The Hierarchical Representation of Subject Verb Agreement

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This paper advances a model for representing agreement features in syntax. I argue that each feature is a zero-level category, which in keeping with the X-bar convention, projects a phrasal category. Verb subject agreement is brought about by consecutive applications of move 2, as argued by Pollock (1986) and Chomsky (1989). The model accounts for the patterns of agreement in Hebrew and Arabic but I believe it is not and cannot be specific to these languages.

The theory developed is then made to account in a straightforward manner for a number of agreement-related phenomena such as null subjects and word order variation.

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1 The Problem

1.1 Agreement Patterns in Standard Arabic

Consider the basic pattern of subject verb agreement in (Standard) Arabic in (1) and (2) below. Verbs agree with their subjects in person, number and gender in the embedded sentences (1b), (2b). They agree with their subjects only in gender in (1a), (2a). As these examples make obvious, the pattern of agreement correlates with the order of constituents in the Arabic sentence. When the verb is clause initial, as in the (a) examples, it agrees with the subject only in gender. Full agreement, in gender, number and person is manifested only when the subject is preverbal, as in (1b), (2b).

(1) a. ?akal-?awlaad 1-l-a?amm.
   ate-M the-boy-M.PL the-food
   'The boys ate the food.'

   said-15 that the-boy-M.PL ate-3-M.PL the-food
   'I said that the boys ate the food.'

1 In Arabic (as well as Hebrew. See ahead.) the third person singular form is ambiguous. It is used as a designation of third person and singular number, but it also designates the absence of person and number agreement. It is this latter, 'impersonal' form which characterizes clause-initial verbs in Arabic.
(2) a. ˏakal-at l-banat ˏtaʕaam.
    ate-F the-girl-F-PL the-food
    'The girls ate the food.'

b. Qult-u ṭinna l-banat ˏakal-na ˏtaʕaam.
   said-IS that the-girl-F-PL ate-3-F-PL the-food
   'I said that the girls ate the food.'

An adequate account of these Arabic facts must explain how the grammar
isolates gender from the other components of Agr, permitting the agreement-
bearing verb to access it directly to the exclusion of person and number.

1.2 Agreement Patterns in Hebrew

The same issue arises when one examines the contrast between the tensed
verbal forms of Hebrew and the participial, present tense form, (Benoni). In the
future and past forms, (3a,b), the verb is inflected for gender, number and person,
which appear congealed into a prefix in (3a) and into a suffix in (3b). In the
Benoni, on the other hand, the verb agrees with its subject only in gender and
number, (3c).

(3) a. Ata šom-r ˏal ha-xacilim.
    you 2-M-S guard on the-eggplants
    'You will guard the eggplants.'

b. Ata šam-r-ta ˏal ha-xacilim.
    you guard-2-M-S on the-eggplants
    'You guarded the eggplants.'

c. Ata šomer ˏal ha-xacilim.
    you guard-M-S on the-eggplants
    'You guard/are guarding the eggplants.'

Because the Benoni represents only two features, number and gender, it has
only four forms, as in (4).

(4)  
<table>
<thead>
<tr>
<th>masculine</th>
<th>feminine</th>
</tr>
</thead>
<tbody>
<tr>
<td>singular</td>
<td>šomer-Ø</td>
</tr>
<tr>
<td>plural</td>
<td>šomer-im /šomer-im/</td>
</tr>
</tbody>
</table>

As in the Arabic examples in (1-2), these data from Hebrew demonstrate that
the grammar can access number and gender features to the exclusion of person
features, which are otherwise available in the language since they are overtly
represented in the tensed verbal forms.

1.3 Evidence For a Hierarchy of Agreement Features

Moreover, features of agreement are dependent one upon the other: Gender
can be represented without number and person, as in Arabic V-initial clauses,
gender and number without person as in Hebrew Benoni forms. But crucially,
there is no verb which is marked for number and not marked for gender and no verb which is marked for person but not marked for number. Observationally, then, the implicational hierarchy in (5) seems to hold.

(5) Implicational Hierarchy of Agreement Features

- If a verb is inflected for number then it is also inflected for gender.
- If a verb is inflected for person then it is also inflected for number.

On familiar learnability grounds, it is highly unlikely that (5) captures an accidental state of affairs. Moreover, (5) generalizes to non-Semitic languages. With certain accountable differences (such as the absence or non-distinctness of gender in the non-participial verb forms), (5) adequately describes the patterns of agreement in Romance as well. Consider, for example, French past participle agreement. Like the Hebrew בְּנֶנֶוָי, it has four forms, the combinations of number and gender. The past participle [repainted] in (6) agrees with the what-fronted object in number and gender. Crucially, there is no form in French which manifests person features but no number distinctions and no form inflected for, say, person and gender, but not number.²

(6) je sais combien de tables ils ont repeintes.

I know how many of the tables-F-PL they have repainted-F-PL

'I know how many tables they repainted.' (Kayne (1987))

Similarly, in Russian, verbs in the nonpast tenses agree in person and number with their subject; in the past tense, they agree in gender and number with their subject. Hypothesizing, then, let us take (5) to be descriptively valid of Universal Grammar.

1.4 Agreement and its Syntactic Correlates

The degree to which a verb is richly inflected has indisputable syntactic correlations in many languages. Thus, in Arabic, fully inflected verbs cannot precede their subjects, but must follow them whereas the semi-impoverished forms (manifesting only gender) appear clause-initially, giving rise to VSO word order.

Word order variation is clearly a syntactic phenomenon, driven, it is commonly assumed, by the exigencies of the Case Module and constrained by the Government and Bounding modules.³

In Hebrew, the degree of inflectional richness correlates with the possibility of (argument) null subjects.⁴ Those are permitted in the tensed forms but ruled out

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² (5) is not as obvious in French since the non-participial, tensed forms are inflected for number and person but not for gender. This is due to the fact that gender is non-distinct in these forms, as in the Semitic first person. (5) should be read as follows: "If a form manifests number then it manifests gender only if gender is distinctive."

³ See, e.g., Koopman (1989), Sproat (1985), Travis (1984) and many others.

⁴ For discussion of non-argument null subjects in Hebrew, which are licenced under different conditions, see Shlonsky (1989a).
2. Inflectional Morphology.

According to Pollock (1988), clauses have the following structure:

\[ (8) \quad \text{TenseP} \quad \text{(-IP)} \]
\[ \text{NP} \quad \text{Tense} \quad \text{AgrP} \]
\[ \text{Tense} \quad \text{Agr} \]
\[ \text{VP} \]
\[ \text{Agr} \]
\[ \text{\{a Gender, b Number, c Person\}} \]

Pollock argues that Tense and Agr constitute distinct heads in the X-bar sense, (i.e., X0). Moreover, he takes the view that where Agr is transparent (or strong), it attracts the verb to it. Move a applies and V raises to Agr and amalgamates with it, forming an inflected verb. This, he claims, is the situation in French finite clauses. In English, Agr is opaque or weak and V cannot raise to it. Consequently, the agreement affixes move down to V. Thus, inflectional morphology in French-type languages takes the form of V-Raising \((9a)\), and in English-type languages it takes the form of Agr-lowering \((9b)\).

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5. See ahead, sect. 4, for discussion of the third person past and future forms, which permit null subjects under more restricted circumstances.
Both instances of Move a are transformations affecting X⁰ elements which
Chomsky (1986b, 1989) argues, involve adjunction to a category on the same level,
i.e. an X⁰.

Pollock further shows that the same principles extend to Tense so that a strong
(finite) Tense attracts movement while a weak (non-finite tense) moves down.

The Head Movement constraint, (10), blocks direct movement of V to T, so that
the grammatical
options are diagrammed in (11).⁶

(10) **Head Movement Constraint** (Travis (1984)).
An X⁰ may only move into a Y⁰ which properly-governs it.

However, (10) appears to rule out all cases of X⁰ lowering, since the e.c. left by
the lowered head is not c-commanded (and hence not governed) by its antecedent,
the lowered head. Chomsky argues that in LF the verbal complex formed by
lowering the affixes onto it raises and covers up the e.c.'s formed at S-structure.
At LF, French-type and English-type languages are identical, with V and Agr
adjoined to Tense. The HMC can be satisfied in LF since the raised heads c-
command their traces. Crucially, this relies on the grammar's ability to suspend
application of the HMC until LF as well as on a number of other assumptions
discussed at length in Chomsky (1989).

Thus, in (11), V must move to Agr in order to raise to Tense. Tense, however,
may lower directly to V. This is so precisely because the HMC can be suspended
until LF.

For Chomsky, V-Raising is obligatory at S-structure whenever possible (i.e.,
whenever Agr and Tense are strong). Otherwise, Agr and/or Tense must lower
onto V. In LF, the strong/weak distinction no longer constrains V-raising which
then must apply, even if it could not apply at S-structure.

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⁶ Baker (1988). Chomsky (1989) argue that the HMC is fully reducible to
the Empty Category Principle (ECP). For clarity of exposition, I continue
to employ the descriptive term HMC.
3. The Structure of Agr.

In Section 1 above, we argued that the \( \phi \) features constituting Agr must be so represented as to be accessible individually and in a particular order. As it stands, (5) fails to articulate any internal structure for Agr, because it treats Agr as a single node containing the features in a bundle.

Suppose, therefore, that there is no Agr node per se but rather, that each feature of agreement (\( \phi \) feature) heads its own maximal projection. In other words, consider the hypothesis that Pollock's AgrP is merely an abbreviation of the more articulate structure in (12).

\[
\begin{array}{c}
\text{Person}' \\
\text{Person} \\
\text{Person} \\
\text{Number}' \\
\text{Number} \\
\text{Number} \\
\text{Gender}' \\
\text{Gender} \\
\end{array}
\]

Given (12) and the theory of inflectional morphology outlined above, we can answer (7-11). Verbs have access to the contents of Agr because they associate with its features one by one, subject to the conditions on head movement and the strong/weak distinctions in each and every head.

Moreover, the generalization in (5) is accounted for by the HMC. V can only adjoin to Number\( ^0 \) if it previously adjoins to Gender\( ^0 \) and a verb will manifest person agreement only if it manifests number and gender agreement, since movement to Person\( ^0 \) must first go through Number\( ^0 \) and Gender\( ^0 \). When V cannot adjoin to some X\( ^0 \) because X\( ^0 \) is weak and does not licence V-Raising, then V can not raise to Y\( ^0 \), where Y\( ^0 \) c-commands X\( ^0 \).

In Arabic, the fact that the verb agrees with the subject only in gender in verb-initial constructions, implies that the verb has adjoined to Gender\( ^0 \), but has failed to move up further. Conversely, in subject-initial clauses, where a verb manifests full agreement, V has raised and adjoined to Person\( ^0 \). In Hebrew, a verb in the Benoni form has only moved up to Number\( ^0 \) but not to Person\( ^0 \).

The Phrase-marker in (12) thus provides a framework in which verbal agreement patterns can be perspicuously described. Given (12) we can state the following two questions:

\[
\begin{array}{c}
\text{I. What blocks V from moving further up to Number}^0 \text{ and Person}^0 \text{ in Arabic?} \\
\text{II. What prevents a Benoni verb from moving to Person}^0 \text{ and acquiring Person features?} \\
\end{array}
\]

In Section 4 below, I attempt to answer (13-11). Question (13-1) is taken up in Section 6.
4 Agreement and Tense in the Hebrew Verbal Paradigm.

4.1 Overview of the Hebrew Verbal Paradigm.

Hebrew verbs manifest either no agreement with their subjects (infinitives), agreement in number and gender only (Benoni forms. See (4) above) and full, i.e., gender, number and person agreement in the past and future tenses, as shown below in (14).7,8

7 Since verbs in the future or past tense display all three agreement features, they should manifest twelve distinct forms for each tense. In reality, only eight forms are attested in Modern colloquial Hebrew, as the table in (14) shows.

The reasons for which the paradigm in (14) is defective are varied. First, Hebrew (and Arabic) are non-distinct for gender in the first person. (cf. 5.5). Second, the past and future second person plural feminine form and the future third person plural feminine form are considered archaic in colloquial Modern Hebrew (but not in Arabic or in more formal registers of Modern Hebrew). Third, the absence of a third person plural feminine form in the past tense is probably an accidental gap, since the equivalent form exists in Arabic.

The overall morphological opacity of the agreement affixes, i.e., the difficulty in breaking them down into the component 'morphemes' (gender, number and person) should not deter us from assigning them discrete syntactic representations. The absence of isomorphy between inflectional affixes on syntactic objects and on morphological ones is quite familiar to students of morphosyntax. A specific argument to this effect is given in Footnote 21. For more discussion, see Anderson (1982), (1986), Bromberger and Halle (1989) among others.

8 The status of the third person past and future forms is not so clear. On the one hand, the third person form lacks any overt manifestation of person. On the other hand, it is discretely represented among the other persons in the sense that the absence of a person affix is itself distinctive and unambiguously identifies the form as third person. These problematic forms are discussed in 4.3.

<table>
<thead>
<tr>
<th></th>
<th>PAST</th>
<th>FUTURE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>singular</td>
<td>plural</td>
</tr>
<tr>
<td>1</td>
<td>šamar-ti</td>
<td>šamar-n-u</td>
</tr>
<tr>
<td>2m</td>
<td>šamar-ta</td>
<td>šamar-te-m</td>
</tr>
<tr>
<td>2f</td>
<td>šamar-t</td>
<td>ti-šmor-i</td>
</tr>
<tr>
<td>3m</td>
<td>šamar-Ø</td>
<td>šamar-Ø-u</td>
</tr>
<tr>
<td>3f</td>
<td>šamar-Ø-a</td>
<td></td>
</tr>
</tbody>
</table>

The Benoni is discussed in 4.2 below. The past and future forms in 4.3 and the infinitive form in 4.4.

4.2 The Benoni.

4.2.1 The Benoni as a Tenseless Form.

Benoni forms in Hebrew differ from the future and past tense forms in two ways. First, as we have seen, they are inflected for gender and number only and
not for person. They differ from the other verb forms also in that they are not specified for tense.

The Benoni, as Berman (1978) shows, appears in a wider range of environments than, say, the English present tense. In addition to its distribution as the present tense form, the Benoni can be a gerundive complement to a perception verb, in (15a) and a participle, (15b), both of which are forms without an independent tense specification.

    see-M.S-1 acc Dani walk-BENOJNI-M-S
    'I saw Dani walking'

b. Dani haya margiz ?et kulam k?e-hu haya
    Dani be-PAST-M-S-3 annoy-BENOJNI-M-S acc everyone when he be-PAST-M-S-3
    ozel xaclim.
    eat-BENOJNI-M-S eggplants
    'Dani used to annoy everyone when he used to eat eggplants'.

To account for the distribution of the Benoni as both a present tense form and as a participle, Berman (1978) and Doron (1983) propose that Hebrew tensed forms can be either past or future. The present tense, in their view, is formally tenseless, its employment as the present tense is so by default.9

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9 Standard Arabic and the modern colloquial dialects have a form which is morphologically identical to the Hebrew Benoni, (called ?anim P?e?il, 'verbal noun' in traditional Arabic grammars.) Its syntactic distribution, however, is much more restricted than that of the Benoni:
In general, it cannot be used as a present tense verb but only as a participle.

Hebrew differs from both Standard Arabic and the modern dialects in having a tense rather than an aspect system (which also characterized Biblical Hebrew.) In Arabic, the present tense is expressed by the imperfect verbal form and not by the ?anim P?e?il. Contrast the Hebrew Benoni (i) with its Palestinian equivalent, (ii), where the verb bears the imperfective prefix, /b-/ . The ?anim P?e?il cannot be used here, as shown by the ungrammaticality of (iii). It can only be used as a participle, as in (iv).

(i) Den pote?ex ?et ha-delet.
    Den open-BENOJNI-M-S acc the-door
    'Den opens the door.'

(ii) Den b-i-fath 1-bash.
    D. IMP-M-S-3 open the-door
    Same as (i).

(iii) *Den fasath 1-bash.
    Den open-BENOJNI-M-S the-door

(iv) Den koen fasath 1-bash (lamma kunna
    D. be-PAST-M-S-3 open Benoni-M-S the-door (while be-PAST-PL-1
    sleep-BENOJNI-M-PL)
    'D. had opened the door while we were sleeping.'

It is thus reasonable to assume that the Benoni form is, indeed, a participle which has been converted to default present tense use in Modern Hebrew as part of the shift from an aspectual to a tense system.
The difference between the tenseless infinitive and the tenseless Benoni is characterized by Berman and Doron by assigning the value [Ø] to the feature [-Tense] in the Benoni and [-Tense] to the infinitive.

(16) Infinitives are [-Tense].
- Benoni forms are [Ø Tense]. (Berman (1976), Doron (1983))

4.2.2 Analysis of the Benoni and the Position of Tense

The problem, as stated in (13-11), is to block V-raising in the Benoni from moving V beyond Number0. Since the Benoni form is [Ø Tense], it surely qualifies as an opaque node in Pollock's sense, (equivalent to his [-finite]). As such it does not tolerate V-Raising. Suppose, now, that we incorporate Tense into the clausal structure given in (12) by making it a complement of Person0, as in (17). (Tense should probably be Tense/Aspect. I retain the shorter label for convenience.)

(17) Person* (-IP)
    Person*
    Person
    Tense*
    Tense
    Number
    Number
    Gender
    Gender
    V

The derivation of the Benoni now proceeds as follows. V raises to Gender0 and Number0. Tense0, being weak, lowers to the verbal complex in Number0. The HMC blocks V-raising to Person0 since it would cross Tense0, violating the HMC.

Thus, the tenselessness and the absence of Person inflection in the Benoni is not coincidental. The Benoni forms lack Person marking precisely because they are [Ø Tense].

To further substantiate this analysis, I turn to some independent evidence which shows that V does indeed raise to Gender0 and to Number0 - as opposed to their lowering onto V- and that V-raising does indeed fail to reach higher than Number0, crucially, that it fails to reach Tense0. This evidence is presented in 4.2.3 and 4.2.4.

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In Arabic. The ‘imma fi‘il may be used as a present tense form only with a small class of perception and stative verbs (e.g., see, hear, sleep, etc...)
4.2.3 The Benoni: V-Raising or Affix-Lowering?

The fact that the Benoni is inflected for gender and for number can, in principle, be accounted for either by V-Raising or by Affix-lowering. A third possibility is that the verb moves to Gender\(^0\) and that Number\(^0\) lowers. Note that all three options are compatible with the explanation for why the Benoni lacks person marking. This is so since weak tense node would, in any event, block V-raising to Person\(^0\).

Prima facie, both Gender\(^0\) and Number\(^0\) are strong in Hebrew since they are fully distinctive in all the Benoni forms. Thus, they ought to attract V-Raising. 4.2.4.1 attempts to provide independent evidence for V-Raising as opposed to Affix-lowering. Once it is empirically established that V raises (to Gender\(^0\)), preventing it from raising further (to Number\(^0\)) would either have to be independently motivated - which it is not- or stipulated. On grounds of simplicity, then, if V is raised to Gender\(^0\), then it is also raised further to Number\(^0\).

4.2.3.1 The Position of VP-Adverbs in Hebrew

One of the standard diagnostics for V-Raising is the placement of VP adverbs. English disallows a VP-adverb to appear between a verb and its object while French allows it, as is illustrated by the contrast in (18).

\[(18)\]
\[
\begin{align*}
\text{a. } & \text{John kisses often Mary. } \\
\text{b. } & \text{John often kisses Mary. } \\
\text{c. } & \text{Jean souvent embrasse Marie. }
\end{align*}
\]

Following Emonds (1976) the pattern in (18) is taken to constitute evidence that V moves to Agr over the adverb in the syntax of French, giving the order V Adv 0, as in (19a) but remains in place, triggering affix lowering in English, (19b).

\[(19)\]
\[
\begin{align*}
\text{a. } & \text{AgrP} \\
\text{b. } & \text{AgrP}
\end{align*}
\]

With (19) in mind, consider possible adverb positions in Hebrew, (20a), and the example, (20b). ("-") possible adverb position.)

\[(20)\]
\[
\begin{align*}
\text{a. } & \text{Dan 's sam ' 3et ha-kosef ' 3al ha-šulhan.' } \\
\text{D. } & \text{put-BENONI-M-S acc the-money on the-table} \\
\text{Dan 's puts the money on the table.' } \\
\text{b. } & \text{Dan sam le-3um krovot 3et ha-kosef 3al ha-šulhan.} \\
\text{D. } & \text{put-BENONI-M-S at-times frequent acc the-money on the-table} \\
\text{Dan often puts the money on the table.' }
\end{align*}
\]

Note that the French order is possible in Hebrew, with the adverb appearing between verb and object.\(^{10}\) It is highly unlikely that the object is moved

\[\text{10 Note that the English order, Adv V O, is also possible. This does not necessarily imply that the verb optionally fails to raise which, incidentally, is impossible given Chomsky's (1989) Least Effort}\]
rightward over the adverb because it is followed by a subcategorized PP. Thus, we can be fairly certain that the object NP is indeed inside VP and not (Heavy NP–)
shifted out of VP. The order V Adv NP is therefore obtained by V-Raising, as in French.

Similarly, the object of a passive verb such as nignav ("was stolen") must be indefinite, as the contrast between (21a) and (21b) illustrates. This is typical of in-situ objects in passives of null subject languages. The presence of the locative NP yesterday between V and it's object is once again indicative that V-Raising has taken place, as in French.

(21) a. Nignav etmol sefer me-ha-sifriya.
   stolen yesterday book from-the-library
   'A book was stolen yesterday from the library.'

b. *?Nignav etmol ha-sefer me-ha-sifriya.
   stolen yesterday the-book from-the-library
   The book was stolen yesterday from the library.'

c. Ha-sefer nignav etmol me-ha-sifriya.
   the-book stolen yesterday from-the-library
   Same as (21c).

I now turn to evidence in support of the claim that V-Raising in the Benoni does not reach Tense, but rather stops at Number. The evidence is taken from the placement of negation in modern Arabic dialects which have a Benoni morphology identical to that of Hebrew, as discussed in Footnote 9.

4.2.4 The Placement of Negation in Palestinian Arabic

The negative element in Palestinian consists of two formatives, [ma] and [ba], very much like French [ne] and [pas]. When a non-Benoni verb, (i.e., a perfect or imperfect verb), is negated, the two negative elements appear as a prefix and a suffix on the verb, as in (22a). There is some, sub-dialectal variation as to whether both or only one of the elements are actually realized on the surface. However, in all sub-dialects of Palestinian, when a Benoni form is used, the negative elements are congealed into a single word, muš (or muš) to the left of the verb. (22b).12


12 To illustrate this point, I have chosen the Benoni of a perception verb which permits a present-tense (statative) use. See Footnote 9.
(22) a. Ma-thmint-š 1-qissa.
   neg-understood-PAST-1-M-S neg the-story
   'I didn't understand the story.'

b. Miš saabim 1-qissa.
   neg understand-BENONI-M-S the-story
   'I/you/he do not understand the story.'

This parallels the contrast between infinitives and tensed verbs in French, as shown in (23), which Pollock discusses.

(23) a. Pierre ne mange pas.
b. *Pierre ne pas mange.
c. Ne pas manger...
d. *Ne manger pas...

Following Pollock, let us assume that the Neg element is generated below Tense0, as in (24), taking ma- to be a scope marker with clitic properties.13

---

(24)

Person

Person

Tense

Tense

Number

Number

Gender

Gender

V

---

To derive a finite form such as (22a), V must move to the left of Neg, i.e. it must adjoin Tense0. If movement to Tense0 is blocked, as I have claimed it is in the Benoni form (22b), the verb reaches number and can go no further. Ma- then criticizes onto -š.14

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ma...makan - 'never' (cf. 'Ne...jamais.')
ma...wala - 'neither...nor'.

13 Mi behaves as a scope marker in constructions involving polarity negation, e.g., ma...ha - 'nobody'.

14 The account of the Benoni can, perhaps, be carried over to past participle in French as discussed in Kayne (1987). His account of French Past Participle agreement rests on the hypotheses that the participle has an Agr node and a subject. Under the view developed in this paper, we might say that in a sentence such as (6), repeated below, the auxiliary verb takes a Person complement with a weak (dependent) Tense node.

(6) Je sais combien de tables ils ont repéntes.
   I know how many of tables-F-PL they have repainted-F-PL.
Sections to be added:

- PRO in the Benoni (cf. 6 below.)
- Analysis of the negation particle gin in Hebrew which is restricted to the Benoni.

4.3 The Tensed Forms.

In the tensed verbal forms, Tense$^0$ is strong so V-Raising is obligatory. Since V moves to Number$^0$ (as in the Benoni) it is free to move to Tense$^0$ and further on to Person$^0$. Thus, the verb in a tensed sentence in Hebrew is adjoined to Person$^0$ at S-structure. V-Raising to Person$^0$ is diagrammed in (25).

4.4 Infinitives.

The non-finite forms in Hebrew consist of a verb form to which the preposition-like prefix $\$-$ in its various, phonologically determined surface realizations, is attached, (26).

(26) a. Raci-ti li-\$mor \$al ha-\$ascalim.

want-PAST-S-1 to-guard on the-eggplants

'I wanted to guard the eggplants.'

b. Raci-ti la-\$exol \$ascalim.

want-PAST-S-1 to-eat eggplants

'I wanted to eat eggplants.'
The non-finite forms are both [-Tense] and lack agreement. They should be analyzed, then, as failing to raise even to Gender₀. Given the clause structure proposed in (17), one might suppose that the non-finite verb remains in-situ in VP at S-Structure. Following standard analyses of infinitives in English, the prefix I- is base-generated in Tense₀ and then lowered and adjoined to V in VP.

The infinitive prefix does indeed lower from a base position in Tense₀, but to a verb which at S-structure is not inside the minimal VP in which it was generated. My thesis is that the infinitives involve V-Raising as well, though to a node which lies between Gender₀ and the minimal VP. The relevant aspects of the derivation of the infinitive is schematized in (27).

(27) | Person* (=-IP)
   |   Person'
   |   Tense'
   |   Person   Tense'
   |       Tense'   Number'
   |       I-
   |       Number   Gender'
   |       Gender'
   |       V'    VP

Consider the fact that an adverb may intervene between an infinitival verb and its complement. If V were in VP at S-structure, the only possible way to derive the sentences in (28) other than by raising the V over the adverb would be to move the object NP rightwards and adjoin it to VP on the right. While this strategy cannot be ruled out in principle (especially in a language like Hebrew which admits a relatively free word order), the presence of subcategorized PP’s to the right of the object NP in these examples, argues strongly against such a move. With the object restricted to remain inside VP in (28), then, V-Raising applies and V is moved up and adjoined to the node labelled 15.

(28) a. Carix li-zkor la-sim tamid ?et ha-sefer ba-makom axarey

   must-M-S-3 to-remember to-put always the-book in-the place after
   ha-simʊs.
   the-use
   'One must remember to always put the book in place back after
   use.'

b. La-tet be-me?ora kaze xacilm le-axot xa be-matana, ze-hu
   to-give on-occasion such eggplants to-sister-your for-present, it-is
   ma?=ase xasar takdim.
   act without precedent
   'To give your sister eggplants as a present on such an occasion,
   that’s an unprecedented act.'

15 As in (20) above, placing the adverb to the left of the verb is also acceptable. See Footnote 10 for some discussion.
The Node $\text{Node}^0$ and the Syntactic Aspect of Semitic Morphology

McCarthy (1982), following a long tradition of Semitic grammarians, argued that the consonantal (verbal) root in Semitic must be represented distinctly from both its vocalic melody and the skeletal tier to which it is linked. He showed that universal principles which govern the linking of segments to skeltons can account for word formation processes in Arabic and Hebrew.

Note, now, that the infinitive form consists of a consonantal root linked to a particular skelton and melody; it is not a bare verb. Suppose that in Semitic, only the consonantal root is generated under $V$ in VP at D-structure.\footnote{This immediately raises the issue of whether derivational morphology is 'syntactic' or 'lexical'. The problem arises most acutely in the cases discussed in Borer (1987) involving, among others, adjectival and verbal passives. The cases under discussion in this paper, however, are unproblematically 'syntactic'. By arguing that the bare consonantal root is generated under $V$ I am not committing myself to the claim that pre-linked verbs may not, in principle, be generated there. There are, indeed, many further questions concerning the place of the morphological component in the grammar and its interaction with the syntactic component. These issues will be discussed in a later chapter where I analyze passives in Arabic in terms of $V$-Raising to a passive melody node.}

An infinitive form such as li-zkor ('to remember') is derived as follows: First, the verbal root $z\text{kor}$ is moved to $\text{Node}^0$ where it adjoins to morphemes consisting of a skeletal tier and a melody, (CCVC and a, respectively). The infinitive prefix $\text{i-}$ (which we can assume to be pre-linked to a skelton) now lowers from Tense$^0$ and adjoins to $V$ in $\text{Node}^0$.

If the verb generated under $V$ at D-structure consists of nothing more than the consonantal stem, then all verbs, finite, or non-finite, involve an extra step of raising to $\text{Node}^0$, a node located below the various agreement and tense nodes.

More generally, once it is accepted that the 'verbal complex' (i.e., the main and auxiliary verbs and the inflectional morphemes which are attached to them) consists of a series of XP's, it is not unreasonable to assume that $U_6$ places no principled limit on their number. In other words, it is more costly, and hence grammatically marked, to rule out $\text{Node}^1$ than to admit it into the verbal complex of Semitic.\footnote{Pesetsky (forthcoming) makes essentially the same point.}

This concludes our initial discussion of Semitic, and specifically of Hebrew verbal inflection. I turn now to the theory of Pro-Drop which, I believe, can be simplified by the model of agreement presented above.
5 The Pro-Drop Parameter

5.1 The Pro-Drop Problem

Studies of pro-drop in languages with agreement (i.e., not Chinese) all concur around the observation that there is a direct connection between inflectional richness and the licensing of pro. At the same time, the notion 'inflectional richness' is generally characterized in no more than vague terms.

In his 1986 study, Rizzi makes an explicit proposal—since then adopted by a number of other authors—regarding the licensing conditions for pro. Paraphrasing his proposal, pro must be both formally licensed (governed and Case-marked) which it is in Italian, but not in English and assigned content by coindexation with the governing head.

In Italian, Inf governs subject pro and assigns it grammatical features; in English it fails to govern pro (due to the negative setting of the pro-drop parameter), while in mixed languages like Hebrew, pro is formally licensed, i.e., governed by Inf but the degree to which it can be assigned features varies in accordance with the richness of Inf. Thus, with respect to languages like Hebrew, the richness of agreement plays a crucial role in the distribution of pro-drop.

Rizzi's theory of pro-drop has two conceptually unappealing components: First, the stipulation that in some languages Inf governs and Case-marks pro, while in others it does not. Secondly, the reliance on an unclear notion of richness of inflection, (which his theory shares with most others.)

The theory of agreement developed above opens up an alternative view of pro-drop in which the pro-drop parameter reduces entirely to the theories of movement and government. The results of this view, lead us to concur with Adams (1987:13) to the effect that,

"...there is no pro-drop parameter per se, but rather a descriptive generalization reducible to other properties, namely, directional government and feature identification."

In this section, I have little to add to Adams' discussion of government directionality. Rather, my intention is to clarify the notion of 'feature identification' and derive it, too, from the theories of movement and government.

5.2 The Hebrew Pro-Drop Paradigm

Argument null subjects in Hebrew are fully licensed only in the first and second persons, past and future. They are ungrammatical with Benoni verbs. The case of null subjects with third person past and future inflection is more complex. They are impossible as subjects of root clauses and steadily improve in direct correlation

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10 But see section 6 on Arabic word order where this notion comes to play a crucial role.
with the degree to which they can be identified contextually or in environments superficially resembling those of control. I defer discussion of this case to (5.4).

5.3 The 'Pro-Condition' = Lexical Government = Rich Inflection = Move 0

My basic claim is that the only condition to which pro is subject is (29), itself an instantiation of the lexical government clause of the ECP.

(29) Condition on Pro

    Pro \in \text{[Spec/Person]}, i.e. subject of IP, must be lexically-governed.

Under the assumptions of Chomsky (1966b), Person$^0$ is lexicalized (and thus made capable of I-marking Tense) when V raises and adjoins to it. When V moves to Person$^0$, the newly-formed lexical head will also lexically-govern its specifier, pro, under a standard definition of government based on m-command. If V does not get up to Person$^0$, the element in Spec/Person$'$ will not be governed and cannot be pro or, for that matter, any empty category excluding PRO. Pro is lexically-governed only when the Person node is filled, i.e. when V adjoins to it.

I have argued that in the Benoni forms, V does not reach Person$^0$. Consequently pro in the clausal subject position will be ungoverned. This explains why pro is not licensed in the Benoni or, for that matter, in any environment in which V is not adjoined to Person$^0$ at S-structure.

In the past and future 1st and 2nd person forms, V does, indeed, move to a transparent or strong Person$^0$ node where it can govern pro in subject position. Thus, pro is licenced in the context of a past and future tense verb.

In English, pro is unavailable because there is no V-movement at s-structure. Hence, Spec/Person$'$ is ungoverned and cannot be occupied by an empty category. It must be filled by a lexical NP. 20

Thus, we can derive Rizzi's (1986) descriptive generalization that argument pro must be identified by features of person and number without making recourse to special mechanisms of feature identification. A language with rich inflection and hence one where pro is attested, is a language where V can adjoin Person$^0$ and hence govern pro at S-structure.

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19 If Spec/Person$'$ is ungoverned in the Benoni, various questions arise w.r.t. to the clausal subject position. How is nominative Case assigned etc… I discuss this and other implications in the following chapters.

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20 One consequence to this analysis is that NP movement in English to Spec/Person$'$ is not Case-driven, but rather forced by the fact that an e.c. is not allowed in the clausal subject position. See Shlonsky (1989c) for further arguments to this effect. Based on the theory of inherent Case developed in Belletti (1988).
5.4 The Third Person Past and Future Forms.

Suppose that the third person forms are characterized by a weak Person\(^0\) node. Thus, V in these forms adjoins Tense\(^0\) but fails to move up to Person\(^0\), as in (30). 
Pro drop is unavailable since pro in Spec/Person\(^-\) is not lexically-governed.

(30) \[\text{Person}^* \quad \text{(-IP)}\]

\[
\begin{align*}
\text{Person}^* & \quad \text{Tense}^* \\
\text{Tense} & \quad \text{Number}^* \\
\text{Number} & \quad \text{Gender}^* \\
\text{Gender} & \quad V^* \\
\end{align*}
\]

Perusal of the verbal paradigm in (14) shows that such an analysis can be partially motivated on the basis of the third person past forms. These forms differ from the first and second person ones in lacking an overt manifestation of person morphology.

Moreover, the third person masculine (singular and plural) forms in Hebrew future and past are homophonous with the impersonal forms which pattern like the Remoni in licensing non-argument null subjects, as shown in Shlonsky (1989a).

Thus, (31) can only have the impersonal interpretation in (a) and is ungrammatical under the personal interpretation, (b). The similarity between the impersonal use of the third person and the Remoni can be seen by comparing (31) with (32).

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\[\text{The third person future forms are more complex. They share with their past tense variants the ambiguity with the impersonal form; yet they manifest an overt prefix, yi- for the masculine form, ti- for the feminine form. One might speculate that these are not person prefixes, but rather, gender prefixes. (which are perhaps truncated when precede by the person prefixes in the first and second person forms.)}\]

Note that a form such as [ti-lamad] can mean either 'she will study' or 'you (M-S) will study', as shown in (i), Yet when the subject pronoun is null, only the second person singular interpretation is available. (ii).

(i) \[\text{hi ti-lamad} \quad \text{sifrut.} \]
\[\text{ata} \]
\[\text{she will study literature} \]
\[\text{you} \]

(ii) \[\text{pro ti-lamad sifrut.} \]
\[\text{*she will study literature} \]
\[\text{you} \]

Suppose that the prefix [ti-] is a person marker in the second person singular form and a gender marker in the third person feminine form. Only in the former can the verb raise to Person\(^0\) and govern pro. In the latter, it reaches up to 'strong' tense but is blocked from adjoining to a 'weak' person node.
(31) Hizminu "et Dani le-mesibat zacilim.
invite-PAST-M-PL acc Dani to-party eggplants
a. Dani was invited to an eggplant party.
b. *They invited Dani to an eggplant party.

(32) (Tamid) mazmin-im "et Dani le-mesibot zacilim.
(Always) invite-BENONI-M-PL acc Dani to-parties eggplants
Dani is (always) invited to eggplant parties.

However, pro-drop with third person inflection is not always ungrammatical. Borer (1988) cites examples such as (33), which show that pro can be licensed in a control-environment. The subject of the future masculine singular third person verb yaklax must be coindexed with the matrix subject. In (33b) it must be coindexed with the object. Crucially, in neither sentence can it be free.

(33) a. Dani hivtiax le-Rutiš še-yaklaxi/še j/š k ba-bxinot.
   Dan promise-PAST-M-S to Ruti that-M-S-succeed-FUT in-the-exam
   Dan promised Ruti that he will succeed in the exam
b. Dani hivtiax le-Rutiš še-taklaxi/še j/š k ba-bxinot.

Borer analyzes the Agr node in (33) as anaphorically bound to the matrix. Be the details of the the analysis what they may, what is crucial is that such control is ungrammatical with the Benoni forms, as Borer herself notes.

Moreover, we find in Hebrew cases of subject pro in contexts where its reference can be recovered from the discourse, as in the fragment given in (34). Again, this is possible only with tensed verbs. Pro with Benoni forms is quite infelicitous, even in narrative contexts.

(34) ...Dan bašan be-šein-av "et dešer mazasa ha-zacilim. Pitoš, pro
   hšš miša caka ve hešel la-ruc le-ševera. Kašavor šniyot šurot kvar pro
   haya bššinim, šaxuv "al ha-šrema ke-sikor...

   ...Dan examined with his eyes the door to the eggplant store-room.
   Suddenly, he let out a scream and began to run towards it. After several
   seconds, he was already inside, laying on the pile like a drunkard...

The difference between the Benoni and the third person forms can be dealt with as follows. In the tensed third person forms, V reaches Tense0 and fails to raise to Person0 because Person0 is weak. In (33) and (34), the Person node is 'strengthened' by some form of non standard binding or control, which supplies it with features through coindexation with an appropriate antecedent. Thus
strengthened, Person\textsuperscript{0} now attracts V-Raising and V moves from Tense\textsuperscript{0} and adjoins to Person\textsuperscript{0}, coming thus to govern its specifier and licensing pro.

In the Hebrew, to recall, it was a weak Tense node which blocked movement to Person\textsuperscript{0} by the HMC. Thus, even if non-standard binding/control can strengthen Person\textsuperscript{0} so that it could attract V-Raising, as in the tensed forms, the weak Tense\textsuperscript{0} node would still constitute a barrier to such movement. V-Raising would then be blocked and pro could not be governed in Spec/Person\textsuperscript{0}.\textsuperscript{22}

5.5 Weak Nodes and Null Nodes

Before concluding this section, let us briefly attend to the more general problem of how to distinguish weak agreement nodes (e.g., the person node in the Hebrew third person) from nodes which are phonetically null yet syntactically strong, e.g., the gender node in the Hebrew first person, which allows movement through it up to Person\textsuperscript{0} or the gender node in the non-participial verbal forms in Romance.

I believe that the language learner can deduce that the gender node in Hebrew and Romance is strong, albeit being morphologically null, because s/he has evidence that V has raised to Person\textsuperscript{0}. Given the HMC, V must have gone through Gender\textsuperscript{0} and Number\textsuperscript{0} first.

On the other hand, the morphological poverty of the Hebrew third person past form will lead the language learner to conclude that it is weak and not merely unspecified. This is so because the other person nodes are all phonetically non-null and, unlike the case of the gender node, there is no other evidence for V-movement to Person\textsuperscript{0}.

A speculation we can entertain at this point is that the language learner assumes that V-Raising applies all the way up to Person\textsuperscript{0} in the unmarked case. The unmarked cases being, on the one hand, languages with full agreement such as Italian and on the other hand, languages without any agreement whatsoever, e.g. Chinese. (It follows that both languages have pro-drop for the same reason: Spec/Person\textsuperscript{0} is lexically-governed at S-structure.\textsuperscript{23}) When a language has partial agreement (i.e. English, French, Hebrew) it is marked and positive evidence must be gathered to determine the extent to which V raises.

In this section, I have tried to show that the analysis of agreement developed in this paper can account for the range of null subject data in Hebrew without recourse to pro-specific rules. The connection between rich inflection and the distribution of pro was made to follow entirely from the theory of government; like NP-trace and variables, pro must be lexically-governed.

\textsuperscript{22} We imply that Tense\textsuperscript{0}, unlike Person\textsuperscript{0}, cannot be bound or controlled. This makes intuitive sense if binding and control are properties of referring elements.

\textsuperscript{23} But see Aoun and Li (1989) where it is explicitly argued that V does not raise to Infl at S-structure.
6 Agreement and Word Order Variation in Arabic

6.1 VSO-Word Order and the Position of the Clausal Subject.

Section 1 described and illustrated the basic word order paradigm in Arabic. To recall, when the verb comes before the subject, it is inflected only for gender and when the subject comes before the verb, the verb bears full, i.e., gender, number and person agreement.

Thus, in the framework of the theory developed in the previous sections, the verb in V-initial clauses, moves only up to Gender\textsuperscript{0}, while it moves all the way up to Person\textsuperscript{0} in the subject-initial clauses.

If the verb moves only up to Gender\textsuperscript{0} in V-initial clauses, it must be the case that the subject is in a position lower than Gender\textsuperscript{*} at S-structure. Under this approach, then, the VSO-hood of Arabic is due not to a V-Raising transformation which moves V to C, as argued, for example by Sproat (1985) for Welsh or Shlonsky (1989b) for Arabic. Rather, VSO order results from base-generation of the subject in VP and subsequent raising of V, as argued in Demirdache (1989).

I will assume that the subject is base generated in Spec/V\textsuperscript{0}. As a first hypothesis, then, consider the following derivation of V-initial clauses in Arabic, (35).

![Diagram]

The main question which arises here is why the verb fails to move higher than Gender\textsuperscript{0}. One cannot simply say that V fails to raise higher than Gender\textsuperscript{0} because other inflectional nodes are weak. First, this is not entirely true, since Tense/Aspect\textsuperscript{0} is actually strong in indicative root sentences such as those in (1) and (2) above. In more general terms, such a line of reasoning works for French/English (cf. Section 2), but its application to Arabic begs the question. This is so since full inflection is available once the subject is fronted, so the nodes are not inherently weak as they presumably are in English. Rather, their weakness in Arabic should be viewed as a morphological reflex of the impossibility of verb raising.
Under Chomsky's Least Effort Guideline, which is central to his analysis of V-Raising in English and French, V-Raising is obligatory unless impossible. This means that unless something prevents V from raising, it must raise, since otherwise the inflectional features will lower and at LF the entire amalgam will be raised again. Such a derivation involves more steps and is hence more complex and less valued than one where the verb raises directly and adjoins to the relevant inflectional X0s.

It follows, then, that V does not raise higher than Gender0 not because it optionally chooses not to, but because it is blocked from doing so. We must attempt to discover why this is the case.

As a first step, consider why V raises raises at all? Why does it not simply remain in VP?

The latter question can be answered by referring back to the analysis of Hebrew infinitives in 4.4. There, it was argued that a consonantal verbal root raises in Semitic to ꞌahead ꞌ to link with a melody and a skeletal tier. If V must move out of VP in order to amalgamate with ꞌahead ꞌ, why does it stop at Gender0 and not raise all the way up to Person0?

My capsule answer to this question is as follows. In addition to amalgamating with the contents of ꞌahead ꞌ, V must lexically support the node which Case marks the subject. Under the assumption that (in VSO languages) Case is assigned rightwards, i.e. in the direction of canonical Government, (Sprout (1985)) it follows that V must move to the right of the subject before S-structure.

As it stands, though, V governs the subject from its position in ꞌahead ꞌ. Yet it does not remain there but obligatorily raises further to Gender0. This is because Gender0, though not ꞌahead ꞌ, is endowed with Case features. More generally, I adopt the standard assumption that Case is assigned (actually, checked) through agreement coindexing. While ꞌahead ꞌ contains inflectional and derivational information crucial to the S-structure in which V appears, it is not, strictly speaking, an agreement node and thus plays no role in nominative Case marking. V raises to adjoin a node which can Case mark the subject. The first such node is Gender0. It need not move any further since gender agreement already establishes the coindexing necessary for Case checking. Raising higher (to Number0, for example) stands in violation of the Minimal Effort Guideline.

Yet Gender0 does not govern the subject of Spec/V'. The subject must itself raise to a position in which it would be governed by Gender0 in the canonical direction. Consequently, movement takes place from Spec/V' to Spec/ ꞌahead ꞌ, as diagrammed in (36).24

24 I thus follow Demirdache (1989) in arguing that both V-Raising and NP-Movement take place in the derivation of V-initial clauses.
Insofar as V-Raising is Case-driven, we predict no movement of V beyond \( \text{\textsuperscript{10}} \) if the subject can get Case by some other means. Interestingly, when the subject is non-adjacent to the verb, i.e., when a subcategorized PP or an adjunct appear between the verb and the subject, the verb optionally manifests no agreement at all with its subject.

Consider (37). In (37a), V agrees in gender with the subject, an instance of the phenomenon we have been examining up till now. In (37b), however, the verb appears in its third person masculine singular form, an agreement-less, 'impersonal' form, while its subject is feminine.

(37) a. \( \text{\textsuperscript{10}} \) at \( \text{\textsuperscript{10}} \)ay-na Maryam.
   \text{come-PAST to-us M.}
   'Maryam came to us.'

b. \( \text{\textsuperscript{10}} \)ay-na Maryam.
   \text{come-PAST to-us M.}
   Same as (a).

I believe (37a) to be an instance of V' Reanalysis of V and the PP, an extension of Larson's (1988) analysis of English Dative Shift. I discuss dative constructions in Arabic and Hebrew in a separate chapter. Suffice it to say, at this point, that V+PP is reanalyzed as a V which then raises to \( \text{\textsuperscript{10}} \) and to Gender\( \text{\textsuperscript{0}} \); the subject is moved to Spec/\( \text{\textsuperscript{10}} \) where it is Case marked. Modulo V'-Reanalysis, then, (37a) is derived just like the cases of standard VSO clauses we have been examining.

In (37b), V' Reanalysis does not take place (its optionality is crucial for Larson's analysis of the alternation between datives and double objects.) The subject is not in Spec/\( \text{\textsuperscript{10}} \) at S-structure. If it were, it would be Case marked by Gender\( \text{\textsuperscript{0}} \) and gender agreement would be manifested on V. Rather, the subject is shifted rightwards (extraposed) over the PP and adjoined to VP, as in (38).
In the adjoined position, the subject cannot get Case from Gender\(^0\). In Arabic, NP’s which cannot receive Case configurationally (under government) are assigned default nominative Case (Ayoub (1980).) This is clearest with clause-initial topics and left-dislocated NP’s. It is reasonable to assume that the mechanism which assigns default nominative to a topic is employed in this case as well.

To recapitulate, the main point is that V must raise to Gender\(^0\) only if Gender\(^0\) is needed as a Case assigner. If a subject receives default Case, V can raise to \(\hat{\nu}\) and nothing forces it to move higher.

6.1 SWO Word Order in Arabic

(This section will be further expanded)

In the Basran tradition, suppose that preverbal subjects in Arabic are left-dislocated, adjoined to Person\(^-\) and associated with null (resumptive) pronoun in Spec/Person\(^-\). (cf. Ayoub (1980), Demirdache (1989) and many others. Contra Shlonsky (1989b))

Pro in Spec/Person\(^-\) must be lexically governed (cf. 5.3). This forces V to raise all the way up and adjoin to Person\(^0\). The result is full agreement on V.

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