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ARABIC WORD SYNTAX

PETER HALLMAN
hallman@humnet.ucla.edu

Recent research in syntax has underscored the importance of lexical features in determining the form of a syntactic derivation. Syntactic operations target features, and movement of syntactic categories is parasitic off of feature movement. An intriguing question in light of these developments is what exactly the difference is between a feature and a syntactic category. Based on structural effects of the distribution of features within prosodic words, this study shows that there is a one-to-one correspondence between features and syntactic categories. The internal structure of words is visible to syntactic operations, which are responsible for the derivation of the surface ordering of the pieces of morphology. Consequently, there is no autonomous morphology.

1. INTRODUCTION

This paper discusses the syntax-phonology interface, primarily in Arabic. It advocates a 'no autonomous morphology' model of grammar, in which the mapping from syntax to phonology is direct. This idea is related to the Mirror Principle (Baker 1988) which states that the ordering of morphemes at spell out is a direct reflection of their syntactic ordering, as well as Kayne's (1994) notion of correspondence between linear and hierarchical order. The present study differs from previous attempts to subsume morphology under syntax in that morphemes and words are not considered syntactic objects. Syntax manipulates only features, which are grouped into morphemes and words *after* syntax. This model is opposed, at least to some extent, to the theories of Halle and Marantz (1993) and Noyer (1992) and others, which give the morphological component of grammar a great deal of power to alter word structure. I will show that the morphological component in the theories of Halle and Marantz and Noyer requires so much power to attain descriptive adequacy because the theory of syntax they assume (Chomsky 1993) is debilitated by the assumption that the smallest element a syntactic operation may affect is the prosodic word/morpheme. A different formulation of syntax, where prosodic words are epiphenomena of the end juxtaposition of features in syntax, obviates a non-trivial morphological component in the theory of grammar.

The motivation for this line of reasoning is that the syntactic approach to morphology has generated important results in the past,

notably, for example, Chomsky's (1957) 'affix hopping' analysis of English verb complex formation. In the affix hopping analysis, a verb locally selects the tense/aspect *affix* of the immediately subordinate verb independently of the subordinate verb itself. This formulation is correct in that the subordinate verb indeed does not play a role in the selection of its own affix. The surface order of the subordinate verb and its affix is derived transformationally. Models of syntax in which affixes come prepackaged in words do not predict the irrelevance of the category 'word' to syntactic dependencies such as affix selection. A word-based theory of affix selection is unsound because it fails to explain why the word-mate subordinate verb fails to play a role in affix selection. Research on the configurations in which sublexical[1] elements enter in isolation into syntactic dependencies is motivated by the prospect of bringing such research to bear toward the reduction of unsoundness in the theory of grammar. In a syntactic framework with features as basic elements and without syntactic prosodic grouping, the following hypothesis will be shown to be tenable:

- *The syntax-phonology interface is direct:* the linear ordering of elements that syntax presents to phonology at spell out is not alterable by morphological operations[2], i.e., there *are* no morphological (i.e. post-syntactic) ordering operations, i.e., there is no morphology in the traditional sense[3], only syntax and phonology.

The empirical domain in which this hypothesis will be tested is Arabic inflectional morphology. Much of what is expressed as affixal morphology in other languages is expressed as alterations of prosodic structure in Arabic. Different 'templates' correspond to different aspects of meaning such as plurality (ḥakiim (*doctor*)→ḥikamaa (*doctors*)), causativity (katab (*write*)→kattab (*make write*)), syntactic category (ðakar (*remember*)→ðikr (*memory*)), etc. I show that Arabic nouns and verbs can be decomposed into pieces of segmental and prosodic structure whose ordering is not only describable in syntactic terms, but whose description in syntactic terms explains both semantic and morphological properties of prosodic alternations which can only be stipulated in a non-syntactic approach. I show this for imperfective

[1] Specifically submorphemic elements, i.e. features, which may coincidentally correspond to morphemes when a morpheme expresses exactly one feature.

[2] Infixation of one morpheme into another may represent a single exception to this generalization. But infixation is a phonological operation.

[3] It's not clear that the algorithm that groups features into morphemes and morphemes into words is purely phonological, since it references the lexicon, unlike e.g. the operation that changes /s/ to [z] in /car/+/s/. But if it is a misnomer for this reason to say that there is no morphology, it doesn't bear on the hypothesis that the mapping from syntax to phonology does not reorder elements of any kind.

verbs in section 3.2, and for nouns and adjectives in sections 3.1 and 3.3. The goal of the research program introduced here is ultimately to provide a complete phrase structure grammar (with movement) for Arabic derivational and inflectional morphology which conforms to the hypothesis above.

But because the idea that syntax is projected from a lexicon whose entries are words (→word formation is not syntactic) requires an autonomous morphology module, the hypothesis that the syntax-to-phonology mapping is direct cannot be evaluated in the lexicalist theory of syntax described by Chomsky (1993/1995). For this reason, the hypothesis will be evaluated in a syntactic framework modified slightly from the Minimalist framework, mostly along lines advocated by Halle and Marantz (1993), Koopman (1998) and Sportiche (1996). An important point in this connection is that all of these modifications are argued independently of the hypothesis. I.e., none of the modifications required to test the hypothesis presupposes the validity of the hypothesis.

The following section discusses these preliminary issues. Section 3 presents an analysis of Arabic inflectional morphology illustrates both how the feature-based 'no autonomous morphology' approach works and its explanatory value.

2. Preliminary Discussion

2.1 *Feature-Based Syntax*

Much recent research in syntax has pointed toward the atomization of complex properties in syntax. Ritter (1991) and Carstens (1991) present evidence that the feature 'number' is an independent head within the noun phrase. Giusti (1995) claims the same for the feature 'case'. Both of these features regularly form a prosodic word with the noun they are features of. Abney (1987) shows that definiteness is instantiated in an independent head within the noun phrase, though in Arabic the definite article prosodically associates to the noun and is copied in agreement configurations the noun enters into. The logical conclusion of this trend is proposed by Koopman (1998), who claims that every feature heads its own projection.

That syntactic operations manipulate features is a conventional assumption. For example, the wh-feature triggers wh-movement (den Besten 1983), the case feature triggers case-movement (Mahajan 1990), semantic features trigger QR (Beghelli and Stowell 1995), etc. In the Minimalist Program, syntactic operations such as wh-movement, case-

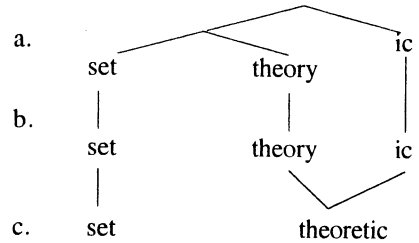
movement, etc., operate on features. However, features enter the derivation as words, already in their prosodic grouping (the 'numeration' consists of words), and the prosodic grouping is preserved under all syntactic permutations. In particular, if an operation moves a feature of an affix, the entire word with which the affix is associated moves with it. So while the features of the prosodic word like case, number, etc. are spread out over several projections, the prosodic word moves from projection to projection, checking a feature each time. This algorithm requires a principle like the Mirror Principle, which ensures that the ordering of features within the prosodic word mirrors the order in which the features are checked, i.e., their syntactic ordering. This system contains three redundancies. Each feature is redundantly instantiated twice, once in the prosodic word and once in its own projection; checking movement is motivated only theory internally; and the Mirror Principle is redundant with the syntactic ordering itself. These redundancies are eliminated by the elimination of the idea that features enter the derivation as words[4]. Words are composed across projections from the ordering of heads in the syntax itself without movement.

Specific empirical evidence also motivates the elimination of the pre-syntactic prosodic grouping of features. The idea that words are the basic components of syntactic structures leads to paradoxes in connection with expressions like *set theoretic*, whose prosodic grouping is '[[set] [theoretic]]' but whose syntactic/semantic grouping is '[[set theory] ic]]'. In the approach taken here, *set theoretic* consists of the features[5] *set, theory,* and *ic* in the hierarchical order in (1a). These features are mapped onto a linear order of morphemes (1b) which in turn is divided into prosodic constituents (1c).

[4] Of course, this elimination makes it necessary to say at some other level what a word is. If the observation of a word boundary ever motivates the postulation of a syntactic partition, the partition is also only motivated theory internally, and is redundant, just like the word based approach. It is therefore an important criterion in the present study that word structures always be motivated independently of word boundaries.

[5] I treat word stems as lexical features. The affix *-ic* is a spell out of an abstract adjective feature.

(1)



This structure is an ordering of features.

This ordering of morphemes is read off the syntax

Phonology groups the ordering read off the syntax into prosodic words

The clumping together of morphemes into prosodic words is partially caused automatically by a stress assignment algorithm and partially by rebracketing as described in Marantz (1988), who claims that a morpheme may prosodically associate with the head of a related phrase under adjacency, as *-ic* does with *theory* in (1). While more needs to be said about the syntactic structure and the basis for the prosodic grouping, creating a derivation that goes in the other direction (from the prosodic grouping at the bottom to the syntactic structure at the top) is not obviously possible at all, hence appellation 'bracketing paradox'. Bracketing paradoxes represent *a priori* evidence against the idea that prosodic words are basic units of syntax.

A similar problem is presented by cases such as in (2).

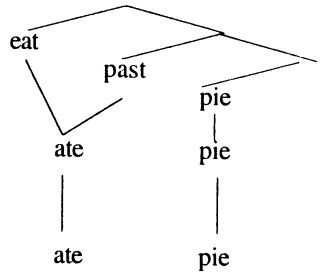
(2) John ate pie, but Mary didn't.

The VP of the second clause (*but Mary didn't*) has been deleted. It's content is anaphoric on the VP of the first clause (*John ate pie*). But the gap in the second clause should read *eat pie* (viz. *John ate pie, but Mary didn't eat pie*). The gap does not include tense, which is expressed on a dummy verb in the second clause as *did*. But the phrase *eat pie* does not occur in the first clause overtly. Tense has merged with the verb in the first clause. The resolution to this problem is the proposal that the merger between tense and the verb in the first clause is PF merger. In the syntax, tense and the verb are distinct, and the VP *eat pie* excluding tense is available as an antecedent for the gap in the second clause. Again, a paradox is avoided by the elimination of prosodic words from syntactic structures.

The irrelevance of tense to the identification of the gap is like the irrelevance of a stem to affix selection in the English verb complex (discussed in section 1). Again, a word-mate morpheme is invisible to

a syntactic dependency. Though, like the Minimalist approach to affix selection, it may be possible to formulate a word-based analysis of the identification of deleted VPs, such an approach is unsound compared to an approach which syntactically separates tense and the verb at the level of representation at which identification takes place, because it predicts the possibility of an interaction between tense and gap identification, contrary to fact.

(3)



This structure is an ordering of features

This ordering of morphemes is read off the syntax

Phonology groups the ordering read off the syntax into prosodic words

The fundamental argument against the presence of prosodic words in syntactic structures is that phonological form never feeds syntactic dependencies. While features such as case may trigger movement, no movement rule is triggered by a phonological property of a word, for example the property of beginning with /s/ or ending in /f/ etc. The absence of phonological information in syntax explains this phenomenological gap. Syntax is not even sensitive to the phonological form of the features it manipulates, much less their prosodic grouping.

2.2 *Selection*

Lexical dependencies obtain under selection (Chomsky 1981). When we say INFL is the complement of C, V is the complement of INFL, we stipulate the hierarchical order of C, INFL, and V as lexical properties of these heads: C selects INFL, INFL selects V. Selection expresses obligatory cooccurrence. When an element selects another element, they form a constituent (at some level). A head selects its sister (Chomsky 1981) and its sister's specifier (Larson 1988), who proposes that objective case is assigned by a verb to a noun in the specifier of the case assignor's complement). I adopt Larson's "traditional" view of case assignment (it obtains under government) instead of the contemporary checking approach. Checking obtains when two features cancel each other under locality. For example, the nominative feature in AgrS cancels the nominative feature of a DP in

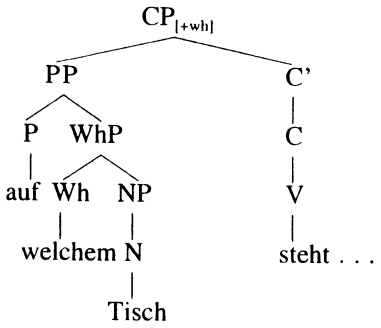
[spec,AgrSP]. However, there is no evidence that a nominative feature exists outside the subject DP. Neither tense, which correlates with subjecthood across languages, nor its host the verb, nor complementizers, which sometimes interact with subjecthood, bear case morphology across languages. The idea that a nominative subject matches AgrS in case as it matches in number and gender, which *do* have an external reflex on the verb (subject agreement morphology) is not corroborated. I propose nominative case is selected by the element with which it always co-occurs, namely tense, in the specifier position of the complement of tense, a structure essentially like that proposed by Pollock (1989).

Elements that covary do not always appear adjacent. I treat such cases in the transformational tradition, postulating that the elements which covary do form a (local) constituent at some level of representation, but that movement either dissociates the constituent when it exists at D-structure, or forms the constituent when it exists at LF. Movement may relate an element to multiple selectors across levels of representation. Though feature percolation is an often used device for characterizing relations between discontinuous but covarying elements, it is not a sound device, as I argue below. The argument against feature percolation is important for the analysis of noun phrases discussed in section 3.1, since the unavailability of feature percolation in a syntactic approach to morphology strongly constrains possible analyses.

The primary argument against feature percolation is that it does not predict the unaffectedness of nodes along the path of percolation. Consider (4a), from Standard German. The prepositional phrase is in the specifier position of a [+wh] COMP, as diagrammed in (4b).

(4) a. Auf welchem Tisch steht die Vase?
on which table stands the vase
'Which table is the vase on?'

b.



The wh-head in the prepositional phrase matches the value of the [+wh] CP. But PP intervenes between WhP and CP. The standard account for feature matching between WhP and CP in spite of non-adjacency is feature percolation from WhP to PP, which itself is in the spec-head relation required for feature checking.

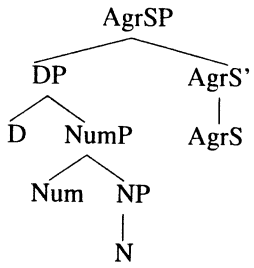
Percolation of the [+wh] feature from the wh-element to PP could be expected to affect the form of the preposition. I.e., there could be a wh-preposition 'on' morphologically distinct from a non-wh-preposition 'on'. Since heads normally covary with features in their local domain (e.g. selection, agreement), the fact that, in feature percolation contexts, no elements along the path of percolation covary with the features being percolated can only be considered coincidental. But this gap is surely not coincidental. The gap exists because features do not 'pass through' syntactic structure. Feature percolation is unsound because it does not predict this empirical gap.

Movement, however, does not predict any interaction between a moved element and the material between the base position and the landing site, since no information about the moved element is represented in any intervening node. Movement is a sound approach to these dependencies, whereas feature percolation is not (it overgenerates).

Further, feature percolation is redundant with movement in the majority of cases. Both operations have the same function, to move a feature from its base position to a selector, and both are subject to the same constraints, as demonstrated below.

In (5), a DP containing a projection of a noun and a projection of the feature 'number' (Carstens 1991), (Ritter 1991) is in [spec,AgrSP], a configuration argued by Chomsky (1993) to underlie subject verb agreement (the Agr head ends up as a verbal suffix).

(5)



In this configuration, the value of NumP matches the number feature of AgrSP. This matching relation seems to extend over the intervening node DP. A typical solution to the problem of intervening structure in this configuration is percolation of the number feature from NumP to DP, where it is local to AgrSP. One question the percolation proposal raises is why the DP needs to move to AgrSP at all. If the number feature (and case feature, d-feature, etc., i.e., all the features that characterize subjecthood) can percolate to DP, why can't they percolate to AgrSP from the DP's base position, allowing the DP to appear in its base position at S-structure, a position separated from the auxiliary in AgrSP by certain adverbials[6], generating e.g. (6). (6) depicts the licensing of number and case features through feature percolation from the base position without any alteration of the base word order.

(6) *has$_i$ probably already [$_{DP}$ the *Num$_i$* plumber] repaired the faucet.
(Intended: 'The plumber has probably already repaired the faucet.')

[6] While a common treatment of the VP-internal subject hypothesis is that subjects are generated in [spec,VP], to the right of manner adverbials, no correlate of subjecthood appears to the right of manner adverbials in English, e.g. floated quantifiers.

(i) The children <all> carefully <*all> died the easter eggs.

I adopt Diesing's (1992) view that the subject is in its base position in 'existential-there' constructions, to the right of certain temporal and conditional adverbials but to the left of manner adverbials. However, this position is not VP internal, as she claims, insofar as manner adverbs mark the left VP edge.

The restriction apparently blocking (6) is that DP is a barrier for feature percolation. A feature may percolate up to DP, but if it needs to percolate past DP, it can't. Instead, DP itself must move to any DP-external element that selects a DP-internal feature[7].

DP is also a barrier for movement, as (7) shows.

(7) *What$_i$ did John like [$_{DP}$the painting of t_i]?

According to the argument developed here against feature percolation, (6), in which feature percolation has illicitly carried subject features across a DP boundary, is analogous to (7), in which movement has illicitly carried a wh-element across a DP boundary. Restrictions on feature percolation and movement overlap here: neither may cross DP.

Consider also the German case of fronting of PPs containing a wh-element, illustrated in (4). The situation in (4) is similar to that in (5). The wh-feature of WhP is postulated to percolate to PP in order to be in the spec-head relation required by the head of the [+wh] CP The wh-head in the prepositional phrase matches the value of the [+wh] CP. But PP intervenes between WhP and CP. The standard account for feature matching between WhP and CP in spite of non-adjacency is feature percolation from WhP to PP, which itself is in the spec-head relation required for feature checking. (8) shows that feature percolation cannot carry the wh-feature to the wh-licensing CP from the base position of the PP, licensing the wh-feature with no alteration of the base word order.

(8) *Steht$_i$ die Vase [$_{PP}$ auf welchem$_i$ Tisch]?
stands the vase on which table

PP must move to the wh-licensing position (4a), showing that the wh-feature may move to PP, but not past PP. PP is a barrier for feature percolation.

(9) shows that PP is also a barrier for movement. A wh-phrase may not move out of a prepositional phrase, even to a wh-landing site.

(9) *[$_{WhP}$ Welchem Tisch]$_i$ steht die Vase [$_{PP}$ auf t_i] ?
which table stands the vase on

[7] The form of this argument is: if you observe a feature percolate to a certain node, then that node in turn *moves* to a licensing position for the percolated feature, then movement must be motivated by the inability of the feature to percolate past the node that moves. Therefore, the node that moves is a barrier for feature percolation.

Again, the constraints on movement and feature percolation are the same.

The constraint on movement out of PP is relaxed in English and in some dialects of German, but not the constrain on percolation.

(10) a. [$_{WhP}$ Which table]$_i$ is the vase [$_{PP}$ on t_i]
b. *Is$_i$ the vase on [$_{PP}$ on which$_i$ table]?
(Intended: 'Which table is the vase on?')

Likewise, weak DPs allow extraction, but not feature percolation.

(11) a. What$_i$ did John like [$_{DP}$ a painting of t_i]?
b. *has$_i$ probably already [$_{DP}$ a *Num*$_i$ plumber] repaired the faucet

(10) and (11) indicate that barriers for movement and feature percolation are sometimes more lenient with movement than with feature percolation. The gross overlap in the conditions on feature percolation and movement nonetheless corroborates the argument against feature percolation, especially in light of the following observation.

Feature percolation also obeys the Coordinate Structure Constraint (Ross 1967). The wh-feature of the first conjunct in (12a) cannot percolate to the preposition *wegen* unless percolation also obtains out of the second conjunct (12b). English examples of the same type are given in (13). In fact, percolation cannot even move a feature of only one conjunct to the coordinating node itself, as the ungrammaticality of the English translation of (12a) shows.

(12) a. *Wegen [welchem Hund und der Katze] beschwert sich Hans?
about which dog and the cat complains refl. Hans
('*Which dog and the cat does Hans complain about?')

b. Wegen [welchem Hund und welcher Katze] beschwert sich Hans?
about which dog and which cat complains refl. Hans
'Which dog and which cat does Hans complain about?'

(13) a. *The cover of [which biography and the novel] did John admire?
b. The cover of [which biography and which novel] did John admire?

(12) and (13) are analogous to (14), which show that movement out of a coordinate structure is illicit unless a gap occurs in both conjuncts, i.e. movement out of only one conjunct is prohibited.

(14) a. I wonder who$_i$ [John hit t_i] and [Bill kicked t_i].
b. *I wonder who$_i$ [John hit t_i] and [Bill kicked Fred].

Again, constraints on movement and feature percolation overlap.

In general, movement and feature percolation are both feature moving operations and are restricted by analogous constraints. The present study adopts the premise that selection is local and excludes feature percolation on the basis of both its incompatibility with the premise that selection is local and the fact that it is redundant with movement. The complex matter of how to formulate the dependency between NumP and AgrSP in (5) and WhP and CP in (4), etc., in terms of movement is addressed in the following section.

3. Syntactic Analysis of Arabic Morphology

3.1 *Arabic Inflectional Morphology: Nouns and Adjectives*

The exclusion of feature percolation as a mechanism for agreement opens up the problem of how to formulate such dependencies at all. However, the decomposition of prosodic words into hierarchies of features allows for an analysis of agreement in terms of structural isomorphy of agreeing trees. This approach says that an element agrees with another element when the syntactic subtree containing all and only the agreeing features of the first element is identical to the subtree containing all and only the agreeing features of the second element. Two trees are identical when they contain the same nodes in the same hierarchical order. Such an approach assumes that agreeing elements are in fact structurally isomorphic, which I show for Classical Arabic nouns and their modifiers below.

Classical Arabic nouns occur in the morphological template illustrated in (15a). The template in (15a) does not include a word final particle termed *tanwiin* which occurs with certain combinations of

definiteness, number and stem, because I do not have a complete theory of the *tanwiin* contexts to present at present.

(15) a. definiteness - stem - number - gender - case
b. al - ṭaalib - aa - t - u
def - student - pl - fem - nom
'the students (fem)'

Because case is selected by a noun-phrase external element, I propose it is base generated in the syntactically highest position in the noun phrase. Also, following the idea that inflectional systems are 'extended projections' of lexical heads (Grimshaw 1991), I propose that the stem is base generated in the syntactically lowest position in the noun phrase.

As for the D-structure ordering of number and gender, note that there is a universal implicational order of these two features, namely Greenberg's (1963) universal 36: "If a language has the category of gender, it always has the category of number." Number and gender are, in effect, hierarchically organized, such that if gender distinctions are present, number distinctions must also be present, but not vice versa. The syntactic approach to inflectional morphology makes it possible to translate the feature hierarchy directly into a syntactic structure. Gender selects number, and not vice versa, universally. Hence, whenever gender is present, number must be present, because gender selects it. The D-structure from which the ordering in (15) is derived is that in (16), where case is instantiated in CaseP, definiteness in DP, gender in GenP, number in NumP, and the stem in NP[8].

(16) [CaseP [DP [GenP [NumP [NP]]]]]

Movement of NP to [spec,NumP], NumP to [spec,GenP] and DP to [spec,CaseP] generates the surface ordering in (15), illustrated in (17).

(17) [[DP [[[NP] NumP] GenP]] CaseP]

I propose these three movement rules on the basis of the argument for (16) and the givenness of the distinct surface ordering (that the constituency in (16) obtains at D-structure, and not at LF via covert movement, is defended below). This analysis differs from traditional

[8] Regarding the mapping to linear order in these trees and others in this paper, I adopt the Linear Correspondence Axiom of Kayne (1994), which states that linear precedence at spell out is a function of hierarchical order in syntax. When an element E_1 is mapped to morpheme M_1, and an element E_2 is mapped to a morpheme M_2, and E_1 asymmetrically c-commands E_2, then M_1 precedes M_2.

analyses of nominal morphology in that it does not make use of head movement. Marantz's (1988) rebracketing algorithm, which I pointed out generates *[[set][theoretic]]* from *[[set theory] ic]*, obviates a traditional motivation for head movement, namely word formation. Given the possibility of this rebracketing, it is not true that every prosodic word must be dominated by an X^0 category, hence word formation does not motivate head movement in (16). I make use only of phrasal movement here, since phrasal movement is demonstrably required in the noun phrase in a certain case which I discuss in section 3.3.

The structures in (16) and (17) also structurally instantiate another of Greenberg's universals, namely universal 39: "Where morphemes of both number and case are present and both follow or both precede the noun base, the expression of number almost always comes between the noun base and the expression of case." Because case is selected by an outside element (a verb or tense), it is the syntactically highest element in the noun phrase. Because it is highest, it is 'outside' of other morphology, in accordance with the Mirror Principle, which states that the ordering of morphemes with respect to a base mirrors their hierarchical ordering. The locality of selection requirement in the structural approach to morphology explains this linguistic universal.

So far I have assumed without discussion that (16) is a D-structure and not a logical form. Suppose we wanted to explain the surface non-locality between the case particle and its outside selector by saying that case is generated discontiguous from the outside selector, but moves to its selector non-overtly. Then the position of the case particle is no longer a visible reflex of the (syntactically high) position of the selector. But the position of case *does* reflect the scopal order, whence universal 39. Also, the structural instantiation of universal 36 is arguably a D-structure relation. Suppose we wanted to explain the surface ordering of number and gender (num < gen) by claiming that number selects gender at D-structure, but we still wanted to explain the impossibility of the absence of the number category in a system with a gender category syntactically by saying that gender selects number, but non-overtly in a derived level of representation. Then we have to systematically fail to spell out gender when it is selected by a number category which is never spelled out, which amounts to restating the generalization. If selection of number by gender obtains at D-structure, number is required when gender is present, but not vice versa, as universal 36 states. For these reasons, the structure in (16) is a D-structure.

Adjectives agree with the nouns they modify in definiteness, number, gender, and case, and these features appear on adjectives in the same surface template as nouns, and in lieu of some reason to believe adjectives have a different D-structure, I assume they are the same.

(18) al - ṭaalib - aa - t - u — al - ðakiyy - aa - t - u
def-student-pl-fem-nom — def-intelligent-pl-fem-nom
'the intelligent students'

Verbs agree with subjects in gender and number. Agreement morphology is suffixal in the perfective tense. It is circumfixal in the imperfective, but the deep order gender > number is preserved (the imperfective is discussed in section 3.2).

(19) al - ṭaalib - aa - t - u — xaraž - na
def-student-pl-fem-nom — left.perfect-pl.fem
'The students left.'

(18) and (19) show that agreeing features of nouns, verbs, and adjectives indeed appear in structurally identical configurations in their respective trees, meaning agreement is directly characterizable in terms of isomorphy of structure (though the lexical heads themselves differ in category; but some form of referential identity is still required, as discussed below). In (20a) an adjective whose root node is CaseP is isomorphic to, and therefore agrees with, a noun whose root node is CaseP. In (20b), a tree containing a verb whose root node is GenP is isomorphic to, and therefore agrees with, a subtree of a tree containing a noun whose root node is GenP.

(20) a. $[_{\text{CaseP}}$ al - ṭaalib - aa- t - u] $[_{\text{CaseP}}$ al - ðakiyy - aa - t - u]
b. al - $[_{\text{GenP}}$ ṭaalib - aa - t] - u $[_{\text{GenP}}$ xaraž - na]

Keenan (1998) defines 'tree' as in (21). Agreement between trees is just identity, as in (22).

(21) A tree T is a pair (N,D) where N (nodes) is a set and D (dominates) is a binary relation on N satisfying (i)-(iii): (i) D is a reflexive order, (ii) there is a node r (root) which dominates every node, and (iii) for all nodes x, y, and z, if x dominates z and y dominates z, then either x dominates y or y dominates x.

(22) A tree T agrees with a tree T' if T=T' (i.e. if, for T=(N,D) and T'=(N',D'), N=N' and D=D')[9].

[9] This definition ignores the difference between a node and its lable, a difference which needs to be taken into account in a more precise statement of identity.

Morphological agreement obtains in (20a) by virtue of the identity of the two CasePs and in (20b) by virtue of the identity of the two GenPs.

Of course, what we speak of as agreement is really *obligatory* identity. The trigger of agreement is a semantic relation. Adjectives do not agree with nouns they do not modify. When a noun enters the 'predicate of' relation with a verb or adjective, the identity relation is triggered between a subtree whose root node is some extended projection of the noun and a subtree whose root node is some extended projection of the verb or adjective, e.g. GenP in example (20b). Adjectives that modify nouns directly (noun phrase internally) agree with the nouns they modify in case, definiteness, number, and gender, meaning that the local adjective-noun relation triggers identity between the trees whose root node is CaseP (the maximal extended projection of the noun and adjective respectively).

Noun phrase external adjectival modifiers like those that form sentence predicates agree like verbs, i.e., only in number and gender. In (23), the adjective fails to match the subject in definiteness and case (it is indefinite and receives accusative from the verb).

(23) al-ṭaalib-aa-t-u kun-na ðakiyy-aa-t-a-n
def-student-pl-fem-nom were-pl-fem intelligent-pl-fem-acc-indef
'The students (def,pl,fem,nom) were (pl,fem) intelligent (pl,fem)

The connection between locality and the extent of agreement suggests that the choice of the root node of the agreeing subtrees is sensitive to the distance between the two trees. The fact that the distance effect mirrors constraints on movement to some extent suggests that agreement may be reducible to across the board (ATB) movement, which also requires structural and referential identity of the moved constituents. Movement is the operation that forms the 'argument of' relation between a noun and its predicate. Agreement obtains through the (non-universal parametric) necessity of pied-piping additional structure, which then must match because of the identity requirement of ATB. The extent of pied piping is determined by constraints on movement.

Predication is unlike c-selection. When we say AgrS selects T, T selects AgrO, and AgrO selects V (per Chomsky 1993), we stipulate the hierarchical order of these elements, we do not posit a deep semantic relation between them. The semantic relation between T and AgrO (if

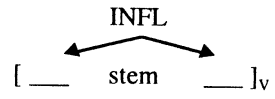
any) is not like the relation between a verb and its object, though both (traditionally) are head-complement relations. An element selects another element when the first requires the second. When we say T selects AgrO we stipulate the ordering of T and AgrO as a formal property of T—it requires AgrO. T selects the subject, which explains why subjects are absent in non-tensed clauses—their selector is missing. But subjects do not enter into a semantic relation with tense. A survey of head-complement relations in any articulated analysis of phrase structure seems to show that selectees are not in general semantically related to their selectors, so I assume they are never semantically related to their selectors, and the predication relation obtains in a configuration other than selection, possibly as a result of a form of movement (ATB) that superimposes the argument on the predicate.

3.2 *Arabic Inflectional Morphology: Verbs*

Set theoretic (1) is an example of a one-to-one mapping of features to morphemes. *Ate* (3) is an example of a many-to-one mapping of features to morphemes. That there are no one-to-many mappings of features to morphemes is more controversial, but the spreading of a single feature (with a certain syntactic exponent) to multiple morphological positions (the syntactic exponents of other features), is not compatible with the hypothesis that there is no non-syntactic reordering. If such spreading is observed, it must obtain in the syntactic configuration which allows such covariation, namely the selection configuration. What follows are two examples what is postulated by Noyer (1992) to be a one-to-many mapping of features to morphemes. I show that the first case doesn't exist and the second case is reanalyzable as a case of syntactic selection.

Noyer analyses circumfixal agreement in the Arabic imperfect (present and future) as splitting of INFL into a prefix and suffix position. These positions are morphological properties of the verb stem.

(24)



(25) Modern Standard Arabic imperfect indicative conjugation

[pers.-gen.-num.]$_{INFL}$	===>	[prefix-*write*-suffix]$_V$
3-m-s		*ya-ktub-u*
3-f-s		*ta-ktub-u*
3-m-pl		*ya-ktub-uu-na*
3-f-pl		*ya-ktub-na*
2-m-s		*ta-ktub-u*
2-f-s		*ta-ktub-ii-na*
2-m-pl		*ta-ktub-uu-na*
2-f-pl		*ta-ktub-na*
1-s		*ʔa-ktub-u*
1-pl		*na-ktub-u*

At first glance it seems as if both the prefix and suffix position are sensitive to all features of INFL. Noyer ingeniously simplifies this paradigm firstly by pointing out that the features '3rd person', 'masculine' and 'singular' are never marked in any category in Arabic and are simply absent from the feature inventory, and secondly by postulating that the prefix *ta*-is homophonous between 2nd person and feminine. The paradigm in (25) then becomes that in (26).

(26)

traditional paradigm	actual features present per Noyer	mapping to morpho-logical positions	prefix-*write*-suffix
3-m-s	-	Ø-*ktub*-Ø	*ya-ktub-u*
3-f-s	f	f-*ktub*-Ø	*ta-ktub-u*
3-m-pl	pl	Ø-*ktub*-pl-*na*	*ya-ktub-uu-na*
3-f-pl	f-pl	Ø-*ktub*-f-pl	*ya-ktub-na*
2-m-s	2	2-*ktub*-Ø	*ta-ktub-u*
2-f-s	2-f	2-*ktub*-f	*ta-ktub-ii-na*
2-m-pl	2-pl	2-*ktub*-pl-*na*	*ta-ktub-uu-na*
2-f-pl	2-f-pl	2-*ktub*-f-pl	*ta-ktub-na*
1-s	1	1-*ktub*-Ø	*ʔa-ktub-u*
1-pl	1-pl	1-pl-*ktub*-Ø	*na-ktub-u*

In the paradigm in (26) the content of the prefix and suffix positions is transparent. *Ya-* and *-u* fill featureless prefix and suffix positions respectively. 'Feminine' and '2nd person' are individually always

spelled out as the prefix *ta-*. 'Plural' is individually always spelled out as the suffix *-uu*. 'Feminine' sometimes appears in the suffix position with 'plural', in which case they are suppleted as *-na*. The feminine plural *-na* is different from an additional *-na* which is suffixed to forms ending in a long vowel, which is unrelated to the content of INFL.

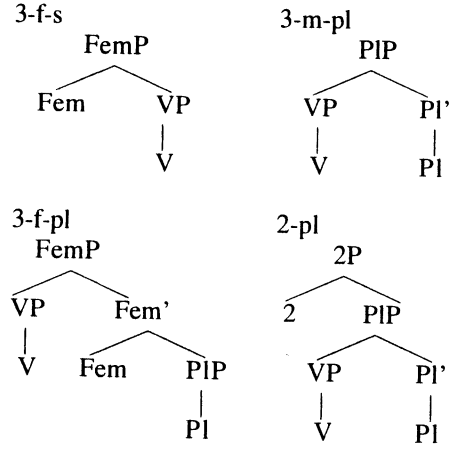
The first form of feature splitting that Noyer proposes–splitting of INFL into distinct prefixal and suffixal morphemes–is obviated by his own analysis, at least in the syntactic framework described in the present study, in which features are never grouped together into a single node, but rather always head their own projections. I propose that the forms in (26) are instances of various possibilities for the position of the verbal stem in a syntactic instantiation of Noyer's hierarchy of features (2>fem>pl>1). Some examples are shown in (27). The distribution of features 'around' the stem is generated by movement of the stem (VP) from a low base position to specifier positions in the inflectional hierarchy[10].

Noyer correctly points out that the hierarchy 2<fem<pl<1 cannot be reordered, generating 'plural' prefixally and 'second person' suffixally for example, so if you know for a certain form that 'feminine' is spelled out suffixally, then you don't have to say that 'plural' is spelled out suffixally, so it is only necessary to say for each agreeing form what the first suffixal feature is. The prefixal features will just be those that precede the first suffixal feature in the hierarchy. However, in the second person, we want to say that the first suffixal feature is the next feature in the hierarchy, after second person, that actually occurs. But then the first suffixal feature in these forms is a function of the prefix, meaning the prefixal features are not just those that hierarchically dominate the first suffixal feature, whatever the latter happens to be. Further, in the first person, there is no 'first suffixal feature', for which case some reference to the end of the hierarchy has to be made, essentially introducing another element to the hierarchy. However, these restrictions can be stated naturally in syntactic terms.

In the syntactic approach, given the syntactic instantiation of the feature hierarchy, it is only necessary to say for each form where the stem (VP) is. But you only have to say once for the first and second person respectively: 'second person' selects the verb to its immediate right, hence all other features are suffixal, since second person is at the top of the hierarchy, and 'first person' selects the verb to its immediate right, hence all other features are prefixal, since first person is at the bottom of the hierarchy.

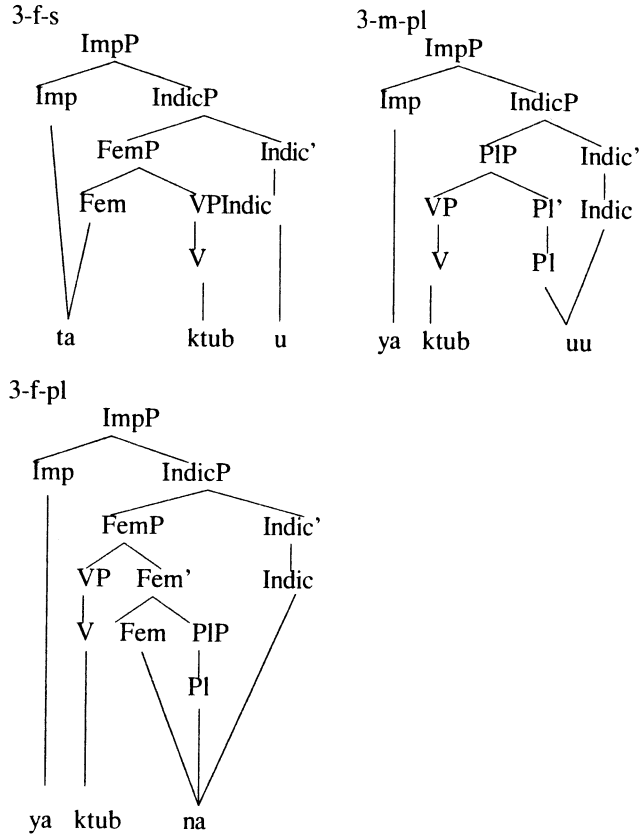
[10] The motivation for the variation in the landing site of the verb is ignored here, because I have not worked it out for all cases.

(27)



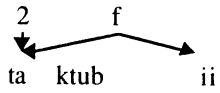
Noyer also does not offer any basis for the fact that the imperfective tense requires both a prefix and a suffix position. But it is the case that the prefix expresses the feature 'imperfective' (there is no prefix in the perfect) and the suffix expresses the feature 'mood' (here indicative: *u* $\rightarrow$*a* in the subjunctive; *u* $\rightarrow\emptyset$ in the 'jussive'). I propose, to account for the dependency between tense and the two possible positions of exponence for the agreement features, that the trees in (27) are mapped by movement into a structure which provides the syntactic correlates of 'prefix' and 'suffix', namely the projections of the features 'imperfect' and 'mood' respectively, to form tensed structures, three examples of which are illustrated in (28). The inflected verb is selected to the immediate right of the imperfective head, namely in [spec,IndicP].

(28)



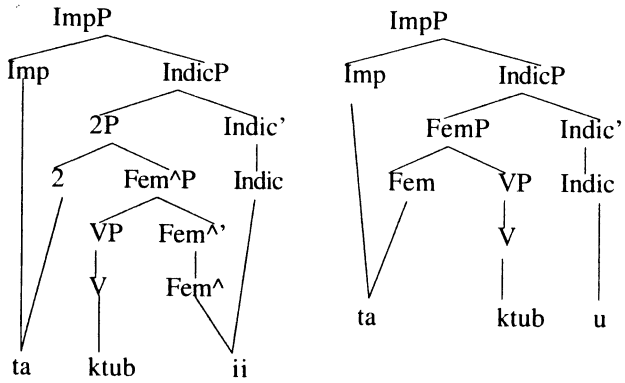
Another case of splitting that Noyer discusses is the case of the 2nd person feminine singular *ta-ktub-ii-na*. If *ta-* expresses '2nd person' in this form then *-ii* must express 'feminine', but feminine gender alone was observed to be spelled out as *ta-*. If *ta-* expresses '2nd person' and 'feminine' then firstly, *ta-* is now homophonous between three things—2nd person, feminine, and 2nd person and feminine together—and *-ii* seems to not be correlated with anything. Noyer's solution is that the feminine feature in the 2nd person feminine singular splits between the prefix and the suffix. The prefix *ta-* is its 'primary exponent' (as well as that of 2nd person), and *-ii* is the 'secondary exponent' of 'feminine', as illustrated below, and the secondary exponent of a feature may be spelled out differently from its primary exponent.

(29)



In the present study, '2nd person' and 'feminine' are syntactically instantiated locally (they are adjacent in the feature hierarchy). I propose, to account for the variation in the form of the feminine marker, that when '2nd person' is present, it selects a form of the gender node FemP—FemP^ (FemP-prime)—which is spelled out as *ii*, unlike FemP proper, which is spelled out as *ta*. While this approach may seem ad hoc, the fact is that the form of 'feminine' changes idiosyncratically in the presence of '2nd person', and the present analysis allows a syntactic formulation of this idiosyncrasy in just the configuration in which lexical idiosyncrasies are expressed–selection–in a syntactic framework in which every feature is structurally instantiated and has only one exponent, i.e. there is no splitting. The 2nd and 3rd person feminine singular are compared in (30).

(30) 2-f-s 3-f-s



There is a sense in which this analysis amounts to the claim that '2nd person' in the prefix 'spreads' to 'feminine' in the suffix, but the mechanism of spreading is selection under locality, precisely the configuration in which this sort of dependency is allowed. In this way, a completely syntactic instantiation of Noyer's morphological dependencies is possible, and there is no one-to-many mapping of features to morphemes, consistent with the no autonomous morphology hypothesis. Spell out rules in this system are not context sensitive at all, though syntactic context determines the category that is spelled out, e.g. whether FemP or ^FemP is selected, etc.

3.3 *Arabic Inflectional Morphology: Plural Nouns*

The last point I will bring in favor of the hypothesis proposed here is that the model developed in the present study deals adequately with one of the most 'morphological' phenomena of all, namely broken plural formation in Arabic, and expresses semantic generalizations about pluralization that the morphological analysis of Noyer (1992) fails to express.

Nominal and adjectival plurals may be formed in one of two ways, either by of lengthening of the vowel directly following the stem (which also changes to [i] in accusative masculine forms) or by alteration of the prosodic structure and vowel melody of the base. In these forms, as before, I leave out the word final *tanwiin* declension for the sake of being able to provide a working analysis. I am in effect working with a substructure of the structure of Arabic nouns. It will become clear that there is some utility in this. Often the declension is treated as forming a unit with case and/or number morphology. I show below that case and number behave systematically without taking the declension into account, i.e., the declension is fundamentally independent of case and number. The final *u* in these forms expresses nominative case (*a* in the accusative and *i* in the genitive).

(31) Broken plurals:

a.	kitaab-u	→	kutub-u	'book'
b.	nafs-u	→	nufuus-u	'soul'
c.	sulṭaan-u	→	salaaṭiin-u	'sultan'
d.	žundub-u	→	žanaadib-u	'locust'
e.	madiin-at-u	→	mudun-u	'city + fem'

(32) Regular plurals:

a.	saariq-u	→	saariq-uu	'thief'
b.	saariq-at-u	→	saariq-aat-u	'thief + fem'

Noyer claims that broken plurals have an inherent plural feature, whereas regular plurals acquire the feature in the syntax. He also stipulates that the presence of the inherent plural feature suffices to block syntactic pluralization.

Noyer's analysis fails to capture a semantic distinction between the two types of plurals. When a word has both plural forms, the two forms are not freely interchangeable. The regular plural form has a

restrictive interpretation, whereas the broken plural form has an attributive interpretation[11].

(33) a. al-ʔawlaad-u marḍaa (broken)
the children sick-pl
'The children are sick.'

b. al-ʔawlaad-u mariiḍ-uu (regular)
the children sick-pl
'The children are the ones who are sick.'

The syntactic analysis proposed here to account for both the morphological distinction and the semantic distinction between the regular and broken plural is based on the analysis of McCarthy and Prince (1990) of the phonological basis of broken plural formation. McCarthy and Prince point out that the alteration of the prosodic structure of the stem in broken plural formation only affects the leftmost foot of the word. The left-edge effect of broken plural formation often cannot be detected, since most Arabic words consist only of one foot. But the fact is evident in forms like (31c and d) above. In these words, the leftmost foot *sul-* and *žun-* respectively is mapped into an iamb, creating (with melodic overwrite) *salaa-* and *žanaa-* respectively. These feet are re-affixed to the base from which they were stripped away to form (again with melodic overwrite) *salaaṭiin* and *žanaadib*. The prosodic structure of the portion of the word not included in the leftmost foot–*-ṭaan* and *-dub* respectively–is not affected.

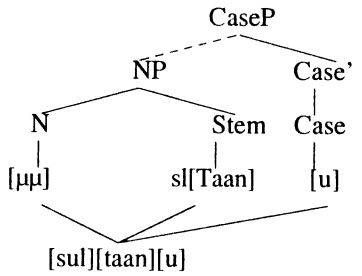
This left-affectedness is unlike regular plural formation, by which a suffix is attached to the right edge of the word. I propose that the left/right-affectedness alternation is a prefix/suffix alternation. Broken plural formation is prefixal, whereas regular plural formation is suffixal. I propose in turn that the prefix/suffix alternation is derived by movement of the stem to the left of the plural morpheme. If the stem fails to move, the order pl>stem is spelled out and the plural morpheme is prefixal (broken). If the stem moves, the order stem>pl is spelled out and the plural morpheme is suffixal (regular). The position of the stem triggers the interpretational distinction in the manner

[11] This was pointed out to me by Lena Choueiri to be true of modern Lebanese Arabic. Michael Fishbein points out to me that the early Arabic grammarians (~9th century AD) mentioned a difference between regular and broken plurals with respect to the 'individuation' of the plurality. As I discuss later, these are both results of restrictive clause formation. I assume that modern Lebanese and Classical Arabic are identical with respect to noun phrase internal syntactic correlate of restrictive clause formation proposed here.

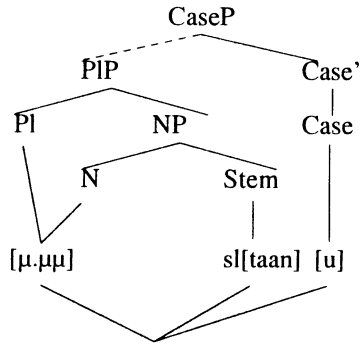
described below. First though, some details of the movement analysis are fleshed out.

According to this proposal, the phonetic material associated with the initial foot of the singular form is not associated with prosodic structure prior to spell-out, i.e., the base form of e.g. *sulṭaan* is *s-l-[ṭaan]*; the base form of *kitaab* is *k-t-b*. The base syntactic structure of *sulṭaan* is depicted in (34a). Prosodic alteration of the initial foot expresses plurality, as in (34b). Since the initial foot of the singular correlates with the category 'noun' (though a stem may turn up in other categories), I consider it the morphological exponent of NP (recall there is no feature 'singular'), i.e., we have a spell out rule of the form N→[μμ] which generates the prosody of the initial foot. N suppletes under adjacency with the category 'plural' when 'plural' is present, i.e., there is a spell out rule of the form Pl+N→[μ.μμ]. The first fails to apply when the second can apply by the Paninian principle. The case vowel is associated with its own mora, i.e., its own light syllable.

(34) a. singular: 'sultan'

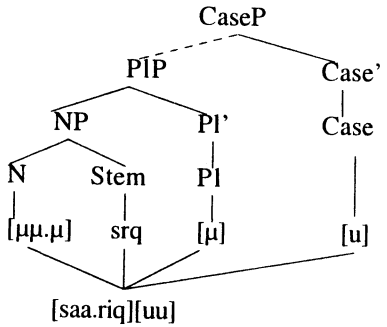


plural: 'sultan'



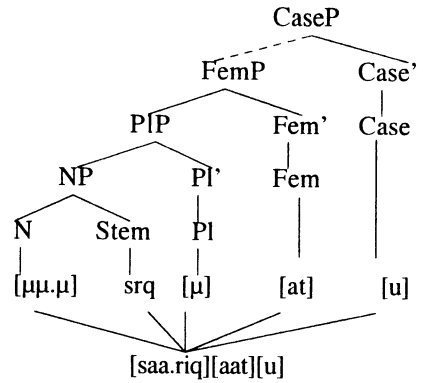
In the regular plural forms, I propose NP moves to the left of PlP, e.g. to [spec,PlP]. Now the category N is non-adjacent to the category Pl, so they do not meet the adjacency requirement for suppletion. N is therefore spelled out as in the singular, i.e., the initial foot of the stem has the same prosody as in the singular. I propose that the plural head in isolation is spelled out as a single mora, i.e., we have a spell out rule Pl→[μ], which also fails to apply when the rule Pl+N→[μ.μμ] can apply by the Paninian principle. This proposal immediately explains vowel lengthening in both the masculine and feminine regular plural forms. In the masculine forms, the plural morpheme [μ] now appears between the stem and the case marker, which has its own mora. The two adjacent moras create a heavy syllable, the vowel of case spreading to the mora of 'plural'. In feminine forms, the plural morpheme now appears between the stem and the feminine marker *at*, which also has its own mora. The two adjacent moras create a heavy syllable here also, the vowel of *at* spreading to the mora of 'plural'. Recall that PlP moves to [spec,FemP] independently, as discussed in section 3.1[12].

(35) a. plural: 'thief (masc)'



[12] The fact that PlP moves to [spec,CaseP] when no FemP is present, and FemP moves otherwise is a strange discrepancy (it means movement to CaseP doesn't always target the same category). But the effect is like pied piping: you want to move NP, but it's frozen in [spec,PlP], so you want to move PlP, but it's frozen in [spec,FemP], so you move FemP.

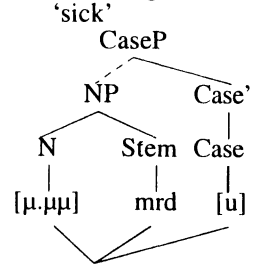
plural: 'thief (fem)'



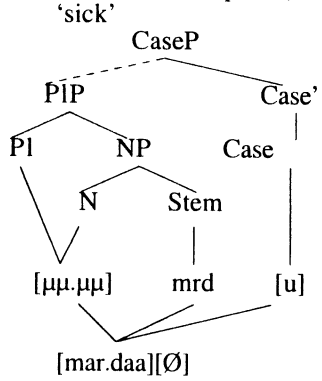
Note that there is no reason to assume the stem has undergone head movement to N (or anywhere else) in these structures; on the contrary, the typical left-adjunction effect of movement (Kayne 1994) would render prosodic morphology suffixal in a head movement configuration, contrary to fact. Movement of N to the left of the plural marker must therefore not be head movement, lest the stem, which is not in N, be left behind. Movement of N must target NP, i.e., it is phrasal movement. Given this instance of phrasal movement within the noun phrase, there is no reason to analyze other cases of movement as head movement insofar as they can be analyzed as phrasal movement, with the parsimonious result that movement targets only one type of category, namely phrasal categories.

The difference between prefixal (broken) and suffixal (regular) plural morphology is illustrated more effectively with the adjective *mariiḍ* ('sick'), a word with both plural forms. The case marker elides by regular phonology following a vowel in (36b).

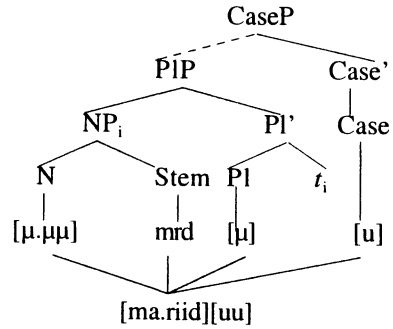
(36) a. mariiḍ (sg.) 'sick'



b. marḍaa (broken plural) 'sick'



c. mariiḍ-uu (regular plural) 'sick'



The proposal made here regarding the interpretation of the two types of plurals is that the plural marker demarcates a semantic partition in the syntactic structure like that proposed by Diesing (1992). Diesing claims that material in IP at LF is mapped into the restrictive clause in a first-order logic-like representation of quantifier scope. Material in VP is mapped into the nuclear scope. What appears in the restriction at LF is presuppositional (Berman 1991). I propose that the prosodic word is also syntactically partitioned into a restriction and a nuclear scope. Raising of the NP as illustrated in (36) places the NP in a portion of the prosodic word which is mapped to the restriction at LF, triggering the suffixal plural morphology and the presuppositional reading of the stem. When the stem does not raise, it remains in that portion of the constituent which is mapped to the nuclear scope, triggering prefixal (broken) plural morphology and the attributive interpretation of the stem. The correlation between the plural morphology and the presuppositional and attributive interpretations of the stem is

demonstrated in (37) and (38). The question in (37) presupposes the existence of sick people, hence the presuppositional (regular) plural form of *mariiḍ* is preferred in the answer. (39) does not presuppose any sick people, so the attributive (broken) plural form of *mariiḍ* is preferred[13].

(37) man mariiḍ-u?
who sick
'Who is sick?'

a. ʔal-ʔawlaad-u marḍaa
the-children pl-sick
'The children are sick.'

b. al-ʔawlaad-u mariiḍ-uu
the-children sick-pl
'The children are the sick ones.'

(38) ʔayna al-ʔawlaad-u?
where the-children
'Where are the children?'

a. al-ʔawlaad-u marḍaa
the-children pl-sick
'The children are sick.'

b. ʔal-ʔawlaad-u mariiḍ-uu
the-children sick-pl
'The children are the sick ones.'

In short, these data are subsumed by Diesing's Mapping Hypothesis under the syntactic analysis proposed here, given a parallelism between sentence structure and nominal structure. This parallelism certainly needs to be specified in more detail, in particular the connection between restrictiveness and depth of structure and the connection between the plural marker in the noun phrase and the VP boundary in the sentence. But the syntactic analysis allows a connection to be made between nominal structure and clausal structure for a noun phrase internal phenomenon with an analog at the clausal level.

[13] These judgements and those in (39) come from modern Lebanese Arabic, though again, the distinction that (39) demonstrates was documented for Classical Arabic before that form of Arabic disappeared as a spoken variant. Recall again the *tanwiin* is intentionally being omitted here and below.

Lastly, I point out that the prefixal/suffixal plural distinction also correlates with distributive vs. collective interpretation of the noun, as might be expected, given the restrictive/attributive distinction, as demonstrated below.

(39) a. al-ʕaamil-uu xabbar-uu bi ḥaadiθ-i

distributivity

def-worker-pl-nom reported-pl about accident-gen

'The workers reported an accident.'

b. al-ʕummaal-u xabbar-uu bi ḥaadiθ-i

*distributivity

def-pl-worker-nom reported-pl about accident-gen

'The workers reported an accident.'

In (a) the suffixally plural marked *al-ʕaamil-uu* (*the workers*) distributes over *ḥaadiθ* (*accident*) to make the reading available 'for each worker, there is an accident which that worker reported,' i.e., there is a different accident for each worker. In (b), the prefixally plural marked *al-ʕummaal-u* (*the workers*) does not distribute. It acts as a collective, and only the reading is available 'there is an accident which all the workers reported together.'

Restrictiveness and distributivity are typical semantic effects of structural distinctions (see, for example, Diesing's (1992) structural analysis of the former and May's (1985) structural analysis of the latter). Any non-structural analysis of these data fails to predict an interpretational difference, and once discovered, such an interpretational difference must be stipulated as a reflex of the position of plural morphology. Such a stipulation, however, fails to capture the directionality of the difference. In particular, suffixal (regular) plural morphology=presuppositional; prefixal (broken) plural morphology=attributive. If this effect is not structural, then the effect could have been the other way around, with prefixal plural morphology correlating with presuppositionality and suffixal plural morphology correlating with attributiveness. In the syntactic analysis proposed here, stems in regular plurals are syntactically higher than stems in broken plurals, the difference in interpretation falling out from a semantic partition of the noun (or adjective) phrase *a la* Diesing (1992), though again, the connection between nominal and clausal syntax has yet to be spelled out in detail.

Note that the function from singular to broken plural morphology is not obviously productive. Some broken plurals have an initial iamb (*sulṭaan→salaaṭiin, nafs→nufuus*) whereas others have an initial trochee (*kitaab→kutub, qiṭaar→quṭur*) and many other templates exist. There are generalizations about the form of the plural given the form of the singular, however (Wright 1981), and these are formulated in syntactic approach proposed here as noun class dependencies, i.e., as subclasses of 'NP'. Since the prosody of the initial foot of the form in singular contexts is a lexical property of the stem, there is a cooccurrence restriction between the subclasses of NP and subclasses of what I have referred to as the category 'stem'. I propose that the cooccurrence restriction results from a lexical selectional relation between NP and the stem (note that NP selects the stem in the diagrams above). Specifically, N_1, whose spell out in non-plural contexts is [μ.μμ], selects a category $Stem_1$, which contains stems like *k-t-b* (*book*), *q-ṭ-r* (*train*), etc., generating *kitaab, qiṭaar*, etc. The spell out rule for the suppletion of Pl and N_1 has the form $Pl+N_1 \rightarrow [\mu.\mu]$, generating *kutub* (*books*), *quṭur*, (*trains*), etc. Further, there is a category N_2, whose spell out in non-plural contexts is [μμ], which selects a category $Stem_2$, which contains stems like *s-l-[ṭaan]* (*sultan*), *n-f-s* (*soul*), etc., generating *sulṭaan, nafs*, etc. The spell out rule for the suppletion of Pl and N_2 has the form $Pl+N_2 \rightarrow [\mu.\mu\mu]$, generating *salaaṭiin* (*sultans*), *nufuus* (*souls*), etc.

There are many other prosodic templates in the singular and plural. One other template is dealt with here. A third subclass of N_3 is spelled out [μ.μ] (it is also a bimoraic syllable the initial foot of *nafs* and *sulṭaan* but with a lexical syllabification), and selects a category $Stem_3$ which contains *ʔ-s-d* (*lion*), *r-ž-l* (*man*), etc. The spell out rule for the suppletion of Pl and N_3 is $Pl+N_3 \rightarrow [\mu.\mu\mu]$, just like the spell out rule for N_2 in the context of plural. That N_3 is nonetheless a distinct noun class from N_2 is evidenced simply by the fact that the distinct syllabification between the two classes is a lexical property of the nouns that cooccur in these two noun classes. No automatic syllabification algorithm would generate *ʔasad* but fail to generate **nafas*. It is a lexical property of *ʔasad* that it is bisyllabic, in particular a lexical property of its class. That N_3 conflates with N_2 in the plural looks suspicious at first, but in fact, it is the normal case that noun class distinctions conflate in the plural, as, in fact, Greenberg points out: "Universal 37: A language never has more gender [read 'noun class'] categories in non-singular numbers than in the singular." This conflation is a normal linguistic phenomenon (see e.g. German), though it does not yet have a natural expression in the present analysis (there are two independent plural formation rules for N_2 and N_3 in the grammar below; there should only be one, though it's presently unclear

how to do this in an insightful way). A grammar fragment that executes this proposal is given below, followed by some illustrative trees. The ultimate aim of the research project introduced here is to provide an explicit grammar like the 'Grammar Fragment' in the appendix which is complete for the inflectional and derivational morphological phenomena of Arabic.

4. Conclusion

The model of syntax proposed in the present study, which is a great deal leaner than other contemporary models, accounts for data which otherwise can only be accounted for with an independent morphology module, which however can never capture in a systematic way the semantic distinctions which correlate with morphological phenomena. In these and other arrays of data, the no-autonomous-morphology hypothesis goes hand-in-hand with a reduced theory of syntax to explain linguistic phenomena which have never before fallen under the scope of any kind of compositional algorithm, much less the theory of syntax.

Appendix. Grammar Fragment for Arabic Plural Formation

Phrase Structure Rules:

$PlP \rightarrow Pl\ NP_x$

$NP_1 \rightarrow N_1\ StemP_1$
$NP_2 \rightarrow N_2\ StemP_2$
$NP_3 \rightarrow N_3\ StemP_3$

$StemP_1 \rightarrow Stem_1$
$StemP_2 \rightarrow Stem_2$
$StemP_3 \rightarrow Stem_3$

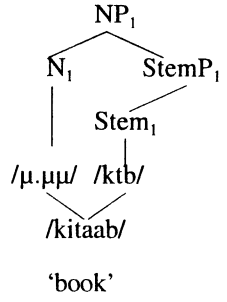
Spell Out Rules:

$Pl \rightarrow /\mu/$ *This rule occurs in regular plurals*
$Pl + N_1 \rightarrow /\mu.\mu/$
$Pl + N_2 \rightarrow /\mu.\mu\mu/$
$Pl + N_3 \rightarrow /\mu.\mu\mu/$

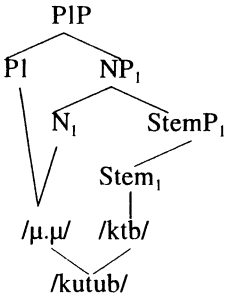
$N_1 \rightarrow /\mu.\mu\mu/$
$N_2 \rightarrow /\mu\mu/$
$N_3 \rightarrow /\mu.\mu/$

$Stem_1 \rightarrow$ {/ktb/,/qṭr/,. . .} *(book,train. . .)*
$Stem_2 \rightarrow$ {/nfs/,/sl[ṭaan]/,. . .} *(soul,sultan. . .)*
$Stem_3 \rightarrow$ {/ržl/,/ʔsd/,. . .} *(man,lion)*

(40)

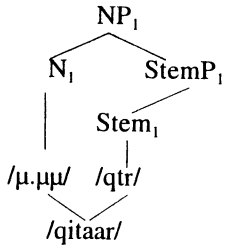


'book'

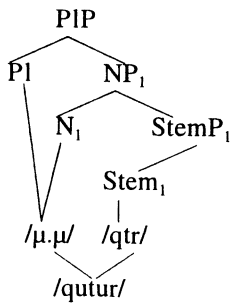


'books'

(41)

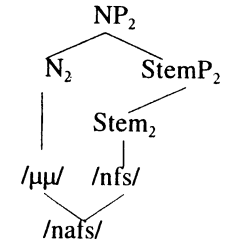


'train'

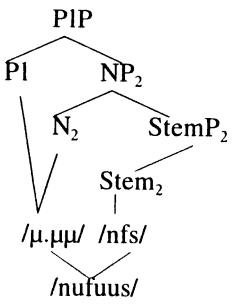


'trains'

(42)

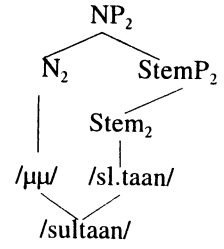


'soul'

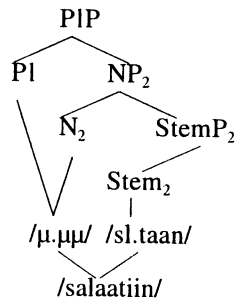


'souls'

(43)

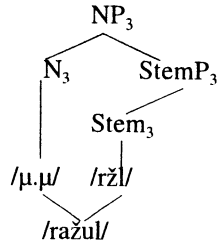


'sultan'

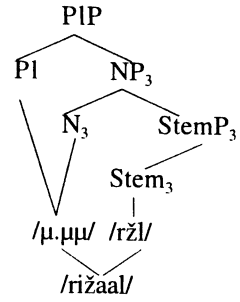


'sultans'

(44)

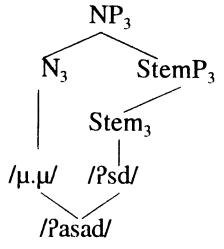


'man'

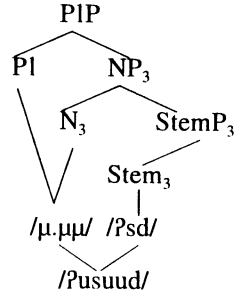


'men'

(45)



'lion'



'lions'

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