [Spec,CP]:

16. a. *ma asiti aba?* [Lior 2;01;18]
what I-did Daddy
'what have I done, Daddy?'

b. *ma samti?* [Lior 2;01;18]
what I-put
'What did I put?'

As anticipated, earlier, this progress correlates with the use of complementizers, which emerge for the first time at the end of that month.

As shown for Lior, children start using questions long before they use subordination. Initially, in what corresponds to Klima & Bellugi's (1966) first stage, children use questions like *efo mafteax* 'where key' meaning 'where is the key?' or *ma ze* 'what that' meaning 'what's that?' and *ma kara* 'what happened?' all of which are grammatical. At this early period there is no use of subordination nor of preconjunctionals. These questions, however, either have no verb, or formulaically use a verb. Moreover, there is no clear-cut evidence that these questions involve movement at all. For example, the answer to *efo mafteax?* 'where is the key?' is *hine mafteax* 'here is the key.' Thus, *efo* could have been generated in clause initial position rather than moving there to form a question. Clear-cut evidence for movement can come only from nonfrozen clauses in which the complement of the verb moves to the beginning of the clause.

Along with the emergence of preconjunctionals, once Tns has been used, the types of questions used also extends, and questions which involve verbs or clear movements seem to emerge. These questions are limited, however, to present tense and third person in the past tense. They never involve verbal negation, though the child uses it productively in indicative clauses. This period seems to correlate with Klima & Bellugi's (1966) second stage.

A few months later, just before overt complementizers are used for subordination, children produce questions which undoubtfully involve movement to [Spec,CP], as attested to by the use of verbs inflected for person in I with or without a subject which must occupy [Spec,IP] or by VS order. These questions indicate that the child has reached the third and last stage in the acquisition of questions. At this stage, children seem to use a fully fledged tree, producing sentences with verbal negation, such as (17.);

17. a. *lama at lo kanit et ze?*
why you-sg-fm not bought-2-sg-fm ACC it
'Why didn't you buy it?' [Yuval 2;06]

b. *ma hu lo hevi li?*
what he not brought-3-sg-ms to-me
'What didn't he bring me?' [Yuval 2;07]

The use of adultlike wh-question just before complementizers are used suggests that the acquisition of the feature [Operator] or [Wh] also plays a role in the use of complementizers. Children identify this feature on C only when IP has been fully occupied by a subject and an inflected verb and they need to move a wh-word outside the IP. That is, before the child has mastered the use of AgrSP, she might assume that this highest functional node could be a locus for topicalization and movement of wh-elements. It is only once the features of AgrSP have been specified and the specifier used

for the subject, that the minimalist child is forced to seek a new non-argument locus for the moved wh-word.

The minimalist hypothesis for acquisition predicts that CP will become accessible only after IP has been fully mastered. Once CP is accessible as the locus for wh-movement, having been marked with the [Operator] feature, other features of C, e.g., [Finite], are identified and specified, making this position available both for verb raising and, more importantly, for subordination. Though subordination is a "yardstick" in language development since it marks the transition from mono-clausal to multi-clausal utterances (Berman 1992), it is the need to use CP for wh-questions which enables the child to access this point.

This generalization overlooks one crucial point. It explains the acquisition of CP in languages with overt wh-movement, but it is not obvious how to apply it to languages with wh-in-situ. By stipulating that the difference between the two types of languages is in the spec-features of C rather than the head features,. a solution, which is similar to the solution offered for the topic raising in V2 languages (Section 3.2.2), is arrived at. The head features of C, which type the clause, are identified in all languages once they cannot be checked within the IP. Overt wh-movement takes place only in languages which specify spec-features for C. In both cases, the wh-feature is checked by LF, following the overt movement which was triggered by the PF-ban or following covert movement of wh-features.

Extending the explanation to wh-in-situ languages suggests that overt wh-movement can serve as an indication that the child has acquired knowledge of the feature

[Operator] or [Wh] as spec-feature of C. Prior to this, children realize that clause-typing cannot be checked at the IP level since this level is fully occupied by the verb and the subject which check the tense and agreement features, but they clearly cannot check [wh] features. To conclude, [wh] or [operator] as head features of C is a prerequisite for further specification of clause-typing, i.e., for subordination.

9.4. Subordination

The final indication that CP has been acquired is the overt manifestation of C in subordination. This manifestation is characterized by the use of complementizers, first *she* 'that,' which is overextended to contexts where greater specification is required and later *ki* 'because,' *kshe* 'when,' etc. The presence of these complementizers indicates the specification of CP, first as the locus for complementizers, i.e., as having value for the features [Operator] and [Finiteness], and then for other features, such as cause, temporality, etc.

Previous studies on the acquisition of Hebrew show that children use more subordination with age (Berman 1988, 1990, Dromi & Berman 1986, Geldman 1987, Kaplan 1983). In Dromi and Berman's (1986) cross-sectional analysis, for example, no subordination was found before age two. Its appearance rose to 9.6% between age two to three years, to 18.3% between age three to four years and to nearly a third of the analyzed utterances between age four to five and a half. Children make use of three types of subordination, first without and later with a main clause. They use complement clauses, as in (18.), adverbial clauses, as in (19.) and relative clauses, as in (20.) (from Rader 1989):

18. *ani ar'e lax efo ratuv* [Smadar 2;00;07]
I will-show you where wet
'I'll show you where it is wet'

ani lo maskim she tesaxaki iti [Asaf 2;03;01]
I not agree that you will-play with-me
'I don't agree toyou playing with me'

19. **titni li neshika [she ze koev]* for *[ki ze ko'ev]* [Smadar 2;02;13]
give me kiss that it hurts because it hurts
'give me a kiss because it hurts'

kshe at madlika et ha-or ha-ze az yesh or ba-xeder [Sivan 2;07;29]
when you turn-on ACC the-light this then be light in-the-room
'When you turn this light on, there's light in the room'

20. **hine od telefon she ani yexola letalfen* for *letalfen mimenu*
[Smadar 1;11;13]
here more phone that I can phone phone from-it
'here is another phone that I can call from'

xatixa she kor'im la gezer [Hagar 2;03;12]
piece,fm that call it,fm carrot
'A piece which is called carrot'

The explanatory capacity of the computing mechanism is fully manifested when discussing the order in which subordinate clauses (with *she* and other complementizers) are acquired.

Two alternative orders are reported in the literature. One possible order for English (Bloom et al 1980, Bowerman 1979) is that complement clauses first emerge after the age of two, followed by coordinate clauses and adverbial clauses in the second half of the third year and finally, around the age of three, by relative clauses. Embedded questions and the complementizer *she* 'that' emerges approximately at the same time. Among the adverbial clauses, reason clauses precede Time clauses. Kaplan's (1983) and Dromi and Berman's (1986) cross-sectional studies show that a similar order is found in Hebrew. Kaplan (1983) reports that at around 2;06 children make extensive use of the

coordinator *ve* 'and' for coordinating clauses but that it is not until the age of three that they acquire subordination. In the acquisition of subordination, complementation by an embedded question precedes complementation by a declarative sentential complement, which is followed by adverbials clauses for causativity and then for temporality. Last of all are the relative clauses.

In these works it was argued that the order may be explained by an accessibility hypothesis which says that the structure which is most accessible, i.e., less complex in terms of embedding, is the first to emerge. If one follows this hypothesis, complement clauses becomes a readily available structure since they are selected by the verb. These clauses involve just one layer of embedding and, thus, would be produced first, while relative clauses which are a non-selected novel structure which involves another layer of embedding would be last. Adverbial clauses are also a non-selected novel structure. However, since they involve only one layer of embedding, they are the intermediate structure.

On the other hand, Penner (1995) argues that in Swiss German, relative clauses are first to be acquired, while complement clauses are last. His data suggests that not only are complement clauses last to be acquired but that they remain unstable till the age of four. In his analysis, this is the order since relative clauses, being adjuncts, require less knowledge about the nature or features of C, whereas complement clauses involve more precise specifications of the C-features, for which the subordinating verb subcategorizes. This kind of analysis, by which the features of C are gradually identified, seems to readily conform with the minimalist hypothesis for acquisition.

There is a question about how opposite orders of acquisition can exist and whether the order is at least consistent for a single language. One major difference between Penner's report for Swiss German and Bowerman's findings for English or Kaplan's for Hebrew is that Penner focuses on the emergence of this knowledge while both Bowerman and Kaplan focus on the stabilization of this knowledge when it is used in at least 90% of the relevant contexts. This makes the contrast among explanations less striking. The following findings from Hebrew suggest that what we see is not different orders of acquisition in different languages but rather different orders of first emergence vs. stabilization.

An extensive analysis of the Hebrew longitudinal corpus which followed Rader's (1989) partial analysis supports the minimalist hypothesis, showing that the emergence of subordination in Hebrew is done in this later order. The examples in (21.), (22.) and (23.) from one child, Lior, give the first occurrence of each of the subordination types:

21. *aviron she la-shamayim* [Lior 2;01;27]
airplane that to-the-sky
'an airplane that flies to the sky'

22. *tizahari she lo yipol* [Lior 2;02;18]
take-care that not will-fall
'Be careful that it does't fall'

23. *racit lehagid she laxasht* [Lior 2;02;25]
you-wanted,fm to-say that you-whispered,fm
'You wanted to say that you whispered'
[The mother corrects this to *laxashti* 'I whispered')

As reported by Penner for Swiss German, Lior uses a relative clause at the age of 2;01;27, an adverbial clause at 2;02;18 and a complement clause at 2;02;25.

Table 1 summarizes Rader's (1989) findings for three children in the longitudinal corpus, Smadar, Hagar and Leor, the two children from the Ravid corpus, Asaf and Sivan, and the longitudinal findings for Lior:

Table 1 - First Occurrence of the Three Types of Subordinate Clauses in Six Hebrew-Speaking Children.

	Asaf	**Hagar**	**Leor**	**Lior**	**Sivan**	**Smadar**
Relative	2;1;10	2;1;20	2;2;05	2;1;27	1;11;2	1;10;19
Adverbial	2;1;10	2;1;19	2;2;25	2;2;18	2;3;12	1;10;19
Complement	2;2;28	2;2;04	2;2;11	2;2;25	2;2;18	1;11;13

Though, as Rader also reports in his study, there some individual differences in the course of acquisition, e.g., Smadar, Asaf and Sivan use subordination with hardly any mistakes while Hagar and Leor seem to have a harder time disentangling the problem, the basic order of acquisition is shared by all six children. They all start with relative clauses. Three of the children, Smadar, Hagar and Asaf, simultaneously start using adverbial clauses, and a few weeks later they use complement clauses. The other two, Leor and Sivan, use complement clauses before adverbial clauses whereas Lior demonstrates a classically gradual course of acquisition. However, the striking fact is that all start with relative clauses, which are according to Berman's cross-sectional studies (1986, 1988, 1990) more complex and, thus, last to be mastered.

As argued by Penner (1995) this order might be attributed to the complexity of feature complex in C. While for relative clauses it is enough to know which features are in C, for complement clause the child has to make sure that these features satisfy the subcategorization requirements of the selecting verb. Thus, relative clauses need less feature specification than complement clauses. In Hebrew, for example, relative clauses

are always [+Finite], while complement clauses can be either [+Finite] for a verb like 'say,' [-Finite] for a verb like 'try' or both for a verb like 'want;' relative clauses are always [-wh], while complement clauses can be [+wh] for a verb like 'ask,' [-wh] for a verb like 'tell' or both for a verb like 'know.' Acquisition of complement clauses involves not only syntactic learning but lexical learning as well.

A similar explanation works for the early emergence of adverbial clauses which also tend to precede complementation. The early adverbial clauses are used without exceptional with the lesser specified complementizer *she* 'that.' Since adverbials are usually not selected by the verb, they need not be specified further to satisfy these requirements. Further specification is a conceptual and semantic requirement but not a syntactic factor. To summarize, by the minimalist approach to language acquisition, the identification of one feature of C is enough to make it accessible, as was also suggested for the preconjunctionals. However, it is the assignment of value to that feature which makes it visible at PF and, thus, requires lexical content for C in order to satisfy the PF-ban. This is enough to make relative clauses a convergent option in the child grammar. Further identification of features and their values extends the use of subordinated clauses to other syntactic contexts.

The acquisition of subordination, being the latest acquisition of early syntax and a "yardstick" (Berman 1990) which marks the beginning of the acquisition of complex syntax, correlates with the disappearance of various phenomena which characterize early syntax. One such example is the use of declarative root infinitives. It seems that the use of subordinate clauses of the various types correlates with a decreased use of declarative

root infinitives. As was suggested earlier, in Section 7.5, when root infinitives were discussed at length, the specification of the features for C makes the use of C obligatory. Table 2 (from Brusilovsky 1995) pinpoints the change for one child, Lior:

Table 2 - Percentage of Root Infinitives and Overt Complementizers out of all Utterances Containing Verbs (Lior).

Age	N	Declarative root infinitives	Overt complementizers
1;11	315	3.8	0
2;00	548	6.75	0
2;01	325	4	0.6
2;02	210	1.4	1.4
2;03	519	1.3	4.3

As shown in this table, Lior's use of declarative root infinitives is reduced from about 5% to about 1% of her verbal utterances when she is 2;02. At the same time, she starts using overt complementizers (Her use of overt complementizer in the previous month is limited to the last session when Lior is 2;01;27.). Thus, it seems that the feature specification which makes C behave like a lexical head also makes indicative root infinitives impossible where it was previously accepted. Since the use of embedded infinitives is linked to the specification of the feature [Finite], this feature also seems to be crucial for subordination. The use of complementizers seems to rely on the feature [Finiteness], and so does the loss of root infinitives. But while [+Finiteness] implies that a complementizer may be used, it also implies that declarative root infinitives are not a convergent option since the nonfinite verb cannot check the [+Finite] feature of C. Thus, the correlation between the use of complementizers and the disappearance of indicative root infinitives might suggest that complementizers are used in order to check the feature [Finite] (See Section 7.5 and Section 9.4 below.).

The acquisition of CP concludes the discussion on the acquisition of the syntax of simple clauses, which is the empirical focus of this work. The way and the order in which the CP system is acquired were accounted for by the minimalist hypothesis for acquisition and the bottom-up tree building that it predicts, together with the PF-ban on empty lexical-like heads. These principles also explain the correlation between the phases in the acquisition of CP and other linguistic developments. Presumably, these same mechanisms are able to account for further developments beyond the simple clause, but that is beyond the scope of this work.

Chapter Ten -- Conclusion: What Children Have to Say about Minimalism

We are now at the point at which we can integrate the various elements. This work had two central foci: syntactic theory and the acquisition of syntax. This concluding chapter will attempt to link the two, by looking at what the acquisition data have to say about Minimalism, and what the Minimalist Program has to say about the data.

The dual focus of this work was indicated by the three goals presented at the end of Chapter 1. The first goal was to define and limit the set of syntactic parameters and to account for the order and method in which these parameters are set. The second goal was to derive, rather than stipulate, the notion of "strong" feature, which had played a role in crosslinguistic accounts of parameterization as well as of the acquisition of parameters. The third and last goal was to account for apparent gradualness in language acquisition and particularly in parameter setting. The theoretical aspects of these aims were discussed within the minimalist program (Chomsky 1995) in Chapters 2-5, while Chapters 6-9 focused on the acquisition of Hebrew and the testing of the theoretical model presented in the earlier chapters.

After a brief review of some aspects of the Parameters and Principles model, particularly the format which parameters should take and how their values are set, Chapter 2 focused on the second aim, a proposal for a "computing mechanism" and a PF-ban which could substitute for the checking of strong features. The computing

mechanism and the PF-ban emerged from the lexical-functional dichotomy which suggests that lexical items are specified for all their features, whereas functional items are neutral, i.e., unspecified. For every functional head, the computing mechanism compares the potential set of features determined by the maximal morphology of the particular language with the set of features specified on the corresponding lexical item. This, together with a PF-ban on fully specified but phonetically null, functional heads, made it possible to derive the distinction between strong and weak heads, rather than stipulate it. The PF-ban on lexically masked functional heads, which was extended to specifiers of these heads, replaced the idea of checking before PF. This makes checking a unified process applying only after spell-out. Thus, by saying that all features should be checked out by LF, checking could be seen as an LF-ban.

This distinction played a crucial role in accounting for parametric differences between languages, which was the first aim of this work. In Chapter 3 it was suggested that most differences could be reduced to the set of features the lexical head is morphologically endowed with and to the balance between those features and the underspecified (valueless) features on the functional heads. Parameters of this form were labeled **relative parameters** and referred to all parameters which are flexible and operative prior to PF where the PF-ban must be satisfied. This category covers merge operations, such as verb-raising, subject-raising and some A-bar movements in V2 languages. We also discussed the distribution of empty pronominal categories focusing on the null subject phenomena. Thus, null-subject or verb-second are merely names for

different phenomena, all of which are reduced to one common formulation in terms of the PF-ban.

Ideally, one would want the attainment of the first goal to take care of all parametric variation; unfortunately, not all needed parameters lend themselves to the above reinterpretation, ass was shown in Chapter 4. Thus, one must countenance **absolute parameters**, that is, absolute binary parameters, which are primarily effective in the projection from the lexicon, and include word-order parameters and categorial features neutrality parameters.

Since the various relative parameters are merely names for phenomena which emerge from crosslinguistic lexical variations, it is possible to argue that they are not parameters at all. Rather, all the phenomena associated with such parameters result from the language specific lexicon and morphology, and a unified mechanism accounts for all of them.

The question is how to treat the absolute parameters, which seem not to rely on a PF-ban or on checking. The Feature Neutrality Parameter seems to be the easiest case since, like relative parameters, it involves neutralized, i.e., underspecified, features. Since the Feature Neutrality Parameter basically extends the application of the computing mechanism to categorial features, this could also be captured as lexical differences rather than a parameter.

A more difficult challenge is posed by the directionality parameters. As discussed in Chapter 4, Kayne's (1994) proposal to reduce directionality effects to head movement

and object scrambling, which would have made them relative parameters, seems not to hold crosslinguistically. Nor does it hold for acquisition. In fact, the acquisition data crucially suggest that children are aware of directionality effects long before checking applies productively, generating adult word-order from their earliest utterances and differing from adult use wherever checking is required. This seems to imply that the distinction between the two types of parameters must be kept. Thus, contrary to Kyane (1994) which could not drew the necessary distinctions, the only parameters which remain are directionality parameters, which are absolute binary parameters and are marked for all lexical and functional categories.

Attributing most of the parametric differences to morpho-lexical variations and leaving directionality parameters as the only "real" parameters partly fulfills the first goal. Moreover, as mentioned in Chapter 4, the Linearity Marking Hypothesis, which underlies the directionality parameters, is not specific to the syntactic module. This hypothesis seems to underlie all modules in which hierarchical trees are generated, e.g. morphology, phonology and prosody. Thus, the two remaining syntactic parameters of directionality seem to be nonspecific to syntax. Is this "beyond modularity" (Karmiloff-Smith 1992)?

After analyzing various crosslinguistic phenomena, we moved to a detailed analysis of the early acquisition of Hebrew, in which the theoretical model was put into practice, and attempted to achieve the third goal. The analysis of the Hebrew data focused on the production of children from their early word-combinations at around age 1;06 to their first complex clauses at around age 2;06. The analysis of the acquisition data was

based on a minimalist hypothesis for acquisition, assuming that, according to UG, children have full knowledge of the tree but that they make minimal use of it at all points unless the evidence they have dictates differently.

First to be analyzed, in Chapter 6, was the structure of DP. It was found that children start by encoding possession relations in a possessor-possessed order, which is ungrammatical in adult Hebrew but reflects the underlying order at the NP level. This is followed by a gradual correction of the order which seems to be triggered by the use of the quantifier *od* 'more, another' as a modifier of the possessed within the possession relation. This change is followed by the use of other functional items, such as the genitive case-marker *shel,* the determiner *ha-,* and the accusative marker, *et.* It was also shown that the use of nominal agreement is age-related to the use of D and [Spec,DP].

In Chapter 7, the focus shifted from the DP to the VP and showed that children acquire the morphology of verbs in a way which reflects the order of the corresponding nodes in the tree. They start at the one-word stage with a vast number of morphologically unclear verbal forms (up to 75% of the vocabulary), which are usually used, in requests. The rest of their verbs are infinitives and imperatives used in requests and, more interesting, aspectually limited past and present verbal forms used for perfect (e.g., 'fell') and durative (e.g., 'eating') actions, respectively. This aspectually limited use of verbs suggests that children make use of the lowest functional node, i.e., Asp, as soon as they use verbs. The vast number of unclear forms suggests that they have not acquired the morphology and syntax which distinguish between finite and non-finite verbs.

From this point, children gradually start to display knowledge of the morphology and syntax of verbs. First, they productively use gender and number morphology, which are typical of participial forms. Then they start to use past and present forms to indicate tense and not merely aspect. Finally, person morphology emerges. This order of acquisition reflects a bottom-up use of the tree, with movement from the VP to AspP, then to AgrPrtP, next to TP and finally to AgrSP.

The order in which verbal morphology is acquired correlates with other acquisition phenomena, and in Chapter 8, it was shown to correlate with the use of pronouns (after T is used) and well-formed use of *pro* (after AgrSP is used). On the other hand, it was suggested, in Section 7.5, that the limited use of indicative root infinitives in Hebrew reflects the richness of Hebrew morphology, which eases the identification of the features of the functional system and their values. It was suggested that while modalic use of root infinitives should disappear once overt modals show up, i.e., when T is specified, indicative use disappears only when CP has been mastered.

The discussion of Hebrew concludes in Chapter 9 with a consideration of the acquisition of CP. There again it is shown that C is never used before T has been acquired and overt C never shows up before AgrS has appeared. Empirically, this means that preconjunctionals emerge after tenses, and subordination shows up only after person agreement. Similarly, in the acquisition of interrogatives, children use adult questions only after agreement is acquired. Once again, the order of acquisition reflects the minimalist hypothesis, by building trees in a bottom-up fashion.

Most prominent in the analysis of the Hebrew findings was the view of the minimalist child who is born with a universal hierarchical ordering of functional categories, but of course, without knowledge of the language specific morphological realization. Children proceeds to learn the morphology in a bottom-up fashion to ensure that they have complete well-formed structures at every stage, given their limited knowledge. These trees seem to follow the Split Infl Hypothesis by having aspect, tense and several agreement heads. This seems necessary in order to account for the order in which verbal morphology as well as several related phenomena are mastered, including the use of null subjects, root infinitives and the use the CP system for questioning and subordination. A similar process plays role in the acquisition of the DP system, in which the order in which the free genitive, the determiners and the accusative marker were acquired again suggests a gradual, bottom-up use of various functional heads within the nominal phrase marker. Such a minimalist bottom-up acquisition fulfills the third goal; it explains the gradualness of acquisition.

10.1 Afterthoughts

The unlimited inventory of functional heads permitted in the theory (Cinque 1996), and even the quite limited set of functional heads used in the proposed analysis, seem, however, to contradict both Newmayer's (1988) claim (quoted at the beginning of this work) for the need to limit our model, as well as current views of the functional system, proposed within the minimalist program. In view of current approaches to the inventory of functional heads which propose that functional heads be semantically motivated heads (Speas 1994, Borer 1995), and in line with Chomsky's (1995) proposal

that there should be no Agr nodes since agreement under spec-head relations is a purely syntactic notion, the proposed model might be reconsidered along the following lines in future work.

I would like to suggest that the bottom-up specification of functional heads could hold even in the absence of agreement nodes. In such case, children might first be triggered to use functional heads as syntactic representations of semantic properties, such as aspect or tense, in line with Pinker's (1984, 1989) semantic bootstrapping. Only after the use of these heads has been semantically motivated can syntactic operations, such as the computing mechanism for checking, be applicable.

An alternative assumption emerges from the links between semantic and syntactic requirements and the two interface levels of LF and PF, respectively. With such an analysis, at each level of the tree, the child first works on the universal LF representation and only then proceeds to the language specific representations at PF. This assumption would constrain possible explanations for the order of acquisition to syntactic bootstrapping.

Following this line, agreement, being an overt PF manifestation of the proposed mechanism, should thus follow the semantic LF function of each functional head. Rethinking about some of the data, we might see how semantic before syntactic use of functional heads might explain some of the yet unsolved problems. This assumption could explain, for example, why quantifiers trigger the use of DP whereas case and agreement are acquired later. Similarly, within the IP system, this assumption might further explains why participial agreement in number and gender is separate from

agreement in person and follows the acquisition of aspect rather than the acquisition of tense. Clearly, agreement for aspectually participial but tenseless forms should be checked under spec-head agreement within AspP while agreement of tensed forms, which are marked for person in Hebrew, is possible only once T has been acquired.

An empirical advantage of this approach is that it explains why the use of preconjunctionals, which make use of the CP system, follows the use of T rather than person agreement (AgrS). The use of underspecified C becomes possible once Tense has been semantically specified, but it is only after T has been syntactically specified, e.g., for agreement, that semantic specification of C for questions, followed by syntactic specification for subject-auxiliary inversion and subordination are plausible.

This last point is where the proposed revision seems to have great benefits over previous proposals including ones suggested earlier in this study. While the emergence of preconjunctionals between T and AgrS before C is accessible requires stipulations as to the status of these sentences, it seems to support an entirely semantically motivated functional heads approach, in which there are no agreement nodes to intervene between T and C, and C could be accessed semantically, though not syntactically, once T is acquired. The very neatly ordered acquisition which questioned the validity of a maturational approach (Guilfoyle & Noonan 1992, Radford 1990), seems to support the minimalization of functional categories to purely semantically motivated nodes. I shall not pursue these changes further since they seem not to contradict the model proposed in this work, but rather improve on it. This, however, will be developed in further work.

To conclude, this work offers a new look at checking, which seems to capture Chomsky's (1995) intuition that there is no reason to apply the same mechanism to strong and weak features. Checking applies to weak uninterpretable features at LF and the computing mechanism and the PF-ban substitute for the stipulated notion "strong," intended to motivate overt movement. Use of these mechanisms reduces most parameters to morpho-lexical variations. The only "real" parameters left are directionality parameters, which are not unique to syntax.

This revision explains the order in which parameters are acquired. It was shown that children set directionality parameters from their earliest word-combinations before checking or the PF-ban apply. Other parametric differences are gradually mastered and follow a bottom-up construction of the tree. Children first satisfy the universal LF requirements and subsequently satisfy PF requirements, employing language specific morphology and lexicon. Thus, the apparent gradualness of language acquisition and parameter setting is attributable neither to linguistic maturation nor to language external modules but rather to the minimalist nature of the child, which combines the gradualness of children's acquisition of the particular morphemes of the language they are exposed to with the evaluation of the values of the features of the functional heads by the computing mechanism and the PF-ban. Taking the afterthought seriously, children seem first to satisfy the universal LF requirements and subsequently satisfy PF requirements, employing language specific morphology and lexicon.

Appendix I - First 20 Verbs Recorded for 6 Israeli Children

The following transcription conventions are used in this appendix, and in the text. Transcription is broadly phonetic, or roughly phonemic. It represents the current pronunciation of educated speakers of standard Hebrew -- like the parents and other primary caretakers of the children in our sample -- and ignores abstract historical distinctions still manifested in the orthography (Berman, in press; Ravid, 1994). The following symbols are used for Hebrew letters:

Vowels:	High = i, u	Mid = e, o [schwa = e] Low = a	
Consonants:	alef = zero	bet= b, vet = v	gimmel = g
	daled = d	heh = zero, h	vav = v, u
	zayin = z	chet = x	tet = tav = t
	yod = y	kaf = k, chaf = x	lamed = l
	mem = m	nun = n	samech = s
	ayin = ', zero	pe = p, fe = f	tsade = ts
	qof = k	resh = r	shin = sh, sin = s

Upper case, capital letters = nonfinal (penultimate) stressed vowels

Verbs are listed in the form and order of their first occurrence in our recordings (except for Child 4, Yuval; in his case, the list includes all of the 22 verbs he used prior to the emergence of wordcombinations; only 18 verbs are listed for Child 2, Smadar, since

these all appeared in a single month). Each entry consists of three items:

I) the form as first pronounced by the child -- notated as follows:

~ stands for (apparent) free variation between forms
> stands for later pronunciation of same target word;

II) the target form attributed to the child, interpreted by reference to the linguistic and situational context in which the form was produced.

III) an approximate English gloss, notated as follows:

!	= Imperative
to-	= Infinitive
Verb stem	= Truncated or "stripped" form
Verb+s	= Present tense
Verb in past	= Past tense
will Verb	= Future

CS = Causative
FM = Feminine Gender
IT = Intransitive
JV = Juvenile, Nursery Word
PL = Plural Number
RF = Reflexive
TR = Transitive

Notes on Glosses [of Target Forms]:

(a) The bare, uninflected stem form of an English verb (e.g. climb, play) is used where the child's form could stand for a variety of target forms, e.g. *pes* -- which we gloss as `climb' -- could, theoretically, stand for infinitival *letapes* `to-climb' and also for the masculine singular of another four forms: imperative *tapes* `climb!'; present tense *metapes* `climbs, is-climbing'; past tense *tipes* `climbed', and future tense *yetapes* `will-climb'.

(b) A gloss with `to-' is used only for forms that are clearly infinitival in shape, even when they lack an overt prefixal *le-* (or its alternants *li-* and *la-*) to mark them as such. For example, we gloss the form *Ede* as `to descend = to-go down, to-get down', standing for the target infinitive *larEdet*, because its final vowel makes it contrast overtly with other target forms such as imperative *red*! (and feminine *redi*), present tense *yored*, past tense *yarad*, and future *yered*. In this, the common juvenile form *Ede* differs from a possible use of *ed*, which could stand for any of the four other forms: imperative, present, past, and future. Compare for the verb *la-tset* `to-exit, go out', as used by Keren, Child 4, whose *set* is interpreted as an infinitive because of the disambiguating final *-t*, versus Yuval, Child 5, whose *se* could be imperative *tse*!, present *yotse*, or future *yetse*.

(c) The English glosses give monolexemic equivalents for verbs that indicate direction of motion, e.g. *exit* for `go out', *ascend* for `go up', as well as for other verbs typically rendered with particles or prepositions in a verbsatellite language like English, e.g. *seek* for `look for', *awaken* for `wake up'. These are like their equivalents in verb-framed Romance languages, and are everyday, not of high register as suggested by the English versions.

1) **LIOR, girl, aged 1;5 - 1;6, in interaction with her mother**

I = CHILD	II = TARGET	III = GLOSS
ni	tni	`give+FM!'
nAnu > gamAnu	gamArnu	‘finished, TR+1 PL'
fal	nafal	`fell'
bo ~ bOi	bo, bO'i	`come!, come+FM!'
xol ~ xal	(le')exol	`eat / ate'
pes	(le)tapes	`climb'
ve	ko'ev	`(it) hurts, is sore'
(mi) ba	mi ba	`(who's) coming?'
seye	letsayer	`to-draw, paint'
zuz	(la)zuz	`move, IT'
gOax	(li)ftoax	`open, TR'
xek	(le)saxek	`play (a game)'
niga	nigmar	`finished, IT = is over'
shon	(li)shon	`sleep'
dEdet	(la)rEdet/yorEdet	`descend'/`descends+FM'
kum	(la)kum	`rise = get up'
boxe	boxe	`cries, is crying'
gor	(li)sgor	`close / shut, TR'
pEset	mexapEset	`climbs, is-climbing+FM'
nEdet	menadnedet/mitnadnEdet	`swings, is-swinging, TR/IT'

2) SMADAR, girl, aged 1;6 - 1;7, with her mother and older sisters

I = CHILD	II = TARGET	III = GLOSS
shev	(la)shev(et)	`sit'
sim	(la)sim	`put'
pes	(le)xapes	`seek' = `look for'
fox	(la)hafox	`invert' = `turn over, TR'
tOax	(li)ftoax	`to-open, TR'
gOax > gor	(li)sgor	`to-close / shut, TR'
ala	halax	`went (away), left'
xi	kxi	`take+FM!'
sim ~ sImi	(la)sim, sImi	`put, put+FM!'
fal	nafal	`fell'
Iax	hicliax	`succeeded, managed'
nigor	nisgor	`we'll-close' = `let's close'
per	(le)saper	`tell, say'
vi	tavi('i)	`bring (+FM)!'
bosh	(li)lbosh	`wear, put-on'
ci	(le)hoci	`extract, take out'
his	(le)haxnis	`insert, put in'
(t)itax ~nitax	ti-~yi-~niftax	`open, TR!' / `will-open, IT'
xel	oxel	`eats, is-eating'
kax	(la)kaxat	`take ~ take!'

3) LEOR, boy, aged 1;9 - 1;10, in interaction with his maternal aunt

I = CHILD	II = TARGET	III = GLOSS
segAnu	sagarnu (or)	`closed+1st PL (light)'= `we turned off (the light)'
(r)ose	rotse	`wants'
tax	niftax	`opened, IT'
kax > kAxat	kax, lakAxat	`take!', `to-take'
dedef ~ dAde	(le)dafdef	`page' = `turn pages of book'
mimar	nigmar	`finished, IT' = `all done'
megEax	mitgalEax	`shaves, is-shaving, RF'
ose	ose	`does, is-doing', `makes, is-making'
lasim	lasim	`to-put'
te'e	tir'e	`look!
vi ~ tavi	tavi	`bring!'
laEdet	larEdet	`to-descend' = `to get down'
Oid ~ oIdi	(le)horid, torIdi	`to-descend, CS ~+FM!' = `take off/down'
labish ~ babish	(le)halbish	`(to-)dress, CS'
osi	(le)hotsi	`to-exit, CS' = extract, take out'
bo	bo	`come!'
tafsIyi	tafsIki	`stop+FM!, TR'
xu	kxu	`take+PL'
gor	(lis)gor	`shut, close'
kum	(la)kum	`rise' = `get up'

4) KEREN, girl, aged 1;2 - 1;4 [Dromi 1987]

I = CHILD	II = TARGET	III = GLOSS
ito	lishtot	`to-drink'
set	latset	`to-exit' = `go out'
nIli	tni li	`give+FM! me'
ax	kax	`take!'
Ede	larEdet	`to-descend' = `get down, go down'
ines	lehikanes	`to-enter' = `go in, get in'
ibar	nishbar	`broke, IT'
pes	tapes	`climb'
eve	lashEvet	`to-sit'
ipose	hitpocec	`burst,IT'
Uax	liftOax	`open'
pes	xapes	`seek' = `look for'
Afa	afa	`fly/flew+FM"
ala	nafla	`fell+FM'
Usi	rUtsi	`run+FM!'
id	(leh)orid	`descend, CS' = `take off, take down'
usi	(leh)otsi	`exit, CS' = `take out, get out'
abis	(leh)albish	`dress, CS'
lalo	la'alot	`to-ascend' = `go up, get up'
nake	(le)nakot	`to-clean / clean!'

5) YUVAL, boy, aged 1;4 - 1;9, youngest child of second author

I = CHILD	II = TARGET	III = GLOSS
Ede	(la)rEdet	`to-descend' ~ `to-exit' = `go out ~ down'
ed	(leh)orid	`descend ~ CS `go down ~ take down
bO(i)	bo ~ bOi	`come! (+FM)' [with and without fem. suffix]
te	shev	`sit!'
ga	kax	`take!'
gen	(le)nagen	`play (musical instrument)'
ke	(le)nakot, nake	`(to-) clean'
do	(li)gzor	`cut (paper)'
ke	(le)taken	`fix, repair' [later pronounced ken]
to	(li)xtov	`write'
du(i)	zuz ~zUzi	`move!(+FM),IT' [with and without suffix]
be	(le)hitlabesh	`dress, RF'
bi	hirbic (li)	`hit, PAST (me)'
kum	(la)kum	`rise = get up'
se	(la)cet	`exit = go out'
i > ti	tir'i	`look+FM!' [first without initial t-]
lOce	lo roce	`not wants' = `I don't want'
mima	nigmar	`finished, IT' = `all done'
ga	gamArnu	`finished, TR+1st PL' = 'we've finished' [when wants to finish with some activity]
ta	tiftax, liftOax	`open, TR'
kra	tikra, (li)kro	`read'
ba	nishbar/nishpax	`broke, IT ~ spilt IT'

6) SHELLI, 1;11 - 2;1, daughter of first author [Berman, 1978]

I = CHILD	II = TARGET	III = GLOSS
kli	tistakli	`look+FM!'
sUsi	zuzi	`move+FM!'
xi	kxi	`take+FM!'
tiri	tir'i	`see+FM!' = `look!'
ni	tni	`give+FM!'
bOi	bO'i	`come+FM!'
shImi	sImi	`put+FM!'
Ede	larEdet	'to-descend' = 'to get down'
shon	(li)shon	'sleep'
xol	(le')exol	'eat'
shev	(la)shEvet	'sit'
Exi	lexi	`go (away)+FM!'
yImi	tarimi	`raise+FM!' = `lift, pick up'
vIili	tavi'i li	`bring+FM! to-me'
kUmi	(ta)kumi	`rise+FM!= `get up!'
rok	(li)zrok	`throw'
fal	nafal	`fell'
xa	boxa	`cries, is-crying+FM'
osa	rotsa	`wants+FM'
xola	yexola	`can, is-able+FM'

Appendix II - The Development of Argument Structure

Table 1 - The development of argument structure for the verb 'want'

	Hagar	**Leor**	**Smadar**
No arguments	*lo roca* 'Don't want' (1;07;02)	*lo roce* 'Dont want' (1;09;04)	*lo roca* 'Dont want' (1;08;13)
Nonfinite verbal complement (modal-like use)	*roce (l)e(hitla)besh* 'Want to dress up' *roce lishon* 'Want to sleep' (1;07;22)	*roce (leh)o(r)id* 'Want to take off' (1;09;04)	*(ro)ce (li)shon* 'Want to sleep' (1;08;13)
NP complement	*roca od* 'Want (some)more' (1;08;01) *lo roca yadayim* 'Don't want hands' *roca aba* 'Want Daddy' (1;08;04)	*roce musika*? 'Want music' (1;09;00) *roce (et) ze* 'Want this' (1;09;00)	*roca (sa)kin* 'Want a knife' (1;07;16)
NP subject	*ani lo roca* 'I don't want' (1;08;09)	*Liori lo roce* 'Liori doesn't want' (1;11;13)	*ani roca* 'I want' (1;11;13)
Subject and object	*ani lo roca kola* 'I don't want Kola' (1;09;21)	*ani roce kariyot* 'I want pillows' (1;10;15)	*ani roca et ha-harkava ha-zoti* 'I want this pazzle' (2;01;26)
Non-NP complement	**ani roca same'ax* 'I want happy' (1;10;01)	*roce kan, roce sham* 'Want here, want there' (1;09;24) roce levad 'Want on my own' (1;11;13)	*kodem be ze ani roca* 'First I want with this' (2;00;07)
Nonfinite CP complement + Subject	*ata roce le'exol?* 'You want to eat?' (1;10;01) *ani roca letayel* 'I want to take a walk' (1;10;03)	*hu roce lesaxek* 'He wants to play (1;11;00)	*buba roca (la)shevet (al ha-)sapa* 'Doll wants (to) sit (on the) cauch' (1;07;07) *ata roce lir'ot?* 'You want to see?' (1;11;13)
Finite CP complement without complementizer	*roca loasim mastik* 'Want chewing chewing-gum' (2;01;24)	*rocim ti(f)tax or* 'Want turn on (the) light' (1;09;11) *roce tavi'i* 'Want bring' (1;09;11) *roce ani yasim* 'Want I put' (1;11;04)	
Finite CP complement with complementizer			*ani roca she nelex lir'ot* 'I want that we go to see' (1;11;18)

Table 2 - The development of argument structure for the verb 'give'

	Hagar	**Leor**	**Smadar**
No Arguments	*latet* 'to-give' (1;07;24)		*tni* 'give!' (1;06;20)
Frozen dative or accusative	*ten lax* 'give you' (1;07;03)	*ten lo* 'give him' (1;09;04)	*tni li* 'give me' (1;07;02)
NP complement		*aba, titen Dani* 'Daddy, give Dani' (1;10;22)	*sefer tni* 'book give' (1;06;20) *ten od daf* 'give another page' (1;07;05)
Frozen dative with NP complement	*ten lax bakbuk* 'give you a-bottle' (1;07;17)	*od ten lo* 'more give him' (1;09;17)	*tni li od daf* 'give me another page' (1;07;05)
Two NP complements	*(x)a(r)uzim latet le (H)agari* 'bids to-give to Hagari' (1;08;09)		*savta Xana lo natna leRotem smalot* 'Granma Xana not gave to Rotem dresses' (2;00;00)
Non-frozen dative clitic with NP complement	*li titni gvina* 'to-me give cheese' (1;09;06) *tni lo lexem* 'give him bread' (2;00;03)	*natan li srita* 'gave me a-scratch' (2;05;06)	*(na)tat li et ha-kaze?* 'you-gave me ACC the-like-this' (1;11;13)
Nonfinite CP complement	*tni li la'avor* 'let me to-pass' (1;11;20)	*ten li lir'ot* 'let me to-see' (2;01;28)	*savta Matilda natna li gam lishtot ba-mita* 'granma Matilda gave me also to-drink in-the-bed' (2;02;10)
NP subject +	*ani roca latet le Bindi* 'I want to-give to Bindi.' (2;01;05) *aba natan li bananot* 'Daddy gave me bananas' (2;01;23)		*savta Xana natna lanu et ha-smalot ha-ele* 'granma Xana gave us ACC the-dresses these' (2;00;00)

Table 3 - The development of argument structure for the verb 'fall'

	Hagar	**Leor**	**Lior**	**Smadar**
No argument	*lipol* 'to-fall' (1;10;01) *lo nafal* *'not fell'* (1;10;14)	*nafal* 'fell' (1;09;17)	*(na)fal* 'fell' (1;05;26)	*(na)fal* 'fell' (1;06;14) *oy! nafal!* 'oy! fell!' (1;07;07)
NP subject	*Hagar (na)fal* 'Hagar (fm) fell (ms)' (1;07;14) *hagari nafla* 'Hagar (fm) fell (fm)' (1;10;17)	*oto nafal* 'car fell' (1;11;22)		*Pigi lala* 'Pigi fell' (1;06;14) *dubi nafal* 'teddybear fell' (1;07;07)
VS	*(n)afal xaruzim* 'fell (sg) bids' (1;07;17)	*nafal ha-magevet* 'fell (ms) towel (fm). (2;05;15)	*(na)fal ze* 'fell this' (1;07;00)	*hala ze* 'fell this' (1;07;05) *nafal Kushi* 'fell Kushi' (1;07;07)
Location	*nafal, la-mayim* 'fell, to-the-water' (1;09;26)			*nafal Bamba (me ha-)kos* 'fell (ms) Bamba (fm) (of the-)cup' (1;07;11)
Dative clitic	*nafal li* 'fell to-me' (2;01;13) *nofel lax* 'fell to-you' (2;02;13)	*nafal li* 'fell to-me' (2;04;22)	*nafal li* 'fell to-me' (1;08;02)	*nafal li* 'fell to-me' (2;01;08)
NP subject +location	*Shauli nafal me ha-kise* 'Shauli fell of the-chair' (2;01;19)	*ze yipol al ha-shulxan* 'this will-fall on the-table' (2;04;22) *hi nafla me ha-ofnoa* 'she fell of the-bikes' (2;05;15)		
NP subject + dative clitic	*ze nofel lexa* 'it falls to-you' (2;02;25)			*ze nafal li* 'it fell to-me' (1;11;13) *nafal li kcat ha-tush* 'fell to-me a-bit the-pen' (2;02;10)

Appendix III - Acquisition of Verbal Inflectional Morphology

Table 1 - Smadar, 1;6-1;11: Breakdown of tenses usage (by percentages)

Age	N	Unclear	Infinitives	Imperative	Present	Past	Future
1;6	23	57	4	17	9	9	4
1;7*	42	43	7	28	10	12	0
1;8**	10	10	10	0	20	60	0
1;10***	55	2	11	5	31	31	20
1;11	122	1	10	14	26	28	23

*First 2 tense/mood contrasts are limited to Infinitive vs. Imperative,
e.g., *lasim* 'to put' - *sim* 'put!' (1;7;5)
lashevet 'to sit' - *shev/shvi* 'sit! ms/fm.' (1;7;7)

**Only one session.

***First occurrences of tense/mood contrasts, for past, present, and future,
e.g., *ose/osa* 'makes, sg,ms/fm' - *asiti/(a)sta/asinu* 'made,1,sg/2,sg,fm/1,pl'
mevia 'brings, sg, fm' - *tavi'i* '(will) bring, 2,sg,fm'
le'exol 'to-eat' - *oxelet* 'eats,sg,fm' - *axa(l)ti* 'ate,1,sg' - *toxli* 'will-eat, 2,sg,fm' also used for imparative.

Table 2 - Smadar: Breakdown of person

Age	Tense	Singular					Plural		
		1st	2nd*		3rd		1st	2nd	3rd
			ms.	fm.	ms.	fm.			
1;6	PAS FUT				1		1		
1;7	PAS FUT	1 **			2				
1;8	PAS FUT	1			1				
1;10***	PAS FUT	7		2 2	4 1	1	1 1		
1;11	PAS FUT	9 8	 1	2 3	9 2	 1	5 9		7

*This table does not include 2nd person imperative forms.

**Last session of that month, age 1;7;16

***The person contrasts at age 1;10 are:
asinu 'did,1,pl' -(a)sta 'did,3,sg,fm' - asiti
ba 'came,3,sg,ms' - bati 'came,1,sg'
(y)isader 'will-tidy-up,3,sg,ms' - nesader 'will-tidy-up,1,pl'.

The list for age 1;11 is very long.

Table 3 - Smadar: Breakdown of gender and number

Age	Tense	Singular		Plural
		ms.	fm.	
1;6*	IMP	2	3	
	PAS	1		
1;7**	IMP	6	4	
	PAS	2		
	PRES	1	1	
1;8	IMP	1		
	PAS	1		
	PRES	1	2	
1;10	IMP	1		
	PAS	4	3	1
	PRES	4	8	2
	FUT		2	
1;11	IMP	2	9	
	PAS	10	4	6
	PRES	7	18	5
	FUT	2	4	2

*The only productive alternation *sim - simi* put, ms - fm, occurred in the last session of this month, when Smadar was 1;6;2

**The contrasts were:

1;7 : *sim-simi* 'put!, sg, ms-fm', *kax-kxi* 'take!, sg, ms-fm',
vi-abi'i 'bring!, sg, ms-fm', *ten-tni* 'give!, sg, ms-fm',
and *shvi-shev* 'sit!, sg, ms-fm'.

1;8 : *osa -(o)sim* 'do,sg,fm-pl,ms', (ro)*ca-(ro)ce* 'want,sg,ms-fm'.

1;10 : *osa-ose* 'do,sg,fm-ms', *asinu-asiti* 'did,1,pl-sg',
and *yoshev-yoshvim* 'sit,sg,fm-pl-ms'.

The list at age 1;11 is very long

Table 4 - Lior, 1;5-1;9: Breakdown of tenses usage (by percentage)

Age	N	Unclear	Infinitives	Imperative	Present	Past	Future
1;5	7	0	28.5	28.5	0	43	0
1;6	22	4.5	36	9	23	23	4.5 *
1;7**	25	12	32	20	24	12	0
1;8***	56	21.5	32.5	16	16	10.5	3.5
1;9****	22	18	18	18	28	13.5	4.5

*Various tokens of the verb *patax* 'open' are used successively in various future forms, all with the intention of imperative 'open!'

**First minimal tense/mood pairs: *(la)shevet* 'to sit' - *shev, shvi* 'sit! ms,fm' (1;7;11)

***First possible tense/mood minimal pair involving past and future,
e.g., *le'exol* 'to eat' - *oxel* 'eats, sg,ms' (Lior 1;8;7-8)
nafal 'fell, 3,sg,ms' -- *(yi)pol* '(will) fall, 1/3,sg,ms' (Lior 1;8;13)

****Based on one file

Table 5 - Lior: Breakdown of person

Age	Tense	Singular					Plural		
		1st	2nd*		3rd		1st	2nd	3rd
			ms.	fm.	ms.	fm.			
1;5	PAS FUT				2		1		
1;6	PAS FUT**				4	2?	1		
1;7	PAS FUT				2		1	1?	
1;8	PAS FUT			1***	3 1		2****		
1;9	PAS FUT			1 1	1		1		

*This table does not include 2nd person imperative forms.

**Lior 1;6 uses the following alternation of 'open' in the future,
e.g., *iftax* '1,sg' - *niftax* '1,pl' - *tiftax* '2,sg,ms',
but all are used with the same imperative intention.

***First occurrence of a past form in 2nd person, sg, fm: *asit* 'made', only in the frozen utterance *asit kaki* 'you dirtied your pants'.

****First productive use of past, 1st person, pl: *bikarnu* 'visited'.
Previous occurrences were all versions of the verb *gamarnu* 'finished'..

Table 6 - Lior: Breakdown of gender and number

Age	Tense	Singular		Plural
		ms.	fm.	
1;5*	IMP PAS	1 2	2	 1
1;6**	IMP PAS PRES	1 4 2	2 2	 1
1;7	IMP PAS PRES	3 2 4	4 3	1 1
1;8	IMP PAS PRES FUT	5 3 6 1	8 1 6 	 2 1
1;9	IMP PAS PRES FUT	2 1 1 	3 1 5 1	 1

*The only gender contrast is *bo/boi* come, ms/fm, which occurs at the last session of this month, when Lior was 1;5;29, but with wrong reference.

**The contrasts are:
1;6 : *bo* - *boi* 'come! sg,ms - fm', *zuz* - *zuzi* 'move! sg,ms - fm',
pes(?) - *peset* 'look-for,? - sg,fm'.

1;7 : *shev - shvi* ‘sit! sg,ms - fm’, *zuz - zuzi - zuzu* ‘move! sg,ms - fm -pl,ms’,
boxe - boxa ‘cry,sg,ms - fm’.
1;8 : *zuz - zuzi* ‘move! sg,ms - fm’, *bo - boi* ‘come! sg,ms - fm’,
kax - kxi ‘take! sg,ms - fm’, *shev - shvi* ‘sit! sg,ms - fm’,
koes - koeset ‘is angry, sg,ms - fm’.
1;9 : *bo -boi* ‘come! sg,ms - fm’.

Table 7 - Leor, 1;9-2;2: Breakdown of tenses usage (by percentage)

Age	N	Unclear	Infinitives	Imperative	Present	Past	Future
1;9	51	12	14	44	12*	12**	8***
1;10	44	20.5	23	34	4.5	9	9
1;11	120	6.5	28.5	25	17.5	11	11.5
2;0	80	5	16	20	31	20	8
2;1	70	3	23	24	31.5	11.5	7

*The present forms in 1;9;a - 1;9;d are *(ro)ce* 'wants', *ose* 'makes', and *osim* 'unclear plural form in the present tense. In 1;9;e two additional verbs show up: *shanenet* for colloquial *yoshenet* 'sleeps, sg, fm' and *mixabey* for *mitxabe* ' hides, sg, ms'.
**The past forms in 1;9;a - 1;9;c are *saganu* for *sagarnu* 'closed,1st, pl', used with the intention of 'let's close' and *mima* for *nigmar* 'finished, allgone'. In 1;9;d, we also find *hidanu* for *hidlaknu* 'turned on, 1st, pl, and *nafal* 'fell, 3rd, ms, sg. In 1;9;e, two forms in 3rd, fm, sg appear: *ha(l)xa* 'went' and *barxa* 'ran away'.
***The future forms in 1;9;a - 1;9;c are all versions of *(n)itax* 'let's open'. In 1;9;d; we find a real future form *(y)i(hi)ye* '(will) be, 3rd, sg, ms,' and in 1;9;e, *nasim* '(will) put, 1st,pl.'

Table 8 - Leor: Breakdown of person

Age	Tense	Singular					Plural		
		1st	2nd*		3rd		1st	2nd	3rd
			ms.	fm.	ms.	fm.			
1;9	PAS FUT				2 1	2	2 2		
1;10	PAS FUT				3 3		2		
1;11	PAS FUT**		1		7 11	3 1	2 2		
2;0	PAS FUT	2 1		1 1	1 1	12 1	1 2	1	
2;1	PAS FUT	1			6 5	2 1	1		

*This table does not include 2nd person imperative forms.

** Many of the future forms have some aspectual modalic meaning, rather than tense.

Table 9 - Leor: Breakdown of gender and number

	Tense	**Singular**		**Plural**
Age		ms.	fm.	
1;9*	IMP	14	5	3
	PAS	2	2	2
	PRES	4	1	1
	FUT	1		2
1;10	IMP	14	4	1
	PAS	3		1
	PRES	2		
	FUT	2	1	1
1;11	IMP	22	4	1
	PAS	8	3	2
	PRES	17	5	
	FUT	10	1	2
2;0	IMP	10	5	
	PAS	12	2	2
	PRES	13	5	6
	FUT	1	2	3
2;1	IMP	17	1	
	PAS	6	2	1
	PRES	16	5	3
	FUT	5	1	

*The minimal pairs at age 1;9 are:
kax - kxu 'take! ms,sg-pl', *ose-osim* 'do,ms,sg-pl',
sim-simi-simu 'put! sg,ms-fm-pl,ms', *tir'e - tir'u* 'look! ms,sg-pl',
bo-boi 'come! sg,ms-fm'.

Table 10 - Summary of age of acquisition of agreement and tense/mood inflections

Child	**Gender & Number**		**Tense/Mood**		**Person**	
	Sporadic	Robust	Sporadic	Robust	Sporadic	Robust
Smadar	1;6;20	1;7	1;7;5	1;8	1;7;16	1;10
Lior	1;5;29	1;6	1;7;11	1;8	1;8;21	1;10
Leor	1;9;11	1;10	1;10;3	1;11	1;11;13	2;0

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תוכן העניינים

סכום בעברית

1. הקדמה

אוניברסאלים לשוניים והבדלים לשוניים שמשו כנושאים למחקר אינטנסיבי בתיאוריה הבלשנית החל ב-ספרו של ספיר *Language* (1921), דרך ספרו של גרינברג *Universals of Language* (1963) והמחקרים הטיפולוגיים שצמחו מתוך עבודה זו (Comrie 1981, Hawkins 1979, Keenan 1978) ועד למחקרים עכשוויים במסגרת התיאוריה הגנרטיבית (Hyams 1994, Speas 1994, Baker 1995). ביקר (1995) הצביע על כך שהמיקוד של העבודות הללו עבר מן העניין של ספיר במאפיינים הייחודיים ("genius") המיוחדים לכל שפה אל העסוק של גרינברג באוניברסאלים המתייחסים למאפיינים המשותפים לקבוצות של שפות. יתר על כן, מאז ספרו של חומסקי (1982) *Lectures on Government and Binding* התחבירנים הגנרטיביים מתמקדים בעקר במקורות הדומה והשונה, זאת אומרת העקרונות הפורמאליים שבבסיס כל שפה בנפרד כמו גם בבסיס התכונות האוניברסאליות שמתגלות בכל השפות במקום להתמקד במאפיינים עצמם.

חומסקי ולזניק (1991) בספרם *Principles and Parameters* מנסים להסביר את המאפיינים האוניברסאליים הבין-לשוניים של שפות באמצעות העקרונות ולהסביר את המיוחד, הווה אומר המאפיינים הלא אוניברסאליים של כל שפה, באמצעות הפרמטרים. עקרונות ופרמטרים אלו הם המרכיבים של הדקדוק האוניברסאלי (UG). המונח פרמטר מתייחס לאוסף של תכונות לשוניות ספציפיות המוגדרות על ידי הדקדוק האוניברסאלי, אשר מתוכן צומח השוני הבין-לשוני. מבחר האפשרויות שהדקדוק האוניברסאלי מציע עבור כל אחת מן התכונות האלו יוצר את ההתגוונות הפרמטרית. כך, הערך האפשרי של כל פרמטר, אך לא הערך הספציפי בשפה מסוימת נקבעים על ידי הדקדוק האוניברסאלי. נושא זה מטופל במסגרת התיאוריה הגנרטיבית, ובייחוד במסגרת התיאוריה המינימאליסטית (חומסקי 1995) בניסיון לצמצם את הסיבות להבדלים הבין-לשוניים ולהרחיב את השפעתן. כלומר, המטרה היא לצמצם את מספר הפרמטרים והעקרונות ואת סוגיהם ולהגדיל את מספר המאפיינים המוסברים על ידם.

נושא מרכזי שני בתיאוריה הבלשנית הוא האופן שבו ילדים רוכשים את האוניברסאלים הלשוניים והמאפיינים הספציפיים של כל שפה. שאלה זו נבחנה מנקודות מבט שונות: מן הזווית האמפיריציסטית חברתית (Bruner 1974-5, Ninio & Snow 1988 למשל), מן הזווית הפסיכו-בלשנית התפתחותית (Slobin 1982, 1985) ובמסגרת התחביר הגנרטיבי המניח את מולדות העקרונות האוניברסאליים (Hyams 1983, 1986, Roeper & Williams 1987). במסגרת תיאורית הפרמטרים והעקרונות, השאלה היא כיצד ילדים מזהים את המאפיינים הספציפיים של שפתם וקובעים את הפרמטרים עבור העקרונות האוניברסאליים המולדים. במסגרת תאורטית זו מוצע שרצוי לצמצם את מספר הפרמטרים והעקרונות כדי להסביר את מהירות הרכישה. הצעה זו יוצאת מהנחת הלמידה שככל שהילד צריך ללמוד פחות התהליך יהיה קל יותר.

ניומאייר (1988) משמיע טענה דומה ביחס לתיאוריה בכללותה. הוא טוען כי ההצלחה העתידית של הבלשנות הגנרטיבית תקבע בעקר לפי יכולתה לצמצם את הפרמטריזציה של העקרונות הספציפית לכל שפה ושפה. רעיון זה הוא הקו המנחה של עבודה זו. מטרתה הראשונה של העבודה היא לצמצם את מספר הפרמטרים ואת הגדרתם. המטרה השניה, הנובעת מן הראשונה, היא לגזור את המונח "חזק", החיוני כל כך לפרמטריזציה בין לשונית, במקום להניח אותו באופן סטיפולטיבי. המטרה השלישית והאחרונה היא להסביר את ההדרגתיות ברכישת שפת אם בכלל ובקביעת ערכם של הפרמטרים בעיקר.

2. פרמטרים, ראשים פונקציונאליים, והתחביר של תהליך הבדיקה (Checking).

לאחר סקירת הספרות והצגת המטרות בפרק הראשון של העבודה, הפרק השני מתחיל להתמודד עם שתי המטרות הראשונות: צמצום מערך הפרמטרים וניבוי ההבדלים בין "חזק" ל"חלש". ניסיונות להגדיר את סוגי הפרמטרים האפשריים נעשו גם בעבר. ספיס (1990) מציינת שלשה סוגים של פרמטרים המופיעים בספרות. פרמטרים מן הסוג הראשון מאופיינים בהבדלים לקסיקאליים בקלט של העקרונות (Borer 1983, Manzini & Wexler 1987, Rizzi 1986), הסוג השני מאופיין בפרמטריזציה של העקרונות (Rizzi 1982), ואילו הסוג השלישי מתאפיין על ידי הרמה התחבירית שבה פועלים העקרונות (Borer 1983, Huang 1982, Rizzi 1991). חומסקי ולזניק (1991) טענו שלמעשה קימות רק האפשרות הראשונה והשלישית ואילו במסגרת הפרוגרמה המינימאליסטית (חומסקי 1995) פרמטרים מצומצמים לסוג הראשון בלבד.

כיצד נראים פרמטרים מן הסוג הראשון? מנציני ווקסלר (1987) מציעים את ה *Lexical Parameterization Hypothesis*. לפי היפותזה זאת ערכם של פרמטרים איננו קשור לדקדוק מסוים אלא לפריטים לקסיקאליים מסוימים. בדומה לבורר (1984) מוצע בעבודה זו להגביל את ההיפותזה הזו לפריטים פונקציונאליים בלקסיקון. זוהי ה- *Functional Parameterization Hypothesis*. הפריטים הפונקציונאליים הם חברי הקבוצות הסגורות בלקסיקון, למשל מיידעים, כמתים או כינויי גוף, ובנוסף להם המורפולוגיה הנטייתית המשתנה משפה לשפה (Shopen 1985, Anderson 1992).

במסגרת הפרוגרמה המינימאליסטית (Chomsky 1995) פריטים לקסיקאליים נבחרים מן הלקסיקון (Select) ומוקרנים לעצים המתמזגים זה עם זה (Merge) ומתממשים (Spell-out), כאשר תכונות חזקות נבדקות לפני המימוש ותכונות חלשות נבדקות אחריו (Checking). במסגרת זו הפרמטרים קשורים לחוזק של הראשים הפונקציונאליים. תזוזות נגרמות על ידי החוזק של היעד, כאשר פריט לקסיקאלי זז בעץ כדי לבדוק תכונות חזקות של הראש הפונקציונאלי, שתראינה ברמה הפונולוגית במידה ולא תיבדקנה. חומסקי עצמו טוען שהמונח "חזק" איננו ניתן להסבר ולפיכך הוא מוגדר באופן סטיפולטיבי כתכונית שאי אפשר לטפל בה מחוץ להקרנה המקסימאלית המכילה את אותה תכונית. כדי להגדיר את המונח "חזק" באופן פחות

סטיפולטיבי, מוצעת בעבודה זו דרך לחישוב חוזקם של ראשים פונקציונאליים, כך שתנועה גלויה מוסברת ברמה הפונולוגית (PF), ואילו הבדיקה נעשית ברמה הלוגית (LF).

כדי להשיג את המטרה זאת , אני מציעה בעבודה זו להבחין בין פריטים לקסיקאליים לפריטים פונקציונאליים על פי הערכים של תכוניותיהם. פריטים לקסיקאליים מסומנים ערכית ביחס לכל תכוניותיהם בעוד שפריטים פונקציונאליים הנם ניטרליים, זאת אומרת, אינם מסומנים ביחס לתכוניותיהם. מנגנון חישובי (Computing Mechanism) המהווה חלק מתהליך הגזירה של משפטים משווה, עבור כל ראש פונקציונאלי, את האוסף האפשרי של התכוניות הנקבע לפי המורפולוגיה המרבית של השפה הספציפית עם אוסף התכוניות המסומן עבור הראש הלקסיקאלי המתאים. כאשר עץ חלקי שראשו לקסיקאלי מתמזג עם עץ שראשו פונקציונאלי ליצירת הקרנה מורחבת, הראש המורחב חולק את ערכי התכוניות של הראש הלקסיקאלי. באופן כזה התכוניות הניטרליות של הראש הפונקציונאלי מקבלות ערך מסוים.

המנגנון החישובי הזה מספיק כדי לספק ערכים לתכוניות של הראשים הפונקציונאליים, אבל לא כדי לקבוע האם הם חזקים או חלשים. מאחר ואבחנה זו משמעותית ברמה הפונולוגית, מוצע בזאת להגביל ברמה הפונולוגית את קיומם של ראשים פונקציונאליים ריקים שכל תכוניותיהם מסומנות. המגבלה ברמה הפונולוגית (PF-ban) תהיה שכאשר כל תכוניותיו של ראש פונקציונאלי מסומנות, הוא חייב להקשר לפריט לקסיקאלי. הרעיון האינטואיטיבי הוא שכאשר הראש הפונקציונאלי מסומן עבור כל תכונותיו הוא נראה כמו ראש לקסיקאלי ולפיכך חייב להיקשר לפריט לקסיקאלי כזה באופן גלוי.

מאחר ותנועה ובדיקה של תכוניות אינן מוגבלות לראשים, שכן גם קטגוריות מקסימאליות נעות, המגבלה הפונולוגית מורחבת גם לתכוניות המגדיר ולעמדת המגדיר (specifier). ההרחבה נעשית באופן שמשקף את ההבדל בין ראשים ומגדירים המוצע על ידי חומסקי ב- *Bare Phrase_ Structure* (1994). האבחנה שם היא שראשים הם חלק הכרחי ביצירת ההקרנה המקסימאלית שכן היא מוקרנת מהם, בעוד שהמגדירים הם רכיב אופציונאלי המציין יחסים מקומיים (אבל לא מקומיים ביותר) בין הראש להקרנות מקסימאליות אחרות. ברוח זו המגבלה ברמה הפונולוגית דורשת שכאשר לפחות אחת מתכוניות המגדיר של הראש הפונקציונאלי מסומנת, המגדיר חייב להקשר עם תוכן לקסיקאלי גלוי. זאת אומרת שהמימוש הגלוי של עמדת המגדיר בא כדי להפוך לגלויים את היחסים בין הראש למגדיר הבאים לידי ביטוי בסימון תכוניות המגדיר של הראש.

כאשר הכללה זאת מיושמת לגבי AgrP, יוצא שבכל פעם שתכוניות המגדיר מסומנות בהעתקה מתכוניות הראש, עמדת [Spec, AgrP] חייבת להיות מקושרת לתוכן לקסיקאלי גלוי. כל הקרנה מקסימאלית יכולה למלא דרישה זאת ברמה הפונולוגית, אבל רק הנושא יוכל לבדוק את תכוניות ההתאם והיחסה ובכך למלא את דרישות הרמה הלוגית. מכאן שלכל IP חייב להיות נושא לקסיקאלי, כאשר ל-I המוטה יש תכונות מגדיר. הנושא הגלוי או ה-pro, כאשר הוא מזוהה כהלכה (סעיף 3.3 בעבודה), ממלאים את הדרישה הזאת. לעומת זאת פעלים בצורת המקור אשר לרוב אין להם תכונות התאם אינם מחייבים נושא גלוי. אין זה אומר שאין להם נושא כלל, שכן מקובל להניח שהם לוקחים PRO כדי לממש את התפקיד התמטי הקשור לנושא. ההשלכה היחידה של המגבלות ברמה הפונולוגית היא שאין צורך להזיז את PRO אל מחוץ לצרוף הפועלי

כדי לממש את תכוניות המגדיר של I (כולל יחסה) שכן אין ל-I לא מוטה תכוניות כאלו. לכלל זה יש יוצאים מן הכלל הנדונים בסעיף 3.2.4 בעבודה. מכאן נראה, שהמגבלה ברמה הפונולוגית תופשת למעשה את תפקידו של ה- Extended Projection Principle בכך שהיא מחייבת את השימוש בנושא.

באופן דומה מסביר המודל המוצע את הנעשה בשפות שבהן הפועל נמצא במקום השני (Verb second languages). בשפות אלו מוצע להניח שיחסת הנומינטיב היא תכונית של C ולא של I וכתוצאה מכך סימון C עבור תכונית זאת כאשר הפועל מוטה, בנוסף לתכוניות הסטנדרטיות של C, מחייבים, ברמה הפונולוגית מימוש פונולוגי. כאשר C אינו מקושר לתוכן לקסיקאלי דרישה זאת מתמלאת על ידי הפועל שעולה ל-C. בכך מוסבר ההבדל בין משפטים עיקריים בהם עולה הפועל למקום השני לבין משפטים משועבדים בהם לרוב עמדת C מלאה על ידי אחד המשעבדים. מאפיין זה נכון גם לגבי תנועת ה- A-bar של צרוף מקסימאלי שאיננו מסמן שאלה אל עמדת המגדיר של C. בהנחה שתכונות הראש של ה-CP זהות בין אם מדובר במשפט עקרי ובין אם מדובר במשפט משועבד, הרי שההבדל צריך להיות בתכונות המגדיר. מאחר ועמדת המגדיר של CP מתמלאת רק כאשר הפועל זז, אפשר לטעון שתכונות המגדיר הגוררות את התזוזה אליו, אינן תכונות של C אלא של הפועל. זאת אומרת, ל-C עצמו יש תכונות ראש אבל לא תכונות מגדיר. תזוזה למגדיר של C נגרמת על ידי תכונות המגדיר של מי שזז אל C, כלומר של הפועל, או ליתר דיוק של I_V. באופן מכוון אינני מתייחסת כאן לתכונות ספציפיות, מאחר ש C, כנקודת ממשק בין המשפט למבעים אחרים, אמור להכיל את כל האינפורמציה המקודדת במשפט, אשר רלוונטית לשיח.

פרקים שלוש וארבע בעבודה מראים את השפעת המנגנון החישובי על מיפוי הפרמטרים. בפרק שלוש נראה כיצד מבחינים המנגנון החישובי והמגבלה ברמה הפונולוגית באופן מעשי בין "חזק" ל "חלש". המודל מיושם שם עבור תזוזת הפועל ל-I בעברית, באנגלית ובצרפתית (סעיף 3.1), עבור תזוזת הפועל דרך I ל-C, בשפות בהן הפועל נמצא במקום השני ועבור תנועת A- לעמדת הנושא ותנועת A-bar למגדיר של CP באותן שפות (סעיף 3.2), ועבור תופעות נושא אפס (סעיף 3.3). כל הפרמטרים בפרק שלוש הם מן הסוג היחסי, כלומר ערכם נקבע בכל גזירה בנפרד באמצעות המנגנון החישובי לפי היחס בין התכוניות של הפריט הלקסיקאלי למקסימום התכוניות האפשרי עבור הראש הפונקציונאלי.

בפרק 4, מוצגים היוצאים מן הכלל של ההכללה הזאת. פרמטרים אלו הם פרמטרים מוחלטים שערכם נקבע כבר בלקסיקון, עוד לפני תהליך הגזירה. בין אלו ניתן למנות את הניטרול של התכונות הקטגוריאליות של הקטגוריות הפונקציונאליות הבא להבחין בין שפות שנראות על פניהן כנבדלות במגוון הקטגוריות הלקסיקאליות. ניטרול זה עושה שימוש באותו מנגנון חישובי אך ללא שינוי בערכים של התכוניות. פרמטר בעייתי יותר מתייחס לכיווניות, זאת אומרת לסדר הליניארי בין הראש למגדיר ולמשלים. פרמטר זה, במידה ואין מקבלים את הצעתו של Kayne (1994), שונה באופן מהותי מכל הפרמטרים האחרים בפי שמוסבר בהרחבה בסעיף 4.2.

בפרקים הבאים מוצגים נתונים מתהליך הרכישה של העברית על ידי ילדים אשר תומכים בניתוח המוצע. לפי נתונים אלו נראה שלמרות שהילדים אינם משתמשים בכל הקטגוריות הפונקציונאליות למין ההתחלה, הרי שהם מניחים שהקטגוריות בהן הם משתמשים חזקות, עד שהם נתקלים בראיות סותרות, תופעה הנגזרת מן הדרך בה מוגדר "חזק" בפרק השני.

3. רכישת העברית משלב הצרופים הראשוניים ועד לראשית התחביר המורכב

מחקרים רבים, בשפות שונות, עוסקים בצרופי המילים הראשונים של ילדים (למשל Bowerman 1973, Pinker 1984). צרופים ראשוניים אלו משמעותיים במיוחד כאשר מנסים להכריע מתי ילדים רוכשים את הפרמטרים השונים, והאם יש סדר קבוע ביו הפרמטרים המוחלטים ליחסיים, ובין הפרמטרים היחסיים לבין עצמם. כך למשל סדר המילים בשלב מוקדם זה מראה מתי ילדים מתחילים להשתמש בסדר המילים הבסיסי האופייני לשפתם (Clahsen 1991, Weissenborn, 1992) אשר נקבע על ידי הפרמטרים המוחלטים. כמו כן ניתן לראות בתקופה זו מתי ואיך מתחילים הילדים להשתמש ב- move וב- merge הנגרמים על ידי הפרמטרים היחסיים. למעשה השאלה היא מתי ילדים רוכשים את הפרמטרים הרלוונטיים לכיווניות ובאיזו מידה תלויה רכישה זו ברכישת הקטגוריות הפונקציונאליות. לאחרונה בעקבות Kayne (1994), אשר טוען כי כל השפות הן בעלות אותו מבנה SVO בסיסי וסדרי המילים השונים בשפות השונות הם רק תוצאה של תנועות אל הרמה הפונקציונאלית, השאלה היא בעצם האם ההבדלים הבסיסיים בסדר המילים יכולים להירכש ללא פרמטרים של כיווניות (Wu 1992). ליתר דיוק, אם לילדים אין גישה למערכת הפונקציונאלית כאשר הם מתחילים לצרף מילים (Radford 1990, Guilfoyle and Noonan 1992), הם אמורים להתחיל מאותו סדר מילים בכל השפות. מנגד, אם סדר המילים בצרופים הראשונים משתנה משפה לשפה, המערכת הפונקציונאלית חייבת להיות נגישה מן ההתחלה.

הפרקים העוסקים ברכישת העברית מתמקדים בממשות הפסיכולוגית של המודל המוצע ובדרך שבה ילדים רוכשים את הידע לגבי סדר המילים הבסיסי והמשני בשפתם. על מנת לבחון את התהליך הזה אראה מהן האסטרטגיות שהילד משתמש בהן וכיצד חסכוניות (economy) ומסומננות (markedness) באות לידי ביטוי בבניית העצים על סמך המידע המוגבל אליו נחשפים הילדים. תהליך זה הוא שיאפשר לילד לקבוע את ערכם של הפרמטרים השונים, על סמך תשומה חלקית בלבד, תוך שימוש במנגנון החישובי ובמגבלות הרמה הפונולוגית ובתוך כך יגלה עד כמה ניתן לזהות את סדר המילים בשפה ללא הרמה הפונקציונאלית, הנמצאת בבסיס המודל המוצע.

בעיית התשומה החלקית עולה בכל דיון על רכישת השפה במסגרת הגנרטיבית. ישנן מספר דרכים בהן התשומה חלקית. ראשית השפה אותה שומע הילד מכילה מבעים תקינים ושגויים אך אין שום ציון איזה מבע תקין ואיזה שגוי. שנית התשומה איננה מכילה על פי רוב פרדיגמות מורפולוגיות ותחביריות סדורות אלא רק את חלקיהן. אך למרות התשומה החלקית והבלתי סדירה הילדים רוכשים בסופו של דבר ידע מלא של שפתם. שלבי הביניים בתהליך זה מעוררים עניין רב. השאלה

היא באיזו מידה התשומה החלקית גורמת לידע חלקי תוך כדי רכישת השפה. אין ספק שהילדים אינם מפגינים ידע מלא ובוגר של שפתם כשהם מתחילים לצרף מילים, אולם השאלה היא האם יכולת חלקית זו משקפת ידע חלקי הנובע מן התשומה החלקית.

התשובה לשאלות אלו, משתנה בהתאם להנחות ביחס להמשכיות (continuity). תומכי היפותזת ההבשלה (Borer & Wexler 1987, Radford 1990) טוענים כי הילדים מפגינים ידע חלקי של שפתם כתוצאה מתהליך ההבשלה הביולוגי שבגללו אספקטים תחביריים מסוימים, למשל שרשראות -A או קטגוריות פונקציונאליות, נעשים נגישים מאוחר יותר. גרסאות מוקדמות של היפותזת ההבשלה גררו חוסר המשכיות, שכן חוסר הנגישות של חלקים מסוימים מן הדקדוק האוניברסאלי (UG) מאפשר לילדים להשתמש בתחביר שאיננו מוגבל ע״י UG ולפיכך איננו חלק מאף דקדוק בוגר (Borer and Wexler 1987, Radford 1990). כדי לפתור את הבעיה הזאת, מציע ווקסלר (1992) להגביל את היפותזת ההבשלה ע״י הדקדוק האוניברסאלי. אף אחת משתי הגישות האלו איננה קושרת בין הידע החלקי של הילדים לבין חלקיות התשומה.

ניקח למשל את הדיבור הטלגרפי שמתאפיין בשימוש בראשים לקסיקאליים לבניית מבעים, כדוגמת *where helicopter? open door, mummy car* (Radford 1990). אין ספק שאופן הדיבור הזה אינו מראה שימוש גלוי בקטגוריות הפונקציונאליות ובנטיות. זאת אומרת שהילדים אינם מראים ידע מלא של המערכת הבוגרת. לפי תפיסת ההבשלה, כפי שמשתמש בה רדפורד, אופן דבור זה נובע מכך שהמערכת הפונקציונאלית , קרי D, I ו-C עדיין לא הבשילה. לפי תפיסה זו, החלקיות של הפלט משקפת ידע חלקי הנובע מסיבות ביולוגיות.

הדיון ברכישת העברית מצביע על כך שישנן אי אילו סיבות לקשור את חלקיות הפלט לחלקיות התשומה. קשר זה איננו נובע מהנחות יסוד ביהביוריסטיות, אלא מן האופן שבו ילדים מפענחים את התשומה. בהנחה שתהליך הרכישה הוא בהכרח המשכי, הרי שהפרספקטיבה של הילד מוגבלת בראש וראשונה ע״י הדקדוק האוניברסאלי, כך שהילד שולה מתוך התשומה רק את מה שמתיישב עם הנחות הדקדוק האוניברסאלי. כפי שטוענים וויסנבורן (1993) וריצי (1994) אטען גם אני שהפרספקטיבה של הילד מוגבלת לא רק ע״י הדקדוק האוניברסאלי, אלא גם ע״י עקרונות החסכנות והצמצום המדורגים מעל כל עקרון אחר בדקדוק האוניברסאלי.

ברוח זו, שתי הנחות מרכזיות ילוו את הדיון ברכישת העברית, ויאפשרו לנו להבין ולהסביר את התהליך. הנחות אלו יזוהו כ**היפותזה המינימאליסטית של הרכישה**:

(1) למין ההתחלה יש לילדים גישה לכל העץ התחבירי כולל הראשים הפונקציונאליים

(Clahsen et al 1994, Crain 1991, Rizzi 1994).

(2) למרות הנאמר ב (1), ילדים מונחים ע״י גישה ״מינימאליסטית״ - עקרון של least effort: עשה רק מה שהוכח שאתה חייב (Weissenborn 1993).

למרות שלפי ההנחה הראשונה אפשר היה לחשוב שילדים ישתמשו בעצים מלאים החל בצרופים הראשונים, ההנחה השניה מבהירה שעל סמך התשומה החלקית הילדים יוכלו להסתפק בעצים החלקיים אשר נראים להם הכרחיים.

ההיפותזה המינימאליסטית של הרכישה מבהירה כיצד ילדים משתמשים בעצי הגזירה. באופן תיאורטי, עצים חלקיים יכולים להיות מיוצרים מלמעלה למטה (top-down) או מלמטה למעלה (bottom-up). עם זאת, הדרך היחידה לגזור עצים שלמים שגודלם המינימאלי יהיה גדול דיו כדי להכיל את כל האינפורמציה הלקסיקאלית, היא מלמטה למעלה. עצים חלקיים שייוצרו מלמעלה למטה יחסרו את הראשים הלקסיקאליים. יתר על כן, הראיות לידע ראשוני של כל המערכת הפונקציונאלית נובעות בדיוק מכך שהעצים נבנים מלמטה למעלה.

אם נחזור ונתייחס לתיאורית ההבשלה, הרי שגם במסגרת זו נעשה ניסיון להתמודד עם העובדה שקטגוריות לקסיקאליות מופיעות לפני קטגוריות פונקציונאליות. רדפורד (1990) טוען שהקטגוריות הפונקציונאליות מבשילות יותר מאוחר, ואילו גילפויל ונונן (1992) מציעים שתהליך ההבשלה עוקב אחרי העץ מלמטה למעלה. ההיפותזה המינימאליסטית של הרכישה מציעה הסבר יותר סביר לסדר הרכישה הזה. כך למשל, ביחס לדבור הטלגרפי, הרי שלפי ההיפותזה המינימאליסטית של הרכישה יש לילדים ידע מלא של העץ, והבצוע החלקי של הילדים נובע לא מתשומה חלקית אלא מידע חלקי לגבי ההכרחיות של כל חלקי העץ. ידע חלקי זה גורר עצים חלקיים המתוארים כדבור טלגרפי.

יתרון נוסף של ההיפותזה המינימאליסטית של הרכישה הוא שנתן לנבא באמצעותה את האפשרות של למידה מדרגה 1 (Morgan 1986) ולמידה מדרגה 2 (Wexler & Culicover 1980). שתי אסטרטגיות למידה אלו מניחות שהילד מסוגל לנצל את הידע הטמון במשפטים משועבדים. לעומת זאת, לייטפוט (1991) טוען שהילדים משתמשים באסטרטגית למידה מדרגה 0, שבה יש גישה רק למשפט העיקרי עם עוד תוספת קטנה. בנית העץ מלמטה למעלה הופכת את הידע הטמון במשפט המשועבד לנגיש, כפי שמציעה אסטרטגית הלמידה מדרגה 1.

בניתוח תהליך הרכישה בעברית, יתבררו היתרונות האמפיריים של ההיפותזה המוצעת. כמו כן יוצגו הזרזים השונים שהחיבור בינם - a confluence of clues (ברמן 1986) - מאפשר לזהות שמבנה מסוים הכרחי למרות היות התשומה חלקית. נראה שבתהליך הרכישה משתמשים הילדים בזרזים ממודולים לשוניים שונים, כדוגמת הפרוזודיה, הפונולוגיה, המורפולוגיה, התחביר, הסמנטיקה, הפרגמטיקה וכד', כדי לפתור את תשבץ הרכישה.

ברמן (1986) מדברת באופן מיוחד על תהליך שמתחיל בשינון של פריטים לקסיקאליים וממשיך בלימוד מערכת החוקים. לפי תפיסה זו, הילדים ניגשים לתשומה באמצעות לימוד לקסיקאלי תוך שימוש חלקי בלבד במבנים העומדים לרשותם (Clahsen 1994). תפיסה זו ממקדת את התהליך בזרזים הלקסיקליים וכפי שמציע רופר (1994) גוררת תהליך של אחוד על בסיס לקסיקאלי (lexically-oriented merger), זאת אומרת, אחוד של פריטים הנבחרים מן הלקסיקון (חומסקי 1994). במילים אחרות, חלקיות הפלט נובעת מן הידע החלקי שיש לילד ביחס לתשומה.

בהתייחס לאמור לעיל, בפרקים 6-9 של העבודה נבחנות שתי מטלות מרכזיות העומדות בפני הילד ברכישת העברית. המטלה הראשונה היא רכישת מערכת היחסות והדרך שבה היא משפיעה על רכישת הצרוף השמני (NP ו-DP). המטלה השניה היא רכישת נטיות הפועל והשלכותיה ברכישת IP ו CP. שתי המטלות יבליטו מדוע התשומה חלקית בעיני הילד "המינימאליסטי" ומהי התשומה המסומננת אשר מזרזת הפרות של הגישה המינימאליסטית שהילד מאמץ. הפרות אלו אינן,

כמובן, הפרות של המינימאליזם אלא רק הוכחות שהילד צריך לעשות יותר מאשר הניח בהתחלה. מעניין לציין שהתשומה המסומנת כוללת פרדיגמות מורפולוגיות ופריטים לקסיקאליים כבסיס ללמידה לקסיקאלית, כמו גם צרופים מורכבים מבחינה מבנית וקבוצות התייחסות (reference sets), זאת אומרת קבוצות של גזירות שוות מבחינה חסכנית, כאשר הבחירה בגזירה הנכונה נעשית על מנת למנוע כפל משמעות ברמת הממשק.

במהלך ניתוח שתי המטלות, אתייחס כמובן לשאלה כיצד הפרמטרים נרכשים ואראה איזה תפקיד ממלא מנגנון החישוב ברכישת ההבדלים הפרמטריים. דגש מיוחד ניתן לחוזק של ראשי ההתאם הגוררים את תזוזת הפועל ומזהים את הנושא הריק ולחוזק של D כיעד לתזוזת ראשים שמניים. אם כי מרבית הניתוח נעשה עבור עברית, יוצגו במהלך הדיון נתונים השוואתיים רלוונטיים מאנגלית, גרמנית וצרפתית.

בשל הקושי לערוך ניסויים מובנים עם ילדים כה צעירים (גלאי 0;3 - 1;6), הנתונים המשמשים בעבודה זו נאספו, כמקובל במחקרים מסוג זה, מתוך ניתוח דבורם הספונטני של ילדים. בנוסף לתעתיקים של סיוון ואסף מתוך קורפוס רביד ולתעתיקים החודשיים של נעמה, אשר נמצאים כולם ב CHILDES, נתונים לאורך זמן נאספו מארבע ילדים דוברי עברית: הגר , ליאור, ליאור וסמדר במשך תקופה של שנה עד שנתיים. ארבעת הילדים הוקלטו בערך שעה בשבוע (במפגש אחד או יותר). עבור כל תופעה שנותחה, נבחרו המפגשים מן ההיקרות הראשונה של התופעה ועד שהילד עושה שימוש בוגר במבנה המסוים ב 90% מן המקרים. לחומר זה הוספתי את היומן של בני, יובל, בגילאים 1;6 כאשר הוא החל לצרף מילים ועד 2;6. יומן זה מחיל את כל הצרופים החדשים שהוא הפיק בנוכחותי, הווה אומר צרופים שלא שמעתי אותם קודם. יומן זה אינו יכול לשמש כמקור יחיד, אך צירופו לחומר לאורך זמן מאפשר התבוננות יומיומית כמעט בתהליך, והשלמת פערים הקיימים בנתונים של ארבעת הילדים. היומן הוסף משום שלאחרונה מתברר ש- "capturing the micro-steps in acquisition brings us a step closer to the articulation of a theory of UG that is biologically plausible" (רופר 1994, עמ' 30).

בנוסף לנתונים הללו, העבודה מתבססת על מחקרים רבים שנעשו על רכישת העברית { ברמן (1985, 1986,1989,1992,1995), גורלניק (1990), דרומי (1986), לוי (1980), ניניו (1992), קפלן (1983), רביד (1995), שלזינגר (1982) ואחרים}. התקופה הנסקרת בעבודה מתחילה עם תום השלב החד-מילי בדיוק לפני הופעתם של הצרופים הראשונים (דרומי 1986) ומסתיימת כאשר הילדים מתחילים לצרף משפטים פשוטים ליצירת מבנים מורכבים יותר (ברמן 1990). מרבית התיאור והניתוח מתייחסים בהכרח לרכישת התחביר תוך רפרור למורפולוגיה בממשק.

מרגע שהילדים מתחילים לצרף מילים, תהליך הרכישה מתקדם בשני מישורים: המערכת השמנית (DP) ורמת המשפט (CP). בנקודות מסוימות בתהליך שתי המערכות נפגשות. ברכישת המערכת השמנית בעברית הילדים צריכים ללמוד כיצד לציין מין ומספר, להשתמש במיידעים, לשמור על התאם בין השם, התואר וחלק מן המיידעים ולהשתמש בערכת היחסות, וכל זאת בנוסף לסדר הליניארי בין ראש למגדיר וראש למשלים. ברכישת מבנה המשפט, הילדים צריכים ללמוד את מערכת הפועל (שימוש בזמנים כמו גם בבניינים), ההתאם בפועל, וסדר הרכיבים במשפט. חשוב לציין שזו רשימה חלקית בלבד של המשימות התחביריות שהילד צריך להתמודד אתן.

פרק 6 מציג את הדרך בה מתמודד הילד עם המטלה הראשונה - רכישת הצרוף השמני. תהליך רכישת הצרוף השמני - NP וההקרנה המורחבת שלו - DP, מהווה דוגמא טובה לדרך בה מיישמים הילדים את כלל החסכנות: עשה מעט ככל האפשר וייצר את העצים הקטנים ביותר אשר יעמדו בדרישות הממשק (converge). ברכישת הצרוף השמני הילדים מתחילים עם שם עצם ערום, זאת אומרת ראש שמני בלתי מתפצל (N) שאינו מנותח מבחינה מורפולוגית. בשלב הבא הקרנת הצרוף השמני (NP) מאפשרת שימוש בעמדת המגדיר עבור כמתים, מספרים ואפילו מיידעים מקריים, אך לעולם לא יותר מאחד מבינם. בנקודה זאת נראה ששום בדיקה איננה נעשית, כך שכל עוד יש די "מקום" ב NP למאייך, נראה שאין לילד שום ראיות לכך שיש צורך להשתמש גם בהקרנות הפונקציונאליות המורחבות. בשלב זה, כשהם מודרכים ע"י החוסר במקום ליותר ממאייך אחד, הילדים מרחיבים את ההקרנה. במקרה של מבנה השייכות ההרחבה נעשית על בסיס לקסיקאלי צר ורק לאחר שהילדים משתמשים בקטגוריות הפונקציונאליות עבור תבנית אחת, הם מרחיבים את השימוש באמצאות מנגנון החישוב, כפי שבא לידי ביטוי בשימוש בידוע וביחסות.

רכישת השייכות, כפי שכבר צוין, מדגימה את המעבר מעצים המספקים צרכים לקסיקאליים בלבד לעצים המהווים חלק מן התהליך התחבירי. שייכות היא אחד היחסים הסמנטיים הראשונים שילדים מסמנים כבר בצרופים הראשונים (Bloom, Lightbown and Hood 1975). באנגלית, ילדים מתחילים לסמן יחס זה באמצעות צרופים כמו *Gia eyes* (Bloom 1970), נראה תקין מבחינה תחבירית למן ההתחלה, שכן סדר המילים תקין ומה שחסר הוא סמן יחסת השייכות *'s*. ילדים דוברי עברית יוצרים מבנה דומה, למשל *aba (sha)on* שמשמעותו 'שעון של אבא,' (שלזינגר 1982), אך בעברית המצב שונה, שכן סדר מילים שבו הסומך מקדים את הנסמך איננו תקין בשום מקרה. כדי שהמבנה יהיה תקין מבחינת סדר המילים, הילדים צריכים ללמוד להעלות את שם העצם המשמש כסומך מ-N ל-D ולהוסיף את סמן היחסה, *shel*. זהו גם הסדר בו נרכש השימוש במבנה זה. תחילה הילדים מזיזים את ראש הצרוף, בנוכחות מאייך נוסף, ומקבלים סדר מילים תקין כדוגמת *od tmuna ima* [ליאור, 1;09], ולאחר מכן יוצרים סדר זה גם ללא מאייך נוסף. תבנית זו מתעשרת כאשר הילדים מתחילים לסמן את יחסת השייכות תחילה ע"י שימוש ב'שלי' רק בהקשר שבו היחסה מבחינה בין שתי משמעויות, למשל 'זה של אימא' השונה מהותית מ'זה אימא'. הן השימוש החלקי ב-D כיעד לתזוזת הראש, והן השימוש החלקי ב'שלי' מאפיינים את פרק הזמן שבו הילדים מיצרים עצים קטנים ככל האפשר העונים רק על הצרכים הלקסיקאליים, בעוד שהרחבת השימוש מצביעה על הרחבת העץ ברמה הפונקציונאלית לצורך בדיקה. תבנית זו חוזרת על עצמה גם ברכישת הידוע ויחסת המושא.

בפרק 7, מוצג תהליך דומה ביחס לצרוף הפועלי, שבו הילד מתחיל משימוש בפעלים כבר בשלב המילים הראשונות ומרחיב את הראש הפועלי לכדי צרוף פעלי, בצרופים הראשונים, ועד למשפט פשוט המכיל לפחות IP. פרק זה דן בשימוש בפעלים הראשונים, המציינים אספקט, מתייחס למבנה הארגומנטים הבא לידי ביטוי כבר בהרחבת הפועל לצרוף ומתמקד ברכישת המורפולוגיה של הפועל. כפי שמוצג בסעיף 7.4, רכישת המורפולוגיה הפועלית נעשית באופן המשקף את בניית העץ מלמטה למעלה כפי שההיפותזה המינימאליסטית של הרכישה מנבאת. בנוסף לשימוש רב בצורות פועליות לא ברורות המשמשות לצווי ובקשה, הילדים מציינים תחילה אספקט דורטיבי,

ע״י פעלים בצורת ההווה, ואספקט מושלם ע״י פעלים בצורת העבר. חשוב לציין שבשלב ראשוני זה לכל פועל יש צורה אחת בלבד. בעקבות השימוש האספקטואלי בפעלים, מתחילים הילדים להתאים את הפועל לנושאו במין, ולעתים גם במספר. בשלב הבא מופיע השימוש הפרודוקטיבי בזמנים, ובעקבותיו השימוש בנטיות הגוף.

הקישור בין המערכת השמנית למערכת הפועלית נעשה בפרק 8, הדן בשימוש בנושא. מוקדי הפרק הם השימוש בכינויי גוף והשימוש בנושא אפס. לאחר תקופה בה הילדים עושים שימוש בנושאים לקסיקאליים מועטים ובציין ׳זה׳ במקביל לשימוש במשפטים רבים חסרי מורפולוגיה וחסרי נושא, מתחילים הילדים במקביל להרחבה של הצרוף הפועלי להשתמש ביותר נושאים לקסיקאליים. השינוי המשמעותי מלווה את השימוש בזמנים ומתבטא בהופעת כינויי הגוף. צעד זה, פותח בתורו פתח לשימוש בנטיות הגוף ובנושא הריק. סוגיית הנושא הריק, והאופן בו הילדים מזהים האם ומתי אפשר להשתמש בו נידונה רבות במסגרת תיאורית הפרמטרים והעקרונות (לדוגמא Hyams 1986). הנתונים המוצגים בפרק זה מצביעים על שתי תקופות מרכזיות בתהליך. בתקופה הראשונה הילדים משתמשים במודל המניח נושא דיון (topic) ריק, אך בעקבות השימוש בזמנים ובנטיות הגוף ניכר מעבר למודל במניח את קיומו של נושא תחבירי ריק, כאשר מרבית השימושים השגויים משקפים עדיין את המודל המוקדם או לחליפין חסר פרגמאטי.

הדיון ברכישת המשפט מסתיים בפרק 9 העוסק ברמת ה-CP. בתהליך הרכישה יש לרמת הממשק בין המשפט לשיח תפקיד מרכזי ברכישת מבני השאלה והסמיכות. משפטים המורכבים משתי פסוקיות מופיעים בשלב מוקדם בתהליך הרכישה, במקביל לשימוש בזמנים. מה שמבדיל בינם לבין המשפטים המורכבים הוא העדרו של ציין השעבוד ולעתים אף שימוש שגוי בזמנים במשפט המשועבד. דוגמה למבנים כאלו (preconjunctionals) מתוך הנתונים של ליאור בגיל 2;1 : *ze shaon ose tuktuk*, או אצל יובל בגיל 1;11 : *lo roce ledaber* במשמעות ׳לא רוצה שתדברו׳. מבנים אלו משרתים את הילדים עד שסיימו את רכישת רמת ה-IP. בכל התקופה הזו יוצרים הילדים מבני שאלה המוגבלים לשני השלבים הראשונים המצוינים אצל Klima and Bellugi (1966). בשלב הראשון מבני השאלה מוגבלים לסכמות ותבניות שאינן משקפות בהכרח תזוזה של מילת השאלה, כדוגמת ׳איפה חתול?׳ או התבנית הקפואה ׳מהזה?׳. שינוי משמעותי חל בעקבות רכישת הזמנים כאשר הילדים מרחיבים את אוצר מילות השאלה ומשתמשים במבנים המחייבים תנועה לראשית המשפט. עם זאת, השימוש במבנים אלו מוגבל במידה המאפשרת לנתחם ברמת ה-IP, שכן לא נעשה שימוש בנטיות הגוף ובשלילה בשאלות בשלב השני. השלב השלישי בשימוש במבני השאלה קשור באופן הדוק לשימוש במשעבדים ומכאן לרמת ה-CP. אצל מרבית הילדים הקדים השלב השלישי כבשבוע את השימוש הראשוני במשעבדים. שני המבנים האלו גם יחד מופיעים רק לאחר שהילדים השתלטו גם על ההתאם בגוף בין הפועל לנושא.

נקודה שחשוב לציין כאן היא הקשר שמתגלה בין השימוש בפעלים בצורת מקור במשפט העיקרי לבין רכישת המורפולוגיה בשלב הראשון והשימוש במשעבדים בשלב השני. נושא זה מטופל הן בפרק 7 והן בפרק 9, כשהדגש הוא שאין לראות בשימוש במבנה זה תופעה אחידה כפי שמציע ווקסלר (1994), אלא שלוש תופעות נפרדות, שכל אחת נעלמת בשלב אחר. פעלים שנטיתם איננה מובהקת, כדוגמת *'pes'* מן השורש ט.פ.ס. בבניין קל, מזוהים פעמים רבות כמקור. צורות אלו

נעלמות עם רכישת הזמנים. שימוש נוסף הנעשה בפעלי מקור ע״י ילדים הוא השימוש המודלי להבאת רצון או בקשה שאינם מוגבלים בזמן, כדוגמת ׳לרדת׳ במשמעות ׳אני רוצה לרדת׳ או ׳לעזור לך?. בשפה העברית צורות אלו מקובלות גם בשימוש הבוגר. בשפה האנגלית יש לצפות להיעלמותן עם הופעת הציינים המודאליים. השימוש השלישי של פעלי המקור במשפט העיקרי הוא שימוש לצורך חיווי במקום פועל מוטה, למשל, ׳הם לזרוק צלחת׳. ווקסלר (1994) מציין שצורות אלו מהוות 50% מן המבעים הפועליים של הילדים דוברי האנגלית, בעוד שהן מהוות רק 5% מן המבעים של ילדים דוברי איטלקית (Guasti 1994) וקושר זאת לשימוש בנושא אפס. נתוני העברית מצביעים על נתונים דומים לאיטלקית (בניגוד למוצע ב Rhee and Wexler 1995), כאשר שימוש מינורי זה מצטמצם לכדי אחוז אחד עם הופעת המשעבדים. תופעה זו מצביעה על הקשר ההדוק שבין תכוניות C, כדוגמת [סופיות] והתוכן של I, כסמן זמן.

4. סיכום

העבודה מסתיימת בניסיון לבחון את ההשלכות של תהליך הרכישה ביחס לתיאוריה המינימאליסטית (Chomsky 1995) בכלל, ולגבי המודל המוצע בפרקים הראשונים בפרט. המטרה הראשונה מושגת על ידי ההבחנה בין ראשים לקסיקאליים לראשים פונקציונאליים, המנגנון החישובי והמגבלה ברמה הפונולוגית אשר מסבירים את הצורך בתנועה גלויה מבלי להזדקק לאבחנה בין תכוניות חזקות ותכוניות חלשות. פתרון זה מגבילה את בדיקת התכוניות לרמה הלוגית. המודל המוצע מאפשר להגדיר מחדש את מרבית הפרמטרים (הפרמטרים היחסיים) כהבדלים מורפו-לקסיקאליים המזינים את המנגנון החישובי, ולצמצם את הפרמטרים לכאלו שאינם משתמשים במנגנון החישובי: הפרמטרים המוחלטים. הבולטים מבין אלו הם הפרמטרים של הכיווניות המאפיינים מודולים לשוניים שונים.

האופן בו נרכשת השפה בכלל, וסדר רכישת הפרמטרים בפרט, היוו את המטרה השלישית של העבודה. שילוב בין המודל המוצע לבין ההיפותזה המינימאליסטית של הרכישה, לפיה הילדים מכירים את כל העץ התחבירי למן ההתחלה, אבל עושים בו שימוש מצומצם ביותר, מאפשר להגשים מטרה זו. בכל שלב בטיפוס במעלה העץ מסמנים הילדים קודם כל את המאפיינים הנובעים מן הפרמטרים המוחלטים ורק אחר-כך, הם מחשבים את ערכיהם של הפרמטרים היחסיים.

ההבחנה בין הרמה הפונולוגית והרמה הלוגית, שנוצרה באמצעות המנגנון החישובי, באה לידי ביטוי גם בתהליך הרכישה. בהנחה שאין ממשות לראשים פונקציונאליים שאין להם מוטיבציה סמנטית, חומסקי (1995) מציע לוותר על ראשי ההתאם המשקפים יחס תחבירי בלבד. התבוננות על תהליך הרכישה מן הזווית הזו, מצביע על כך שבטיפוס במעלה העץ (למשל מ-ASP ל-T ול- C ברמת המשפט) הילדים ממלאים קודם כל את דרישות הרמה הלוגית, ורק אחר כך את דרישות הרמה הפונולוגית, כפי שהן באות לידי ביטוי בסימון ההתאם. הפער הזה נשמר גם ברמת הצרוף השמני, ומשקף את המקום המרכזי שתופסות רמות הממשק בתהליך הרכישה כמו גם בתיאוריה המינימאליסטית. כך ניתן להסביר את הדרגתיות הרכישה וסימון הפרמטרים מבלי להזדקק לתיאורית ההבשלה ומבלי להסתמך על מודולים חוץ לשוניים, אלא פשוט באמצעות טבעו המינימאליסטי של הילד.

אוניברסיטת תל-אביב
הפקולטה למדעי הרוח
בית הספר למדעי התרבות

הילד המינימאליסטי:

פראמטרים וראשים פונקציונאליים ברכישת העברית

חיבור לשם קבלת התואר "דוקטור לפילוסופיה"

מאת

שרון ערמון-לוטם

הוגש לסנאט של אוניברסיטת תל-אביב

יולי 1996

עבודה זו נעשתה בהדרכתם של

פרופ׳ אלכסנדר גרוסו ודר׳ ג׳וליה הורוות