Chapter 3

Distributed Morphology and the Pieces of Inflection

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1 Morphology with or without Affixes

The last few years have seen the emergence of several clearly articulated alternative approaches to morphology. One such approach rests on the notion that only stems of the so-called lexical categories (N, V, A) are morpheme "pieces" in the traditional sense—connections between (bundles of) meaning (features) and (bundles of) sound (features). What look like affixes on this view are merely the by-product of morphophonological rules called word formation rules (WFRs) that are sensitive to features associated with the lexical categories, called lexemes. Such an a-morphous or affixless theory, adumbrated by Beard (1966) and Aronoff (1976), has been articulated most notably by Anderson (1992) and in major new studies by Aronoff (1992) and Beard (1991). In contrast, Lieber (1992) has refined the traditional notion that affixes as well as lexical stems are "morpheme" pieces whose lexical entries relate phonological form with meaning and function. For Lieber and other "lexicalists" (see, e.g., Jensen 1990), the combining of lexical items creates the words that operate in the syntax. In this paper we describe and defend a third theory of morphology, Distributed Morphology,' which combines features of the affixless and the lexicalist alternatives. With Anderson, Beard, and Aronoff, we endorse the separation of the terminal elements involved in the syntax from the phonological realization of these elements. With Lieber and the lexicalists, on the other hand, we take the phonological realization of the terminal elements in the syntax to be governed by lexical (Vocabulary) entries that relate bundles of morphosyntactic features to bundles of phonological features.

We have called our approach Distributed Morphology (hereafter DM) to highlight the fact that the machinery of what traditionally has been called morphology is not concentrated in a single component of the gram-

mar, but rather is distributed among several different components.' For example, "word formation"—the creation of complex syntactic heads—may take place at any level of grammar through such processes as head movement and adjunction and/or merger of structurally or linearly adjacent heads. The theory is a new development of ideas that we have each been pursuing independently for a number of years.[3] It shares important traits with traditional morphology (e.g., in its insistence that hierarchically organized pieces are present at all levels of representation of a word), but deviates from traditional morphology in other respects (most especially in not insisting on the invariance of these pieces but allowing them to undergo changes in the course of the derivation).

As noted above, the theory of DM is in substantial agreement with lexeme-based morphology that at the syntactic levels of Logical Form (LF), D-Structure (DS), and S-Structure (SS) terminal nodes lack phonological features and that they obtain these only at the level of Morphological Structure (MS) (see (1)). DM parts company with lexeme-based morphology with regard to its affixless aspect. As discussed in greater detail below, lexeme-based theory treats inflections of all kinds as morphosyntactic features represented on nodes dominating word stems and sees inflectional affixes as the by-product of WFRs applying to these stems. Anderson (1992) motivates this position by citing violations of "the one-to-one relation between components of meaning and components of form which is essential to the classical morpheme.. ." (p. 70). Rather than redefine the notion of morpheme so as to allow for particular violations of the one-to-one relation between meaning and phonological form, as in DM, Anderson chooses to eliminate all affixes from morphology.

On its face, Anderson's proposal contradicts not only the traditional approaches to morphology, but also much current practice in generative syntax, where inflections such as the English tense or possessive markers are standardly treated as heads of functional categories and must therefore be terminal nodes. Since Anderson neither offers alternative analyses nor indicates any intention to revise syntactic theory, we suppose that he accepts the current view that in the syntactic representations—in LF, SS, and DS—Tense, Possessive, and other inflections constitute separate nodes. Since Anderson recognizes no affixal morphemes in the morphology or phonology, we must assume that on his account these inflectional morphemes are eliminated in the input to the morphology, and their morphosyntactic features are transferred to the stem lexemes, so that at the point at which lexical insertion applies, the terminal nodes allow for the insertion of stems exclusively. It is to these affixless stems that Anderson's

WFRs apply and insert (or change) phonological material. Anderson's theory thus crucially involves a stage where affixal morphemes are eliminated, followed by a stage where many of the same affixal morphemes are reintroduced by the WFRs.

In many cases the hierarchical structure of phonological material (affixes) added by the WFRs recapitulates the hierarchical organization of functional morphemes in the syntax. In Anderson's theory, any such parallel between the layering of syntax and the layering of phonology is just an accident of the organization of the WFRs into ordered blocks, since in his theory the ordering of the blocks creates the layering of phonological material and is essentially independent of the sorts and sources of morphosyntactic features mentioned in the rules. This direct relationship between syntax and morphology does not obtain everywhere: it is violated, for example, in cases of suppletion such as English be, *am. was*, and (as shown in section 3.2) it is with suppletion phenomena that Anderson's theory deals most readily. Since suppletion is not of central importance in the morphology of English or of any other language, the approach did not seem to us to be on the right track. Moreover, as we explain below, we find essential aspects of the approach unnecessary and even unworkable.

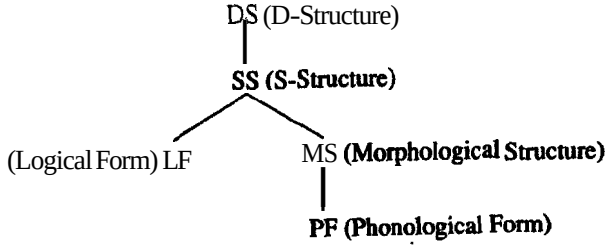
Lieber (1992) elaborates the traditional view that affixes are morphemes in a version that both contradicts Anderson's lexeme-based approach and deviates in important respects from DM. In Lieber's theory, affixes and stems alike are lexical items containing both phonological and morphosyntactic features. Crucially for this theory, these lexical items combine to create the words manipulated by the syntax. We agree with Lieber that both stems and affixes are lexical (for us, Vocabulary) entries that connect morphosyntactic feature bundles with phonological feature complexes. However, for DM the assignment of phonological features to morphosyntactic feature bundles takes place after the syntax and does not create or determine the terminal elements manipulated by the syntax. This difference between the theories yields two important contrasts between DM and Lieber's lexical morphology. First, since in DM syntactic operations combine terminal nodes to create words prior to Vocabulary insertion, the theory predicts that the structure of words—the hierarchical location of affixes, and so on—is determined by the syntax and not by subcategorization frames carried by each affix, as on Lieber's account. Second, since in DM none of the morphosyntactic features involved in the operation of the syntax is supplied by Vocabulary insertion, the Vocabulary entries can be featurally underspecified. On this issue, DM agrees with a major insight of Anderson's theory and diverges from Lieber's theory, where the

Vocabulary entries of affixes must carry enough features to generate the proper feature structures for the syntax and LF. This aspect of Lieber's approach leads to difficulties that are discussed in Marantz 1992c and Noyer 1992a and are therefore not included here.

2 Distributed Morphology

DM adopts the basic organization of a "principles-and-parameters" grammar, diagrammed in (1). The added level of Morphological Structure is the interface between syntax and phonology. MS is a syntactic representation that nevertheless serves as part of the phonology, where "phonology" is broadly conceived as the interpretive component that realizes syntactic representations phonologically.

(1)



Representations at each of the five levels consist of hierarchical groupings of terminal elements graphically represented by the familiar tree diagrams. The terminal elements of the trees consist of complexes of grammatical features. These terminal elements are supplied with phonological features only after Vocabulary insertion at MS (see below). Although nothing hinges on this terminology in what follows, we have chosen to call the terminal elements "morphemes" both before and after Vocabulary insertion, that is, both before and after they are supplied with phonological features.

If hierarchical tree structures of terminal nodes (morphemes) within both words and phrases constitute the representations at every level of grammatical analysis, we might expect the organization of phonological pieces (stems and affixes) in the structure at PF to be isomorphic to the hierarchical arrangement of morphosyntactic terminal elements in the syntax. As already remarked, in many instances there seems to be no one-to-one relation between terminal elements in the syntax and phonological pieces, nor does the organization and bracketing of the phonological pieces directly reflect the syntactic bracketing. Affixless morphology constitutes one response to this observation; a different response is offered by DM. Instead of abandoning the notion that affixes are morphemes, DM recognizes that MS is a level of grammatical representation with its own principles and properties and that the apparent mismatches between the organization of the morphosyntactic pieces and the organization of the phonological pieces are the result of well-motivated operations manipulating terminal elements at this level and at DS and SS.

2.1 Mismatches between Syntax and Morphology

We examine here some of the important differences between the terminal elements and their organization in LF, SS, and DS, on the one hand, and in MS and PF, on the other. We assume that in LF, SS, and DS there is only hierarchical nesting of constituents, but no left-to-right order among the morphemes. The linear order of morphemes that all sentences exhibit at PF must therefore be established by the rules or principles that relate SS to MS (and PF). (For some discussion, see Travis 1989, 1992, Marantz 1989.) Note that we do not assume, with Lieber (1992), that the ordering of constituents within words and the ordering of words within phrases obey the same principles, with common notions of "head," "complement," and "specifier" triggering orderings of affixes with respect to stems and of phrases with respect to syntactic heads. Although we will not argue against Lieber's position here (but see Anderson 1992: chap. 2 for some relevant considerations and the critical review in Spencer, to appear), we will assume that an affix's status as a prefix, suffix, or infix is in principle independent of its syntactic role.

An additional source of the noted lack of isomorphism between PF and SS is the fact that morphemes may be inserted in MS to meet universal and/or language-specific well-formedness conditions. For example, subject-verb agreement is implemented in many languages by adjoining an Agr morpheme to the Tns node; features from the subject are then copied onto the Agr node. Case-number-gender concord in Determiner Phrases (DPs) is implemented in a similar fashion by supplying, for example, case-number suffixes to Adjective and Determiner nodes and copying features associated with the head noun of the DP onto them.[4]

This addition of terminal nodes at MS changes the number of terminal elements that might find phonological realization and thus contributes to the noted lack of isomorphism between PF and SS. Other grammatical processes also may disturb the one-to-one relation between terminal ele-

ments in the syntax and terminal elements at MS: a terminal element may be moved from one position in a tree and adjoined to a terminal element in another position by head-to-head movement; structurally adjacent nodes may be merged; sister terminal nodes may be fused into a single terminal node; and a given node may be fissioned into two. (For discussion of head movement, merger, fusion, and fission. see Baker 1988, Bonet 1991, Koopman 1983, Marantz 1984, 1988, 1989, 1992b, Noyer 1992a, and below.)

We distinguish here between "merger" and "fusion." Merger, like head-to-head movement, joins terminal nodes under a category node of a head (a "zero-level category node") but maintains two independent terminal nodes under this category node. Thus, Vocabulary insertion places two separate Vocabulary items under the derived head, one for each of the merged terminal nodes. Merger generally joins a head with the head of its complement XP; see the references cited above. Thus, like head-to-head movement, merger forms a new word from heads of independent phrases; but these independent heads remain separate morphemes within the new derived word. On the other hand, fusion takes two terminal nodes that are sisters under a single category node and fuses them into a single terminal node. Only one Vocabulary item may now be inserted, an item that must have a subset of the morphosyntactic features of the fused node, including the features from both input terminal nodes. Unlike merger, fusion reduces the number of independent morphemes in a tree. Since both head-to-head movement and merger form structures in which two terminal nodes are sisters under a single category node, both may feed fusion.

Examples of head-to-head movement include the movement of English auxiliary verbs to Tense (Tns), and Tns to C in questions (see section 4). Merger combines Tns with the main verb in English, as illustrated in section 4. A simple example of morpheme fusion is the single affix signaling number and case encountered in many Indo-European languages; such affixes realize a terminal node that is the result of the fusion of independent Case and Number nodes. In contrast, number and case constitute separate phonological pieces in Turkish, indicating that fusion has not applied to the Number and Case nodes here.

Morpheme fission is discussed in Marantz 1992b and Noyer 1992a. A simple example involves the pronominal proclitics of Georgian, treated by Anderson (1992) in terms of WFRs but analyzed, we believe correctly, as pronominal clitics by Nash-Haran (1992). Sample Georgian verb forms

are listed in (2), in three subgroups.[5] The first subgroup (2a–f) contains the 3rd singular object forms; the second subgroup (2g–l) contains the 3rd singular subject forms; and the third subgroup (2m–q) contains forms where both subject and object are either 1st or 2nd person.

(2) With 3rd person object: X draw(s) 3rd person

a. v-xatav
'I draw him'

b. v-xatav-t
'we draw him'

c. **Ø-xatav**
'you (sg) draw him'

d. **Ø-xatav-t**
'you (pl) draw him'

e. xatav-s
'he draws him'

f. xatav-en
'they draw him'

With 3rd person subject: 3rd person draws X

g. m-xatav-s
'he draws me'

h. gv-xatav-s
'he draws us'

i. g-xatav-s
'he draws you (sg)'

j. **g-xatav-(s)-t**
'he draws you (pl)'

k. xatav-s
'he draws him'

l. xatav-s
'he draws them'

I-you and you-me forms

m. g-xatav
'I draw you (sg)'

n. m-xatav
'you (sg) draw me'

o. g-xatav-t
'we draw you (sg or pl)' or 'I draw you (pl)'

p. gv-xatav
'you (sg) draw us'

q. **gv-xatav-t**
'you (pl) draw us'

The most salient feature of the examples in (2) is that 3rd person arguments do not surface in prestem position, nor do they (generally) determine when the plural /-t/ is inserted.[6] To capture these facts, we postulate that in prestem position these verb forms contain a Clitic cluster, which syntactically attaches as a sister to the inflected verb. The Clitic cluster incorporates under a single node all the 1st and 2nd person (pronominal) arguments (and certain special 3rd person arguments; see note 6). The terminal nodes in the Clitic cluster then fuse into a single terminal node.

Plural

f. [+pl] ↔ /-t/

The Vocabulary entries in competition for insertion in a particular terminal node automatically organize themselves into blocks like that illustrated in (5), where entries are ordered by the principle that the most specified entry takes precedence over entries that are less specified. As noted by Kiparsky (1973), this ordering by decreasing complexity was explicitly recognized already in Pāṇini's Aṣṭadhyāyī. A consequence of this ordering principle is that in (5) the affix marked, for example, [+1], DAT, [+pl] (5a) will take precedence over those marked simply [+1], DAT (5b) and [+1] (5d). Similarly, the affix marked [+2], DAT (5c) will take precedence in insertion over the affix marked simply [+2] (5e).

The Pāṇinian elsewhere principle as now understood fails to determine the precedence between (5b) and (5c) or between (5d) and (5e). Competition between these pairs could arise, in principle, because the Clitic morpheme incorporates and fuses the features of subject, object, and indirect object arguments. The representation in (4q) indicates how two sets of agreement features can coexist under a single Clitic node in Georgian. Both sets in principle might be DAT. Noyer (1992a) has argued that hierarchical relations among particular morphosyntactic features impose further ordering relations among the competing entries above and beyond those that are imposed by complexity. These considerations may provide the required ordering. If this should turn out not to be the case, the correct output can be obtained by imposing an extrinsic order of precedence between the two Vocabulary entries in question, as was done in (5) and elsewhere in this paper. What is crucial here is that in the syntax we are dealing with bundles of morphosyntactic features, which are not *from* the Vocabulary in any important sense, and that for their phonological realization the Vocabulary must be searched for the underspecified entry that best matches the morphosyntactic features supplied by the syntax. Once that entry is found, its phonological and other idiosyncratic features are copied into the morpheme.

Fusion and fission of morphemes affect the correspondence between pieces at SS and pieces in the phonology. In addition, at any level of grammatical analysis, the feature composition of a morpheme may be changed in particular contexts, leading again to apparent mismatches between the syntax and the phonological affixes. For example, quite generally, features are deleted at MS in what Bonet (1991) calls "impoverishment." We will consider several examples of impoverishment in the analysis of Potawatomi in section 5.[9]

2.2 Vocabulary Insertion Examined

We have shown that in DM the ordering, number, feature composition, and hierarchical positioning of terminal nodes may change in the derivation of MS, but only in highly constrained and fairly well understood ways. We emphasize that the operation of morphology is constrained by substantive universals (a theory of features) and locality conditions on merger, fusion, fission, and feature interactions between morphemes; in the absence of such motivated constraints, the theory loses its empirical content. Although the terminal nodes may change at MS, perhaps the most striking difference between SS and MS derives from the systematic difference in the type of features found in the terminal nodes in the two structures. As noted above, in conformity with the "separation" theory of Beard (which finds traces back to Chomsky's (1965) treatment of inflectional morphology), it is assumed here that at LF, DS, and SS terminal nodes consist exclusively of morphosyntactic/semantic features and lack phonological features.[10] The morphosyntactic features at these levels are drawn from a set made available by Universal Grammar (we are unaware of any arguments that language-specific features are necessary at these syntactic levels). The semantic features and properties of terminal nodes created at DS will also be drawn from Universal Grammar and perhaps from language-particular semantic categories or concepts.

We assume that the Vocabulary of a language plays no role in the creation of terminal nodes at DS. That is, the particular set of universal and/or language-particular semantic and syntactic features chosen for a terminal node is not constrained by whether or not that set of features appears in any Vocabulary entry in the language. The bundles of morphosyntactic and semantic features that constitute morphemes at DS, SS, and LF are more or less freely formed. Although the feature complexes at these three levels must satisfy all universal and language-specific constraints on combining such features, they are not necessarily identical with the feature complexes of actually occurring Vocabulary items of the language. This, however, will not prevent Vocabulary insertion from taking place, since insertion requires only that the feature bundle of the Vocabulary item be nondistinct from the features of the terminal node at MS that serves as the site of insertion. The competition among different Vocabulary items nondistinct from the features of a terminal node at MS ensures

that the Vocabulary item that matches the most features of the node will be inserted.

Vocabulary items may therefore be underspecified for the morphosyntactic feature complexes that they realize (see Lumsden 1992 on this point). For example, the Vocabulary entry for the English verb *sink* is featurally not specified for the distinction between its transitive (causative) and intransitive (inchoative) variants, although at LF, SS, and DS a given sentence may have the features corresponding to either the one or the other. Similarly, as discussed below, the English past participle ending /-d/ in I had played *tennis* all day will correspond only to the feature [+past] in its Vocabulary entry although in the example just given it is inserted at a node with the feature [+participle] in addition to the feature [+past].

It is assumed here that the entries that make up the Vocabulary of a language are each composed of two distinct sets of features: phonological and morphosyntactic/semantic. Thus, phonological features are supplied to morphemes only at MS and the mechanism responsible for this is Vocabulary insertion. As noted above, for a given Vocabulary entry to be "inserted" in some SS morpheme, none of its morphosyntactic features can conflict with a morphosyntactic feature present in SS; the Vocabulary entry must contain a subset of the morphosyntactic features of the terminal node. Like the operation of feature copying crucial to agreement and concord at MS, Vocabulary insertion at MS is subject to the constraint that it cannot modify already existing feature values.

On this view, as in Anderson's model, the phonological affixes and stems that make up complex words are underspecified with respect to morphosyntactic features. Since, unlike in the lexicalist models of Lieber and others, in DM the phonological pieces are not required to carry all the features necessary to explain the syntactic behavior of the words they create, they may be specified only for those features that determine which morpheme is inserted at which terminal node." However, as in Lieber's model but not in affixless theories, the Vocabulary items might come with categorial and subcategorial information that is not part of the morphosyntactic representation prior to Vocabulary insertion and that affects the further phonological realization in the word. For example, inserted affixes or stems might belong to inflectional classes that condition the insertion of other affixes or the operation of morphologically conditioned phonological rules (here called "readjustment rules"; for examples, see below).

Since Vocabulary entries differ from morphemes at LF, DS, and SS in that, in addition to rnorphosyntactic features, they possess a set of phonological features, the Vocabulary can be regarded as the repository of the knowledge that speakers have about the interrelationship between the rnorphosyntactic feature bundle characterizing a morpheme and its phonological features, that is, about the mapping of morphosyntactic features onto complexes of phonological features.

2.3 Allomorphy

As we have just noted, a variety of changes can affect morphemes in the course of deriving the MS representation, creating a hierarchical structure of terminal elements related in a principled manner to, but not identical with, the hierarchical structure of such elements at SS. Vocabulary items, listed according to their morphosyntactic categories, compete to realize the resulting terminal elements in Vocabulary insertion. This immediately raises the issue of how to determine the winner in any such competition. Two types of competition can be distinguished in Vocabulary insertion: context-free and context-dependent (or conditioned allomorphy). We discuss the two in turn.

In context-free insertion, we find the Vocabulary entries whose category is compatible with the category of the terminal element being phonologically realized and whose features are compatible with the set of morphosyntactic features that the syntax and morphology have generated on this terminal element. As noted, this search will in some instances involve competition among different entries for the chance to spell out a particular set of features, where the entries differ only in the features they realize (that is, in their "substantive" features).

Like context-free Vocabulary insertion, conditioned allomorphy also involves a choice among alternative Vocabulary items. However, the choice in this case is not among items that differ in their substantive morphosyntactic features, but among items that differ in their stated insertion contexts and phonological features. For example, in English the past tense suffix ∅ is selected by the so-called strong verb stems (e.g., put, beat), whereas weak verbs select the suffix /-t/ or /-d/ (e.g., *dwelt*, played). The substantive features ([+past], etc.) of the /-t/, /-d/, and ∅ allomorphs are the same; they differ only in contextual features. As in context-independent insertion, the choice among competing allomorphs in conditioned allomorphy is again determined by the Pāṇinian principle, understood here as giving precedence to the allomorph appearing in the most complex, most highly specified context over allomorphs appearing in less complex contexts. The past tense allomorphs are therefore ordered as in (6). (These entries will be revised in (8).)

(6) *Tns*

[+past] ↔ ∅ / [+strong] ——
[+past] ↔ /-t/ / [−strong] ——
[+past] ↔ /-d/

Here the ∅ and /-t/ allomorphs of the past tense have precedence over the /-d/ allomorph, because ∅ and /-t/ impose conditions on the verb stem, whereas /-d/ is inserted elsewhere. The /-d/ is thus literally the default entry for [+past] Tns. (As the entries in (6) are currently written, the ordering between the ∅ and /-t/ allomorphs is not determined by complexity.)

For many terminal nodes (e.g., the English Tns node; see section 3), the competition among Vocabulary items will include competition among items with the same features and different environments, as in (6), and simultaneously among items with different features, as in (5). We propose that consideration of the substantive features realized by a Vocabulary entry takes precedence in the competition over contextual considerations so that all Vocabulary items that realize the same features (e.g., the three in (6)) are ordered in a block together relative to Vocabulary items that realize different features. Within each such block, the specificity of the environment determines relative ordering. as just explained.

3 Vocabulary Insertion versus Readjustment

3.1 English Verb Inflection

The phonological information contained in the Vocabulary entries is not sufficient to ensure that in all cases the correct phonological output will be generated. As suggested in Halle 1990 and elsewhere, the remaining part of the information about the phonological form of morphemes is provided by a set of readjustment *rules*.[12] This distinction between these two sources of phonological information parallels the traditional distinction between morphophonemic alternations (i.e., allomorphs related by a set of morphologically conditioned phonological rules), on the one hand, and suppletion and canditioned allomorphy, on the other. To clarify the nature of this distinction, we examine the inflection of English verbs.

The inflectional affixes of the English verb are, in part, surface manifestations of the different complexes of morphosyntactic features that may be generated at the terminal I(nflection) node in the IP constituent (or, more specifically, at the terminal T(ense) node of the TP constituent; for an example showing the position of this node in sentences and some discussion, see (13)). Disregarding here and below the verb be, the five principal parts of the English verbal inflection are illustrated in (7).

(7)

Past participle	beat-en	put	dwel-t	play-ed
Past finite	beat	put	dwel-t	play-ed
Nonpast finite 3rd sg	beat-s	**put-s**	dwell-s	play-s
Nonpast participle	beat-ing	putt-ing	dwell-ing	play-ing
Nonpast finite	beat	put	dwell	play

The feature complexes that can occupy the I node at the point of Vocabulary insertion are made up at least of the morphosyntactic features [± past], [± participle], to which in [−participle] bundles are added the six number-person complexes (Chomsky's ϕ-features) that express subject-verb agreement in English (1st, 2nd, and 3rd person in singular and plural). Specifically, an Agr morpheme is added to [-participle] I nodes at MS, and the Agr morpheme is fused with the I morpheme into a single node. The fused I node can thus accommodate 2 [+participle] bundles ([± past]) and 2 ([± past]) × 6 (for agreement features) [−participle] bundles, for a total of 14 different feature bundles.

Examination of (7) reveals that there are three phonetically distinct suffixes in the nonpast forms: /-ing/, /-z/, and ∅. And there are four phonetically distinct suffixes in the past forms: /-n/, ∅, /-t/, and /-d/. These seven suffixes compete for insertion into the I node, which will contain one of the 14 feature bundles just described.

As shown by the forms in the first line of (7), there are four distinct past participle suffixes: /-n/, ∅, /-t/, and /-d/. The last three are identical with the finite past suffixes. It is worth noting that of the 58 English verbs that take /-n/ in the past participle, 9 have the default /-d/ suffix in the finite past (do. ^hew, ^prove, "sew, "shear, show, ^*sow*, "swell, ^*strew*), 1 takes the /-t/ suffix (*go-ne/wen-t*), and 48 form the finite past tense with the 0 suffix.[13] In other words, although verbs that take the /-n/ suffix in the past participle manifest a preference for the ∅ finite past suffix, the preference is not absolute. Since the verbs that take /-n/ in the past participle share no other grammatical, morphological, or semantic property, there is no justification for treating these verbs as belonging to a special inflectional class of their own, as was done in (6).[14] The list of verbs that choose the /-n/ suffix in the past participle will therefore be included in the Vocabulary entry of this suffix as a disjunctive list in a contextual feature for the suffix (see (8)). The fact that in almost all other verbs the past participle form is identical with the finite past form is expressed in (8) indirectly, by the absence of a separate past participle entry other than /-n/. In most cases, then, a node with the features [+past], [+participle] will be realized by an affix with only the [+past] feature.

Several of the verbs that take the /-n/ suffix in the past participle have an alternative form with the default /-d/ suffix, where the alternation is manifested sometimes by different speakers, sometimes by a single speaker. We have listed such stems with the diacritic ^ to indicate that they optionally take /-d/. Whenever Vocabulary insertion fails to insert the /-n/ suffix after such ^ stems, the default /-d/ suffix will automatically be inserted, unless the stem appears among those listed with one of the other past suffixesin (8). We leave open the questions of whether there is true optionality within the grammar of an individual speaker and of what the formal treatment of optionality should be; we emphasize here only that if the first (most highly specified) Vocabulary item—/-n/—competing for the Tns node is not chosen for one of the "optional" ^ stems, the remaining Vocabulary items in (8) will yield the correct "alternative" past participle form. The seven Vocabulary items competing for insertion under the fused Tns-Agr node are all suffixes and have the representations in (8).[15]

(8) *I* (=fused *Tns* and Agr)

[+participle, +past]	↔	/-n/ / X + ___ where X = "hew, *go*, beat, ...
[+past]	↔	∅ / Y + ___ where Y = beat, drive, bind, sing, ...
[+past]	↔	/-t/ / Z + ___ where Z = dwell, buy, send, ...
[+past]	↔	/-d/
[+participle]	↔	/-ing/
[3sg]	↔	/-z/
	↔	0

The entries in (8) are listed in the order of decreasing complexity of the conditions on their insertion, where this can be determined. Recall that substantive features take precedence over contextual features for determination of complexity, so an entry with the features [+past, +participle] would take precedence over any entry with the feature [+past] even if the former were inserted in any environment and the latter restricted to certain stems. Since the ∅ and /-t/ past suffixes are of equal complexity, both containing the [+past] substantive feature and an environment feature, they are not ordered by complexity. Since each contains a different set of verbs in its environment, no ordering is required. The ordering among past suffixes as a group, [3sg] /-z/, and [+participle] /-ing/ is also not determined by complexity. Here, though, the ordering matters. We do not want to insert the [+participle] /-ing/ in a [+past, +participle] node. Nor do we want to insert /-z/ in a [+past] node that is [3sg]. Perhaps a universal hierarchy of tense > aspect > agreement might order these affixes; otherwise, their ordering must be stipulated in the manner shown in (8).

As noted above, the fact that a given terminal node contains morphosyntactic features that are absent in a particular Vocabulary entry will not block insertion of this item as long as the additional morphosyntactic features are nondistinct from the features in the Vocabulary entry. For example, the [+past] /-d/ will be inserted in a [+past, +participle] node as long as the stem is not listed in any of the [+past, +participle] or [+past] entries in (8). After insertion, the node will still be [+past, +participle] although the Vocabulary entry itself had only the feature [+past].

Since in language there is an arbitrary relation between the morphosyntactic and phonological features of a Vocabulary item (Saussure's arbitraire du signe), it is not surprising that the relationship between morphosyntactic and phonological features is many-to-many. Thus, phonological 0 is the phonological realization of two distinct sets of features in (8), and the [+past] morpheme is represented by ∅, /-t/, and /-d/.

As the examples in (9) show, the past participle and past forms frequently differ from nonpast forms and/or from each other in the phonological composition of the stem.

(9) a.	i.	beat – beat – beat-en	break – broke – brok-en
		drive – drove – driv-en	fall – fell – fall-en
	ii.	put – put – put	bind – bound – bound
		sing – sang – sung	come – came – come
b.		dwell – dwel-t – dwel-t	send – sen-t – sen-t
		leave – lef-t – lef-t	buy – bough-t – bough-t
c.	i.	prove – prove-d – prove-n	do – di-d – do-ne
	ii.	yell – yell-ed – yell-ed	tell – tol-d – tol-d

The suffixes in (8) differ in the extent to which they trigger phonological changes in the stems. For example, the /-n/ suffix triggers changes in 56 of the 58 stems that take it, whereas for ∅ and /-t/ the figures are 103 out of 131 and 16 out of 40, respectively. By contrast, of the several thousand stems that take the /-d/ past suffix, only 13 undergo stem changes. Specifically, as shown in (10), the /-d/ past suffix replaces the stem rime with short /u/ in four verbs (should, would, could, stood), with short /i/ in one verb (did), and with short /e/ in one verb (said). The same suffix rounds

and backs the syllabic nucleus in two instances (*sol-d*, tol-d), but shortens the nucleus in only three stems (*flee-d*, heard, *sho-d*). Finally, the stems make and have lose their final consonant before the /-d/ suffix. Unlike allomorphy resulting from the choice of contextually distinguished Vocabulary entries, the stem allomorphies under discussion here result from the operation of readjustment rules that have the form of phonological rules and apply to morphemes after Vocabulary insertion. The readjustments described above are given more formally in (10).

(10) a. Rime → /u/ / X ___ [+past]
X

where X-Rime = shall, will, can, stand

b. Rime → /i/ / Y ___ [+past, −participle]
X

Rime → /ʌ/ / Y ___ [+past, +participle]
[−past, 3sg]
X

where Y-Rime = do

c. Rime → /e/ / Z ___ [+past]
[−past, 3sg]
X

where Z-Rime = say

d. V → [+bk] / W U [+past]
[+rd]

where WVU = sell, tell

e. V → V / T ___ S [+past]
X x X

where TVS = *flee*, hear, shoe

f. C → 0 / Q ___ [+past]
⟨[−past, 3sg]⟩

where QC = make. (have)

The readjustments induced in the stem by the /-t/ suffix are somewhat less varied than those summarized in (10). Here stems ending in /d/ delete the stem-final consonant—send → *sen∅-t*—and stems with rimes ending in a dorsal (velar) obstruent (or that historically derive from such stems) replace the rime with the low vowel /a/—bring → brough-t. None of the other stems is subject to stem readjustment before the /-t/ suffix, once account is taken of the fact that stem vowel shortening and final obstruent devoicing in forms such as mean-t, kep-t, *lef-t*, *los-t* ate due to general phonological rules whose effects in English are also found outside verb inflection—for example, in bread-th, *dep-th*, wid-th.

The readjustment rules triggered by the /-n/ past participle and the ∅ past suffixes are considerably more complex than those triggered by /-d/ or /-t/. Since these facts add little to an understanding of the issues under discussion, they have been omitted here.[16]

There are two verbs for which the relationship between the allomorphs in the [−past] and [+past] is entirely arbitrary. These are *go/wen-t* and the archaic and highly literary *work/wrough-t* (/rɔt/). For these verbs, two different Vocabulary entries with the same substantive features will be listed; they will differ in that one will contain the contextual feature [___[+ past, − participle]]. With the exception of these two verbs, the relations among variants of a given stem in the different morphological contexts can be characterized by means of readjustment rules like those in (10), rules that satisfy the same formal constraints as ordinary phonological rules (and might even be ordered among the phonological rules; see the discussion of "allomorphy rules" in Davis 1991).

3.2 English Inflection and Affixless Morphology

In the theory of affixless morphology, the terminal string at the input to the morphology consists exclusively of lexemes, that is, of word stems. Such information as that a noun is plural is represented at this stage by features assigned to the nonterminal node dominating the noun. Ultimately, the plural features are spelled out by WFRs."

The WFRs constitute a homogeneous set. This is an important respect in which affixless morphology differs from DM, where the phonological shapes of words are accounted for by rules and processes belonging to different classes subject to different constraints. As illustrated above, Vocabulary insertion is responsible for certain phonological aspects of an utterance, whereas other aspects are accounted for by the rather different set of impoverishment and readjustment rules. In this section we examine the way in which the homogeneity of WFRs in the affixless theory affects the treatment of the familiar facts of English noun inflection.

Anderson notes that **WFRs** "operate to map... lexical stems onto fully inflected surface words" (p. 122). This procedure, however, fails to "provide an account of the complementarity of regular and irregular modes of inflectional marking. For instance, we must avoid applying a rule for a regular formation such as the English plural in /-z/ to an item which is already lexically specified for the same properties. Thus, since the (irregular) plural of ox is oxen we must not produce ***oxes*** or ***oxens***" (p. 123).

To achieve this complementarity between regular and irregular inflection, Anderson introduces two special principles. He explains that

> [o]ften ...more than one phonological stem will share the same syntax and semantics.... Where more than one stem makes up the lexical stem set of a given lexical item, the principle in (19) governs the choice among them.
>
> (19) In interpreting a given Morphosyntactic Representation M, from among the stems in the lexical set S of a given lexical item, only that stem S_i which is characterized for the maximal subset of the features compatible with M may serve as the basis of an inflected form {S, M). (p. 133)[18]

Anderson notes that principle (19) allows him

> to account for the absence of forms like ***oxes*** in English. Such a form, if it existed. would be the result of applying the regular plural rule so as to add /-z/ to the stem /aks/. But in fact the stem /aks/ is not available to interpret the position whose Morphosyntactic Representation contains the features [+Noun, +Plural], because the only stem set containing /aks/ also contains /aksən/. Since this latter stem is characterized for a larger subset of the features [+Noun. +Plural] than is /aks/, the principle in (19) requires us to use only /aksən/ and not /aks/ to interpret such a position. (p. 133)

By entering oxen as a stem with the features [+Noun, +Plural], Anderson has in effect accounted for this irregularity by means of suppletion, because there is no way in which his solution takes account of the partial identity of oxen and ox. Instead of being composed of the latter two stems, the stem set could equally well have contained ox and any phonetically well formed string of phonemes. It is an accident of English that it contains no truly **suppletive** pairs of singular-plural noun stems.

Although principle (19) rules out ***oxes***, it fails to rule out ***oxens***. According to Anderson,

> [t]his suggests that another principle of disjunction (or "blocking") is at work here. This principle... shares an obvious family resemblance with the principles in (18) and (19), since all of these conditions enforce the precedence of specific cases over general ones.
>
> (20) When a rule R of the grammar would apply to a stem S on the basis of the features F of a given position to be interpreted, application of R is blocked, if F constitutes a subset of the lexical specifications of S.

> The absence of ***oxens*** ...then follows directly. In interpreting a position with the morphosyntactic features [+Noun, +Plural], we have already seen that only the stem /aksən/ is available. In order to derive /aksənz/ it would be necessary to apply the regular plural rule to append /-z/ to /aksən/. This is prevented by (20), however, since the features that this rule refers to are precisely [+Noun. +Plural], a subset of the lexical features of /aksən/. (p. 134)

Principle (20) rules out forms where a special stem **allomorph** is selected for insertion in the context of a particular feature while a second WFR affixes something to the stem in the context of the same feature. Anderson remarks, "If genuine cases of such 'double marking' do indeed exist, this would imply that the scope of the principle proposed here as (20) must be limited in some way that is not yet understood" (p. 134).

In fact, forms with such "double marking*'are widely attested. Several examples from English are found in (11).

(11) a.		live-s	bath-s	house-s		
b.		broke-n	froze-n	drive-n	go-ne	do-ne
c.	i.	bough-t	caugh-t	taugh-t	though-t	
	ii.	buil-t	sen-t	wen-t	len-t	

In (11a) the stem-final consonant is voiced before the plural suffix. In (I lb) the stem vowel is modified and the suffix /-n/ is added as well. In (I lc) the past /-t/ is suffixed; in addition, the rime is replaced by /ɔ/ in (I lci) and the stem-final consonant /d/ is deleted in (11cii).

Since genuine cases of "double marking*' are quite common, Anderson's principle (20) cannot be maintained. Without (20), however, his account of English plural formation will not work.

It should be noted that nothing in Anderson's theory prevents him from dealing with the three sets of examples in (11) as instances of suppletion. As noted above, he proposes to treat ***ox/oxen*** as an instance of **suppletion**, that is, as a set of "phonologically distinct stems... each associated with its own (partial) set of morphosyntactic properties" (p. 133). In the case of ***ox/oxen*** this treatment obscures the fact that except for the /n/ the two forms are phonologically identical. Since only two or three nouns in the language take such **non-ϕ** irregular plural endings, one might be inclined to sweep these examples under the proverbial rug. The point made by the examples in (11) is not only that there are additional cases that must be similarly swept under the rug, but also that phonological "modifications" produced by what we have called Vocabulary insertion (the addition of phonological material) are separate from and independent of those produced by readjustment rules (which may change and

delete features, as well as add them). An approach such as Anderson's, which denies the existence of this distinction, is unable—as a matter of principle—to distinguish cases of total suppletion such as *be/were* from cases of partial suppletion such as *go/wen-t*, from different stem readjustments such as *goose/geese*, *life/live-s*, and from cases of irregular suffixation such as *ox/ox-en* and *child/childr-en*, and is therefore forced to subsume all of these clearly different cases under the rubric of suppletion.

We have shown, then, that one of Anderson's principles of disjunction for morphology, his principle (20), incorrectly rules out the choice of a suppletive stem or a stem readjustment in the context of a feature that also triggers affixation. In our terms, the features of a terminal node (e.g., [+past] on a Tns node) may form the context for choice of a stem allomorph or trigger a readjustment rule in addition to serving as a crucial feature for the insertion of a Vocabulary item at the node. Anderson proposes a principle similar to (20)—his "elsewhere" principle (18) (p. 132)—that prohibits a WFR in one rule block from applying if its triggering features are a proper subset of those for a WFR that has applied in an earlier block. Since Anderson treats stem allomorphy and affix allomorphy as completely distinct phenomena (incorrectly in our view), he cannot combine his two disjunction principles. In section 5 we will show that this additional disjunctive principle (18), like principle (20), cannot be maintained, and for the same reasons. Readjustment rules apply to affixes as well as to stems. A readjustment rule for one affix triggered by a feature of a terminal node to its right simply does not block the insertion of phonological material—that is, Vocabulary insertion—at the location of the triggering feature. As we will show, Anderson's own analysis of Potawatomi, as well as our analysis, clearly illustrates this lack of disjunctivity.

4 Null Morphemes

As shown in (8), among the English Vocabulary items that compete for assigning phonological features to the Tns-Agr node there are two that assign phonological zero to the node. Anderson (1992) has questioned the reality of zero morphs of this kind. Thus, he remarks that "these obviously have no content at all.. .. the assumption that any information which is not overtly signalled nonetheless corresponds to some zero morpheme leads to the formal problem of assigning a place in the structure (and in linear order) to all these zeros. Thus, the free positing of zero morphs allows us to say that Latin amo 'I love' represents 'LOVE + CONJ1 + INDIC + ACTIVE + PRES + 1PERS + SG', but in which order (from among the 7! or 5040 possible orders)?" (p. 61).

In Anderson's Latin example each morphosyntactic feature is assumed to constitute a single morpheme. This assumption is surely not logically necessary, and Anderson offers neither evidence nor argument for it. Once it is admitted—as the large majority of workers in this area have done—that several morphosyntactic features can (and sometimes must) coexist in a single morpheme, Anderson's example loses much of its combinatorial absurdity and with it also its negative force. Without question, morphology must include a theory of features that determines when they must cluster in morphemes and when they may surface in separate terminal elements. For example, the feature "CONJI" in Anderson's Latin example clearly is a classificatory feature that partitions the general class of verb stems. Thus, not only must this feature be a feature of the stem, and not a separate morpheme; as a classificatory feature it would be unable under any circumstances to split from the stem and form its own terminal node. The person, number, and gender features of 1st and 2nd person arguments arguably form a constituent. Thus, Anderson's 1PERS and SG features would belong to a single morpheme. We do not yet have a solid understanding of how tense features are distributed among the functional heads in the syntax (for one view, see Giorgi and Pianesi, to appear), but it is not unreasonable to suppose, in the absence of any arguments to the contrary, that the features that Anderson identifies as PRES, INDIC, and ACTIVE, if they are really operative features in Latin, are features of a single Tns node. We have assumed that subject Agr attaches to Tns at MS, so Tns and Agr form a unit in the Latin verb that is attached to the Verb stem marked for its conjugation class. The only complexity faced by the child learning Latin, then, is the fusion of the Tns and Agr nodes before Vocabulary insertion, a possibility left open but not required by Universal Grammar. Thus, Anderson's Latin example sheds no light on the issue of zero morphemes.

We recognize at least two types of zero morphemes, leaving open the question of whether these are actually distinct. One type was illustrated by the ∅ English past tense chosen by a particular set of stems (see (8)). Here the zero past tense suffix blocks the default past tense /-d/. Thus, we find drove but not drive-d or drove-d. The English tense system (8) illustrates the second sort of zero morpheme as well. For the [−past, −participle] ending when the subject is not 3rd person singular, the suffix is also ∅. However, in this case the ∅ suffix is a default for the [−past] feature, in fact, for the Tns node as a whole. It may be that Universal Grammar

provides a zero spell-out as the default phonological realization of a morpheme in the unmarked **case.** This possibility in no way undermines the existence of zero morphemes.

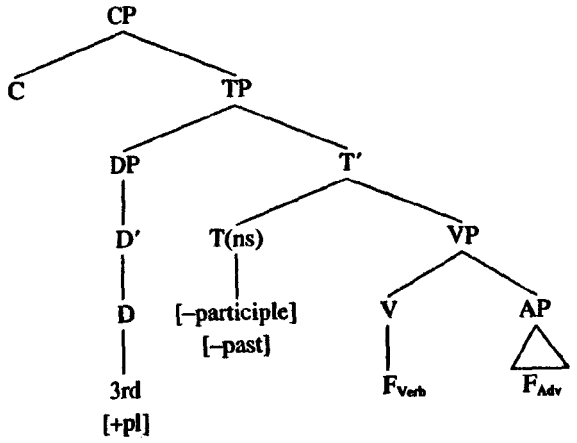
To see the linguistic reality of zero morphemes such as the zero realizations of the English Tns-Agr node, consider the sentences in (12).

(12) a. They sleep late.
b. Do they sleep late?
c. They do not sleep late.

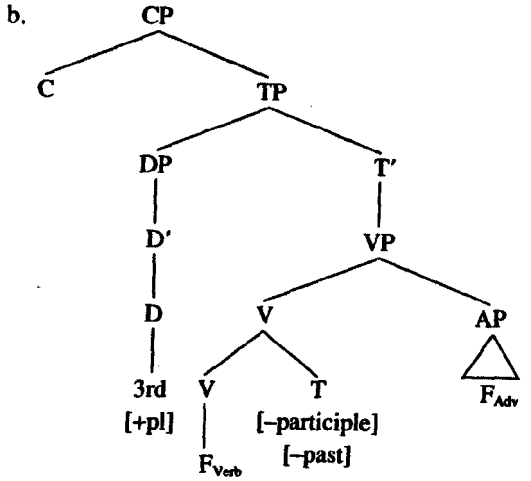
Somewhat simplified DS and SS trees for **(12a)** are given in (13). In English, main verbs, unlike auxiliary verbs, do not raise to Tns at SS. Thus, unlike auxiliary verbs, English tensed main verbs are ordered in the sentence in the position of verbs, not in the position of Tns. This is seen by comparing They ***definitely seem*** old with They ***are*** definitely old. The first contains an inflected main verb that must follow adverbs like ***definitely*** that come before the VP; the second contains auxiliary BE that raises out of the VP to Tns and thus occurs before the adverb.

Although main verbs do not raise to Tns, Tns does appear on the verb in sentences like **(12a).** The joining of Tns with main verbs is sometimes attributed to a "lowering" head movement analogous to upward head movement. However, we believe that this joining is an example of merger under structural adjacency of a type discussed by Marantz (1988,1989). If Tns merges with the main verb (as opposed to the verb adjoining to Tns), the resulting inflected verb should pattern with verbs rather than with Tns (and auxiliary verbs), as required. The result of merger is shown in (13b).

(13) a.



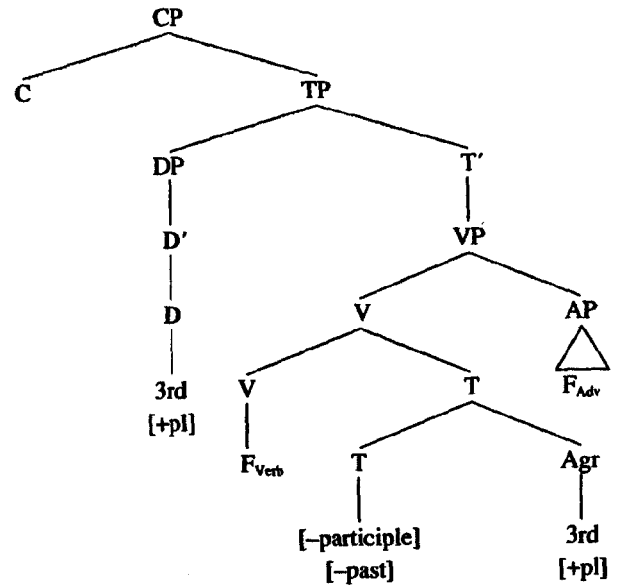
b.



In the preceding discussion we have assumed that the values of the different morphosyntactic and semantic features under terminal nodes are almost entirely specified in the syntax but that no actual Vocabulary items are present in these trees. In particular, although the features of the main verb in (13) need not single out the verb sleep, at least the feature that distinguishes main from auxiliary verbs in English must be present in the trees. At MS, the Vocabulary is consulted to find items whose features are nondistinct from those of the terminal nodes in the tree and that therefore can be inserted, providing phonological features for the nodes.

In many languages—for example, Spanish, Russian, Latin, **Latvian**—word stems must have a Theme suffix, which has no syntactic or semantic role (see, for example, Halle 1991). It is natural to assume that such affixes are introduced by the rules that relate SS to MS. By placing them in this part of the grammar, we account for their lack of effect in the syntax or at LF. It has been argued by Marantz **(1992a)** that, like the Theme, Case and Agr morphemes are added to heads at MS in accordance with **language-**particular requirements about what constitutes a morphologically well formed word in that language. In addition to the Theme **suffix,** languages like Russian, Latvian, and Latin require a case suffix for well-formed nouns and adjectives. English differs from these languages in that it requires neither a theme nor a case suffix for nouns or adjectives. English, Latin, Russian, and Latvian are alike in that they require an Agr morpheme for well-formed finite verbs. The insertion of the Agr morpheme, onto which the appropriate features of the subject have been copied, transforms tree **(13b)** into tree (14).

(14)



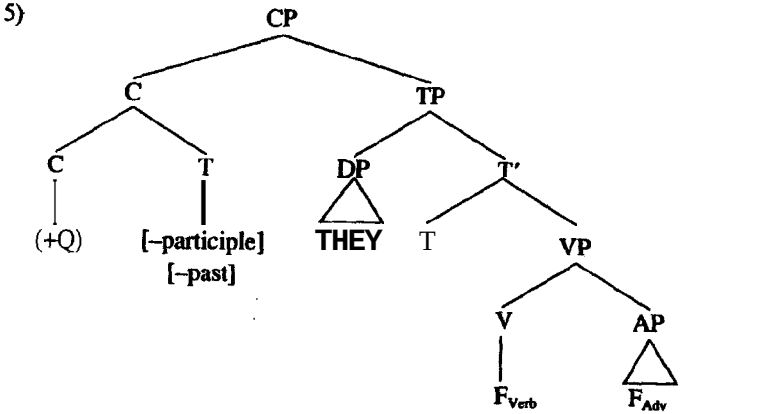
The fusion of **sister** morphemes into a single terminal node is a widely attested phenomenon. For example, the Case and Number morphemes that appear separately in an agglutinativelanguage like Turkish are fused into a single morpheme in Latin, Latvian, and Russian. Similarly, Tns and Agr fuse into a single morpheme—terminal node—in English, but remain separate in German and Russian.

After merger and fusion of terminal nodes, phonological features are supplied to the different morphemes by consulting the Vocabulary; that is, at this point Vocabulary insertion takes place. In addition to phonological features, Vocabulary insertion supplies morphological features that signal idiosyncratic properties of specific Vocabulary items.

We assume that the insertion operation has available the entire syntactic tree so that insertion at a given node may make reference to features at other—primarily adjacent—nodes. For example, the verb stem wend will be inserted at a V node with the syntactic and semantic features of "go" if the adjacent Tns node dominates[+past, –participle], whereas go will be inserted elsewhere. Similarly, **/-t/** will be inserted next to wend under the [+past, –participle] node since wend is a verb on the list subcategorized for by **/-t/.** (Recall that the final **/-d/** of wend will delete before **/-t/ as in *send/sent*.)**

Concerning English inflection, it is essential to note that even when spelled out as 0, the Tns-Agr morpheme is present among the terminal nodes at MS. Consider the derivation of **(12b).** Question formation in English involves the raising of Tns to C or to **some** functional head between CP and TP; the identity of this head is irrelevant for present purposes. If an auxiliary verb moves to Tns, then this derived Tns moves to C **(e.g., *Are*** you sleeping?). Main verbs in English do not raise to Tns; thus, in **(12b)** only Tns moves to C, via head-to-head movement, as shown in **(15).**

(15)



To the Tns morpheme in **(1**5) at MS must be added an Agr node, as in (13b), that will pick up the features of the subject DP.

It is a morphological fact about the English Tns morpheme that it requires a V to make a **well-formed** MS word. Note that it is not a property of English verbs that they require Tns; the morphological requirement is on Tns itself (English verbs appear tenseless, for example, in causative constructions such as **I** made ***him*** *leave*). This requirement holds regardless of the affix—regardless of the Vocabulary entry—inserted as the Tns morpheme. **As** first noted by Chomsky **(1957),** whenever a Tns morpheme is stranded without a verbal stem to which it may suffix, the dummy verb do is inserted, and this applies when the Tns morpheme is phonetically **ϕ** as well as when the Tns morpheme is readily isolated as a piece in the phonetic string. In **(12b)** the Vocabulary item chosen for [–participle][–past] Tns + Agr will be phonologically ϕ, yet a verb must be adjoined to Tns in (IS) to meet the morphological **well-formedness** conditions on Tns in English. **We** assume that the morphological **well-**formedness condition is met by the minimal disruption in the structure,

that is, by the insertion of a V node without any features other than its category identification. There is a Vocabulary entry for the V ***do*** in English that has no features other than its category, making ***do*** the unmarked Verb, chosen to phonologically realize the V node when the other verbs lose out in the competition by being overly specified.

Thus, the ∅ Tns morpheme is just as much a morpheme as any other Tns morpheme in English. In **(12c),** when negation is included, the existence of the null Tns morpheme is revealed yet again. A Neg functional head blocks the merger of Tns with a main verb (the intervention of a **NegP** with a filled head between TP and VP prevents the Tns head of TP from being structurally adjacent to the V head of VP). Since Tns, regardless of its realization, requires a sister V as a morphological property, an empty V node must be inserted at MS and realized as ***do*** in **(12c)** even though the spell-out of Tns will be ∅. Note that the presence of the negation ***not*** is not a sufficient condition for ***do*** insertion, as shown by the absence of the dummy verb ***do*** in a tenseless clause such as the bracketed one in ***John made [them not work].*** What is required for ***do*** insertion is the presence of a stranded Tns morpheme, regardless of whether or not the Tns morpheme will have a nonnull phonetic realization.

5 Complex Inflectional Systems. The Potawatomi Independent Verbal Inflection

Anderson (1992) illustrates his approach to inflectional morphology with an analysis of some inflectional paradigms from Hockett's description of the Algonquian language Potawatomi (in particular, Hockett **1966).**[19,20] From Anderson's analysis of Potawatomi, one might conclude (i) that the disjunctive relations among competing affixes should follow from disjunctive relations among **WFRs** in arbitrary rule blocks, (ii) that multiple exponence is possible in the form of repeated and arbitrary reference to the same features in multiple rule blocks, and (iii) that readjustment and impoverishment should not be distinguished from the choice of affixal material—both are simply consequences of the **WFR** blocks.

In the analysis of Potawatomi to follow, we will show that these claims are not warranted. In particular, the evidence reviewed below shows (i) that each "disjunctive rule block" of the correct analysis corresponds to a terminal node from the syntax or morphology (or some terminal node that results from the merger and fusion of other nodes) and that the blocks therefore are featurally coherent, (ii) that there is no "multiple exponence" of features from a single syntactic or morphological node,

and (iii) that teadjustment and improverishment (the influence of one morpheme on others) need to be distinguished from the choice of a phonological form for a terminal node (as argued in section 3).

We make the strong claim that many of the terminal nodes that find phonological realization in affixes are syntactic heads; the rest are added or created at MS in principled and predictable ways, as described in section 2. Thus, it is not possible to go far with any morphological analysis without also doing syntax. Although our knowledge of Potawatomi syntax is limited and the literature on Potawatomi itself and on related Algonquian languages grossly underdetermines the analysis, we can motivate each of the morphemes relevant to the analysis, even while leaving a great deal undecided about both syntax and morphology.

5.1 Features and Affixes

Potawatomi verbs are inflected for tense, negation, and agreement in two general patterns, called the ***independent*** and ***conjunct*** patterns or ***orders*** ("orders" because the order of negation and the verb differs in independent and conjunct inflected verbs). In the two examples given in (16) the verb is inflected for a 2nd person plural subject and a 3rd person plural object. The conjunct order verb in **(16a)** shows a negative prefix before the verb stem. Following the stem is an Agr morpheme whose phonological realization is sensitive to the features of both subject and object; see table **1.** The last suffix realizes a preterit Tns morpheme. The ihdependent order verb in **(16b)** begins with a pronominal **clitic** never found in the conjunct, here signaling the 2nd person subject. The verb stem is immediately followed by an Agr morpheme agreeing with the 3rd person object, also not found with the conjunct order. Following this agreement suffix is the negative suffix characteristic of the independent order, as opposed to the negative prefix found in the conjunct order verb shown in **(16a).** The negative suffix is followed by a second **Agr** morpheme that occupies the same structural position as the conjunct Agr and signals that the subject is 2nd person plural. This Agr is followed by the same preterit Tns morpheme found in the conjunct order, which is in turn followed by a third Agr morpheme agreeing in plurality with the 3rd person object.

(16) a. ***Conjunct order***

pwa-	min	**-kwa**	-pun
Neg	V	Agr	Tns
	give	**2plNOM.3plACC**	preterit

'you (pl) didn't give them (something)'

b. *Independent* order

k-	wapm	-a	-s'i	-m	-wapunin	-uk
Cl	V	Agr	Neg	Agr	Tns	Agr
2	see	3ACC		2pl	preterit	3pl

'you (pl) didn't see them'

The independent order is generally used with main clauses in declarative styles; the conjunct order is used, for example, in embedded contexts and for participles (see Hockett 1966 for details). Anderson discusses only the independent order without negation and without the preterit (past) suffix—importantomissions, it will turn out.

In the Potawatomi clause, all arguments are pronominal; that is, they consist of DPs containing only features for person, number, and so forth, on the D (see Jelinek 1984, Speas 1990, and Baker 1991 (on Mohawk) for a discussion of such languages). Full DPs—phrases such as 'John' or 'the canoe by the river'—are adjoined to the clause and bind (thus, "double") the pronominal arguments within the clause. This striking difference between Potawatomi and, say, familiar Indo-European languages is not clearly brought out by Anderson. An understanding of the issues and of the exposition below depends on keeping this feature of Potawatomi clearly in mind.

With independent order verb inflection, 1st, 2nd, and certain 3rd person pronominal DPs (the [−obv] DPs; see immediately below) cliticize to the front of the CP and are realized as proclitics in this position. The remaining 3rd person pronominal DPs are small pro's that are identified by Agr on the inflected verb. Since the tensed verb also agrees with the 1st and 2nd person arguments, what looks like multiple exponence results: phonological material corresponding to 1st, 2nd, and certain 3rd person arguments appears as both proclitic and agreement suffix (as in Georgian; see section 2). However, this is the standard type of agreement found everywhere in language; that is, we commonly see both the arguments and the agreement that agrees with these arguments, as in the English ***She sleeps***. The Potawatomi pronominal proclitics are not part of the verb: they need not appear immediately before the verb stem or even as part of the same phonological word as the verb; their location depends on what else occurs within the CP. The examples in (17) show that the clitics appear at the front of CP on phonological words that are independent from the inflected verb, clearly indicating that these clitics are not (directly) part of the inflectional system.

(17) a. **n-ku wapm-a**
1st-OK see
'OK I'll see him'

b. **n-kuko? ns'-a**
1st-quickly kill
'I kill him quickly'

c. **n-wep ns'-a**
1st-incep kill
'I start to kill him'

The Potawatomi verb shows agreement with both subject and object, for person, number, and "obviation" of 3rd person arguments. Obviative marking distinguishes 3rd person arguments in discourse and allows the listener to track 3rd persons across clauses. The details of obviation in discourse, although ultimately important for the correct analysis of Potawatomi, will be ignored here. We will assume a three-way division among DPs (more precisely, among Ds): [+obv], [−obv], and unmarked for obviation. 1st and 2nd person pronouns, here treated as Ds, are always marked [−obv]. 3rd person DPs may be marked [+obv] for discourse reasons or left unmarked. In a particular syntactic environment to be described below, 3rd person DPs may be marked [−obv]; these [−obv] 3rd person DPs behave like 1st and 2nd person DPs. Potawatomi nouns are classified into two genders: animate and inanimate. Although 1st and 2nd persons and nouns referring to people are animate, the division of other nouns into the two genders is fairly arbitrary.

For animate nouns, as in (18)–(19), the marking on the nouns (18) and the agreement pattern on intransitive verbs (19) show one suffix /-k/ for nonobviative plural (18b)/(19b) and another suffix /-n/ for [+obv], either singular or plural (18c)/(19c).

(18) Animate noun

a. waposo 'rabbit'
b. **waposo-k** 'rabbits'
c. **waposo-n** 'rabbi t(s) (obv)'

(19) *Verb* with *an animate subject*

a. kaskumi 'he starts running'
b. **kaskumi-k** 'they start running'
c. **kaskumi-n** **'he/they** (obv) start running'

Inanimate nouns as in (20) have a plural marking **(20b)** but no obviative suffix; the singular and plural forms in (20) are both ambiguous between obviative and nonobviative.

(20) ***Inanimate noun***

a.	Eiman	'canoe' (obv or not)
b.	**čiman-un**	'canoes' (obv or not)

Although the suffixes on inanimate nouns do not distinguish between **[+obv]** and nonobviative, the distinction must nonetheless be marked by a morphosyntactic feature on inanimate nouns because intransitive verbs with inanimate subjects have the same pattern of agreement for plural and [+obv] as intransitive verbs with animate subjects, as shown in (21). Compare (21) with (19). In both cases a **[+obv]** subject triggers a particular suffix, **/-n/** for animates, **/-nun/** for inanimates, regardless of the plurality of the subject. Nonobviative **[+pl]** subjects trigger a different affix, **/-k/** for animates, **/-ton/** for inanimates.

(21) ***Verb with an inanimate subject***

a.	wawyeya	'it (not obv) is round'
b.	**wawyeya-ton**	'they (not obv) are round'
c.	**wawyeya-nun**	**'it/they** (obv) **is/are** round'

Although 3rd person arguments are generally either **[+obv]** or unmarked for obviation in Potawatomi, a 3rd person D may be marked [−obv] in certain environments.[21] In particular, in clauses with 3rd person DPs as both subject and object arguments, one of the 3rd person DPs must be specially marked [−obv] and the other must be marked **[+obv].** Only animate DPs may be marked [−obv]. Exactly the same sort of morphosyntactic marking occurs **inside** possessed DPs, with a 3rd person possessor specially marked **[−obv]** and the possessed argument marked **[+obv].** Although either a subject or an object DP may be **[−obv]** when the other argument of a transitive verb is **[+obv],** within possessive DPs only the possessor, not the possessed, may bear the [−obv] feature.

To illustrate the distribution of this special **[−obv]** marking for 3rd persons, we compare in (22)–(23) 2nd person [−obv] possessors or transitive subjects with 3rd person possessors or transitive subjects. In both sets of examples the possessed argument or the direct object is 3rd person. Note that for both 2nd and 3rd person possessors or subjects in these examples, there is a proclitic showing the person of the possessor or subject—**/k-/** for 2nd person and **/w-/** for 3rd person—and an agreement suffix **/-wa/** when the possessor or subject is plural. Since Potawatomi

proclitics are limited to [−obv] arguments, the data in (22)–(23) support the proposal that a 3rd person DP is marked [−obv] in opposition to another 3rd person argument in the DP/IP—either a subject or object in the case of a transitive verb or the possessed NP in the case of a possessed DP.

(22)

a.	**k-čiman**	'your (sg) canoe'
b.	**k-čiman-wa**	'your **(pl)** canoe'
c.	**w-čiman**	'his canoe'
d.	**w-čiman-wa**	'their canoe'
e.	**k-os'**	'your father'
f.	**k-os'-un**	'your father (obv)'
g.	**w-os'-un**	'his father (obv)' **(/w/ → /ʔ/** by phonological rule)
h.	**w-os'-wa-n**	'their father (obv)'
i.	***w-os'**	'his father (not obv)'

(23)

a.	**k-wapm-a**	**'you (sg) see** him'
b.	**k-wapm-a-wa**	'you **(pl)** see him'
c.	**w-wapm-a-n**	'he sees **him/them** (obv)'
d.	**w-wapm-a-wa-n**	'they see **him/them** (obv)'
e.	***w-wapm-a-wa**	'they see him'

There is one major difference between the structures involving a 3rd person [−obv] DP and those involving a 1st or 2nd person DP (which are automatically [−obv]), a difference that shows up in the possessed form of an animate noun **(22e–i)** or in the transitive verb pattern with an animate direct object (23). **(22e)** shows that an animate noun possessed by a 2nd person need not be marked **[+obv],** whereas the ungrammaticality of **(22i)** shows that an animate noun possessed by a 3rd person (by hypothesis, [−obv]) DP must be so marked. (23a–b) show that the 3rd person object with a 2nd person subject also need not be marked [+obv], whereas the ungrammaticality of **(23e)** indicates again that the 3rd person object with a [−obv] 3rd person subject must be marked [+obv].

The examples in (24) should be compared to those in (23).

(24)

a.	**w-wapm-uko-n**	**'he/they** (obv) sees him'
b.	**w-wapm-uk-wa-n**	**'he/they** (obv) sees them'
c.	***w-wapm-uk**	'he (not obv) sees him'

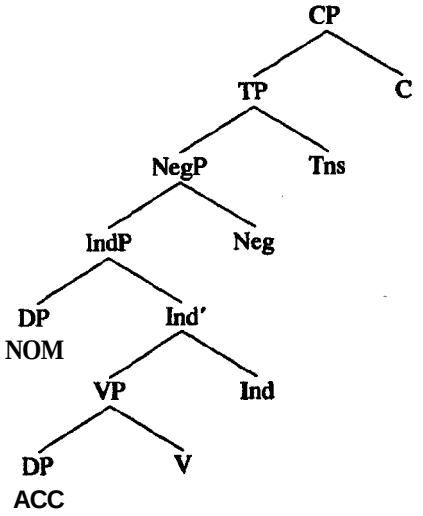
In **(24),** as in **(23),** both subject and object of the transitive verb are 3rd person. In **(23c–e)** the subject was marked **[−obv]** and the object **[+obv].**

(24) shows that the other option is also possible; the object is marked **[−obv]** and the subject **[+obv].** The difference is signaled by the morpheme immediately after the stem, **/-a/** in (23) and **/-uko/** in (24). As will be explained in more detail below, this morpheme agrees in case with a 3rd person argument that is not **[−obv]**—**/-a/** for an accusative argument as in (23) and **/-uko/** for a nominative argument, as in (24). The ungrammaticality of (24c) again shows that when one 3rd person argument is [−obv], the other must be **[+obv].**

5.2 Identifying the Morphemes

The syntactic structure of independent order clauses is summarized in **(25).**

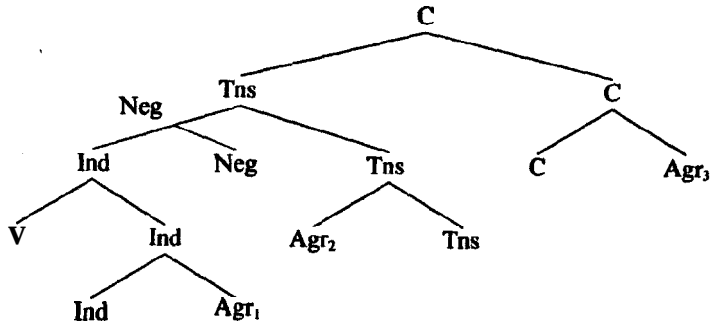
(25)



We assume that independent order clauses contain a functional head, here represented as **"Ind,"** that forms a particular "participle"-like phrase under **T(ense)P.** Given that independent order clauses have a special distribution in discourse, we might suppose that there is a selection relation in (25) between C and Tns, and between Tns and Ind. Recall that all the **DPs** in argument positions in Potawatomi are pronominals, consisting solely of features on the head D. Full **DPs** "doubling" these pronominal arguments will be adjoined to the CP when they occur. [−obv] **Ds—1st, 2nd,** and some 3rd **person Ds—are** true pronominals and will **cliticize** to the front of CP at MS. Other **Ds—[+obv]** 3rd person Ds and **Ds** unmarked for **[obv]—must** be small pro's. We have placed the "NOM" subject in [Spec, **IndP]** and the **"ACC"** object in the VP in (25); however, the subject might move to [Spec, TP] in the syntax if **TPs** need subjects.

In the syntax, the verb will raise via head-to-head movement to Ind, Neg, Tns, and then C. Each time the verb raises, it adjoins to the next head up in the tree. At MS the **Agrs** are added to the appropriate functional heads, $\mathbf{Agr}_1$ to Ind, $\mathbf{Agr}_2$ to Tns, and $\mathbf{Agr}_3$ to C, yielding the structure in (26).

(26) ***Inflected independent order verb at MS***



Recall that if both DP arguments are 3rd person, one must be marked **[−obv]** and the other **[+obv].** Agr, will agree in all features, including case, with a pro DP—non-**[−obv]—argument** in the government domain of V + Ind, after V raises (see Marantz **1992a** for elaboration on the mechanisms of agreement). Agr, agrees in person and number with all **[−obv]** DP arguments in the government domain of V + **Ind(+Neg)** + Tns after V-raising. Agr, is a Gender (animacy)/Number/Obviation concord morpheme, much like the **Gender/Number/Case** morpheme assumed to be added at MS to Russian adjectives, as explained in footnote 4. Agr, will agree, via concord, in **[+pl]** and [+obv] with the Agr, on Ind, which independent C selects. The characteristics of the various Potawatomi Agr morphemes are summarized in (27).

(27)

Agr	*Adjoins to X at MS*	*Agrees with Y in Z features*
$\mathbf{Agr}_1$	**Ind**	Agrees with a pro DP argument (a non-[−obv] argument) in animacy, case, [±pl], and [±obv]
$\mathbf{Agr}_2$	Tns	Agrees with [−obv] arguments in person, [±pl], and case
$\mathbf{Agr}_3$	**C**	Agrees (via concord) with Agr, in animacy, [±pl], and [±obv]

We assume that the determination of government relations in word structures like (26) follows the same principles as for government relations in the syntax. In particular, when A is adjoined to B, as $\mathbf{Agr_2}$ is adjoined to Tns in **(26),** A c-commands everything that B c-commands; that is, **A** c-commands everything c-commanded by both the "segment" of B to which A is adjoined and every segment of B formed via adjunction. Thus, in a structure like (26) $\mathbf{Agr_2}$ c-commands all constituents c-commanded by its sister Tns node (here, Neg and the constituents dominated by Neg) and all constituents c-commanded by the highest Tns node (here, constituents dominated by C).

The major problem in the analysis of the independent order verb is that the agreement for [—obv] arguments (Agr,) is in a different (suffixal) morpheme from that of other arguments. Example **(16b),** repeated here as **(28),** is a typical instantiation of the independent order verb structure (26) with its three agreement suffixes, labeled Agr,, $\mathbf{Agr_2}$, and $\mathbf{Agr_3}$.

(28)	k-	wapm	-a	**-s'i**	**-m**	**-wapunin**	-uk
	Cl-	V	Agr,	Neg	Agr,	Tns	$\mathbf{Agr_3}$
	2	see	3ACC		**2pl**	preterit	**3pl**

'you (pl) didn't see them'

Agr, reflects the subject versus object contrast of a non-[—obv] 3rd person argument (a pro argument) of the verb (the **/-a/** in (28) is for an ACC argument (direct object)). The obviation and number features of this argument are assigned to Agr,, (the **/-k/** in (28) signals plural). Sandwiched between $\mathbf{Agr_1}$ and Agr,, and between Neg and Tns, is the $\mathbf{Agr_2}$ morpheme, which marks the person, number, and case features of all and only the [—obv] arguments of the verb, the **/-m/** affix standing for 2nd person plural. In sentences with a 1st or 2nd person argument as subject and object, $\mathbf{Agr_2}$ will contain two sets of agreement features, one with **NOM** and one with ACC case. Similarly, the **Clitic** complex will contain two sets of features, one for each of the arguments.

In Marantz **1992a** it is argued that Agr always attaches to some head at MS to pick up the features of **DPs** governed by that head. For the analysis of Potawatomi to follow from general principles, we need to motivate the terminal nodes that the various Agrs in (28) are attaching to.

The $\mathbf{Agr_2}$ next to Tns presents no conceptual difficulty. The usual situation cross-linguistically is for **Agr** to attach to Tns and agree with one or more arguments in the government domain of **[V+Tns]** (see Marantz **1992a).** In the conjunct order inflection (see **(16a))** all arguments, **including** non-[—obv] 3rd person ones, show agreement in this position in the verb.

Table 1
Potawatomi "conjunct order" $\mathbf{Agr_2}$ (for transitive animate stems)

	OBJECT							
	1	2	3	3obv	1incl	1excl	2pl	3pl
SUBJECT								
1		unan	uk				unuko	ukwa
2	**yun**		**ut**			**yak**		**utwa**
3	t	uk		at	unuk	yumut	unak	
3obv			ukot					ukwat
1incl			at					
1excl		unak	uko				unak	
2pl	**yek**		ek			**yak**		ukwa
3pl	wat	**uk'wa**		awat	unuk	yumut	unak	

The various manifestations of this $\mathbf{Agr_2}$ for transitive verbs with animate objects in the conjunct order are shown in table 1 (from Hockett 1948). Note that the repetition of phonological pieces within the various cells of table 1 suggests that some splitting of features of the $\mathbf{Agr_2}$ morpheme into independent terminal nodes might be justified, just as we split the plural feature from the **proclitics** in Georgian in section 2.1. However, as a whole, the conjunct Agr, node agrees simultaneously with both **subject** and object in person, number, and case.

Recall that in contrast, $\mathbf{Agr_2}$ in the independent order agrees only with the **[—obv]** arguments. The question, then, is to determine what is special about the independent order inflection that splits [—obv] arguments off into a special class and employs two extra morphemes, one on the stem **($\mathbf{Agr_1}$)** and one outside all the other morphemes **($\mathbf{Agr_3}$),** that show agreement with different features of the non-[—obv] arguments.

Since independent order inflection goes with main clauses, the choice of such inflection must involve the Complementizer system in some way, or at least some functional category higher than TP that may be governed from C. For present purposes, we will identify as a C this functional category that contains the information that the clause is independent. The independent C chooses the morpheme that appears on the verb stem and shows agreement with **non-[—obv]** (the pro) arguments in case; that is, independent C chooses the morpheme to which Agr, attaches. This morpheme appears only in the independent order, not in the conjunct order.

We call the form of the verb stem chosen by independent C the ***independent*** or Ind stem.

Since the agreement on the functional category that creates this Ind stem ($\mathbf{Agr_1}$) agrees in case with a pro 3rd person argument, as shown in **(29),** it would be tempting to call the form that agrees with a subject as in **(29a,b,f,i)** the "active" participle and the one that agrees with the object as in **(29c–e,g,h)** the "passive" participle. However, cross-linguistically passive and active participles have aspectual implications not exhibited by these forms. Moreover, passives and actives are not generally restricted to 3rd person arguments. We therefore leave the nature of these stem forms open for further investigation, emphasizing again that the only unusual thing about them is that the agreement on them targets **non-[−obv]** arguments only. (See Johns 1992 for speculations about Inuit that might suggest that the **Ind** stem forms should be treated as nominalizations of the verb root.)

(29) a. **k-wapm-uk** 'he sees you **(sg)'**
b. **k-wapm-uko-k** 'they see you **(sg)'**
c. **k-wapm-a** **'you (sg)** see **him'**
d. **k-wapm-a-k** 'you (sg) **see them'**
e. **n-wapm-a** 'I see **him'**
f. **n-wapm-uk** 'he sees me'
g. **n-wapm-a-n** 'I see **him** (obv)'
h. **w-wapm-a-n** 'he [−obv] sees **him** (obv)'
i. **w-wapm-uko-n** 'he (obv) sees him **[−obv]'**

$\mathbf{Agr_1}$ and Ind fuse into a single terminal node prior to Vocabulary insertion. The data in (29) are consistent with there being two Vocabulary items that compete for spelling out the fused Agr, **+Ind** node, as in (30).

(30) [Agr, + Ind]
NOM ↔ **/-ukO/** / [+trans] ___
↔ **/-a/** / [+trans] ___

We have included the stipulation that the Vocabulary items in (30) are inserted only on [+trans] stems, where the [+trans] stems comprise an inflectional class in Potawatomi that does not conform exactly to the syntactic class of transitives. The **[Agr + Ind]** node is always zero with intransitive animate stems ([−trans] stems with an animate subject); see (19). However, the **/−a/** appears on transitive inanimate stems ([+trans] stems with an inanimate object) in addition to the transitive animate stems of (29), agreeing with a pro, [−anim] object in these ***cases;*** see (38).

Whereas Agr, agrees in case with a pro argument and appears in the position of Ind, $\mathbf{Agr_3}$ agrees in obviation and number with such an argument and appears in the position of what we now identify as the C node. (31) shows examples of this $\mathbf{Agr_3}$ agreeing with either the subject, when Agr, is **NOM** as in **(31c–d),** or the object, when Agr, is ACC, as in **(31a–b). (31e–f)** are a reminder that the Vocabulary items that spell out **[+pl]** and [+obv] in the $\mathbf{Agr_3}$ + C node are the same as those that spell out these features on animate nouns.

(31) a. **n-wapm-a-k** 'I **see them'**
b. **n-wapm-a-n** 'I see him **(obv)'**
c. n-wapm-uk 'he sees me'
d. **n-wapm-uko-k** 'they see **me'**
e. **n-os'-uk** **'my fathers'**
f. **n-os'-un** 'my father **(obv)'**

Recall that there is a selection relation between independent C and the Ind node creating the independent stem. This node **carries agreement—$\mathbf{Agr_1}$—with** a pro argument. If there is concord agreement for animacy, [±pl], and [±obv] between C and the Ind node that it selects, we would have the features we want in the correct place in the verb. The agreeing features from $\mathbf{Agr_1}$ appear on the $\mathbf{Agr_3}$ node, which fuses with C to yield a single terminal node for Vocabulary insertion. The competing Vocabulary items for **[$\mathbf{Agr_3}$ + C]** in (32) will yield the correct results. We have also included the Vocabulary items for a D within the DP, which agrees in animacy, [±pl], and [±obv] with the head N of its NP complement. For animate nouns and animate pro's, the Vocabulary items for fused **[$\mathbf{Agr_3}$ + C]** and [Agr + **D]** are the same, (32d–e). For inanimate nouns and inanimate pro's, the Vocabulary items are different. Agreement with pro on a C for inanimates requires the items in (32a–b), illustrated in **(21).**[22] Agreement on D for inanimates involves the plural suffix **(32c).**

(32) [$\mathbf{Agr_3}$ + C] (Agr + D)
a. C ↔ /-ton/
[+obv]
[−anim]
b. C ↔ /-nun/
[+pl]
[−anim]
c. [+pl]
[−anim] ↔ **/-n/**[23]

in (35) will only be inserted in independent order verbs, the suffixes in (35) are explicitly marked to occur either next to +-features (person, number, and gender) or next to the Ind morpheme. The **ϕ-features** mentioned in **(35a,c)** are the person, number, and gender (animacy) features that either Agr,, found only on Ind, or a noun stem might have. By mentioning these **ϕ-features** in the Vocabulary entries here, we explain why the affixes **/-nan/** and **/-wa/** are limited in the verbal inflection to independent order verbs where a pro subject or object occurs and Agr, therefore has ϕ-features. In addition, we explain why these same affixes occur as the agreement form for plural possessive agreement, as shown in (36).

(36) a. **n-čiman-nan** **'our** canoe'
b. **k-čiman-wa** 'your (pl) canoe'
c. **w-čiman-wa** **'their [−obv]** canoe'

In the case of the possessed nouns, it is the noun stem itself that **carries** the **ϕ-features** that serve as the environment for the insertion of **(35a)** or **(35c)**. Thus, the forms in **(35a,c)** will compete for the Agr on N in **DPs** that agrees with the (genitive) [−obv] possessor. The possessors are also pronominal **proclitics** that **cliticize** to the front of the possessed **N** and are realized with the same Vocabulary items that compete for the pronominal proclitics on independent order verbs **(see** (33)).

The ordering of the affixes in (35) deserves some comment. The ordering of **(35b)** before **(35c)** does not clearly follow from general principles, although the ordering is required unless the features assigned to the affixes are modified, as noted above. The issue of which entry is more fully specified, **(35b)** or **(35c),** hinges on decisions made about hierarchies of features, as explored by Noyer **(1992a).** If case features are dependent on person features, for example, and [+ I] is more specific than [−obv], then on one view, **(35b)** would be more specific than **(35c).**

For the sake of completeness, **we** have included a few elements in (35) that have not yet been encountered in examples. At this point we will illustrate the basic use of each of the Vocabulary items in (35). In the next section we will illustrate how the interaction between morphemes affects both the distribution of these Vocabulary items and their phonological form.

The examples in (37) show the **basic** uses of the **[+pl]** affixes **(35a–d).**

(37) a. **n-wapm-uk-nan** 'he **sees us'**
b. **n-wapm-a-mun** 'we see him'
c. **k-wapm-a-wa** 'you (pl) **see** him'
d. **k-wapm-a-m-wapun** 'you **(pl) saw** him'

The suffix **/-nan/** is used for a **1st** person plural Agr, with ACC case in **(37a),** inserted next to /-uk/, which has +-features agreeing with a pro subject. The suffix **/-mun/** appears in **(37b)** in place of **/-nan/** since the **1st** person plural Agr, in **(37b)** is **NOM,** not ACC or GEN. We will discuss the different environments for the suffixes **/-wa/** and /-m/ in the next section; we note here only that **/-wa/** occurs for a plural Agr, in **(37c),** whereas **/-m/** occurs in **(37d)** before the preterit **/-(wa)pun/.** We will propose an impoverishment rule that removes the case features of $\mathbf{Agr_2}$ before the preterit Tns, causing the choice of **/-m/** rather than **/-wa/** before **/-wapun/.**

What remains to be introduced from (35) are elements involved with inanimate verb stems, which we have not yet discussed, these are illustrated in (38).

(38) a. **w-wapt-a-nawa** 'they see it (inanim)'
b. **k-wapt-a-n** 'you see it (inanim)'
c. k-wapt-a-0-napun 'you saw it (inanim)'

The form *waput* 'see' in (38) is morphologically related to the verb ***wapum*** 'see' that we have been using in most of our examples. The former is used for inanimate direct objects, the latter for animate direct objects. The situation described under the Vocabulary item **(35c),** in which the expected **/-wa/** shows up as **/-nawa/,** is illustrated in **(38a).** Here Agr, is **[−anim]** and thus $\mathbf{Agr_2}$ is next to **ϕ-features** containing [−anim]. (The **/na/** could be added by a readjustment rule; see section 5.3 for a discussion of such rules in Potawatorni.) The Vocabulary item in **(35e),** like **/-nawa/,** is restricted to transitive inanimate stems. **(38b)** illustrates this **/-n/** suffix. Although **/-n/** occurs with inanimate object verbs in the independent order, it does not occur on inanimate possessed nouns. For that reason, the restriction to stems with the Ind morpheme is included among its features in **(35e).** If we used the context, /-features including **[−anim]** for **(35e),** this Vocabulary item would attach to inanimate possessed nouns, which have /-features including **[−anim].** The disappearance of **/-n/** before the preterit suffix, as described by the "deletes before [+preterit]" in **(35e),** is shown in **(38c).** (This deletion could be written as a readjustment rule.) The appearance of the preterit as **/-napun/** rather than **/-pun/** will be discussed below.

Continuing with this survey of Potawatomi affixes, we turn to the preterit and negative morphemes of the independent order. As mentioned above, the preterit Tns affix is /-pun/, with some allomorphs **(/napun/,**

/wapun/, /napunin/, /wapunin/) to be discussed below. The negative affix for independent order verbs is **/-s'i/.**

5.3 Affixes as Morphemes

We have shown that the positioning of phonological pieces in the Potawatomi inflected verb is plausibly the result of the insertion of Vocabulary items into terminal nodes derived from the syntax. Each "position" in the Potawatomi verb can be related to a featurally coherent terminal node whose syntactic and morphological function is fairly straightforward. On this analysis, there is no reason to appeal to arbitrarily ordered blocks of **WFRs,** as on Anderson's analysis, to derive the Potawatomi verb.

In addition to determining the location of the phonological realization of inflectional features, the Potawatomi inflectional morphemes show their presence by influencing the realization of structurally adjacent morphemes. It will be recalled from the discussion of English verb inflection in section 3.1 and the Georgian inflections in section 2.2 that such contextual influences fall into three categories. First, there are instances of conditioned allomorphy, where the choice of one item in Vocabulary insertion is determined by an adjacent morpheme, as, for example, in the English past participle forms take-n and *put-*$\emptyset$. Parallel examples from Potawatomi were discussed in the preceding section in connection with the choice of affixes for $\mathbf{Agr_2}$ in (35). Second, English also has alternations such as freeze–froze-n or break–brok-en where the phonetic composition of a morpheme is modified in a position adjacent to another morpheme. Alternations of this kind were handled by readjustment rules like (10). In this section we discuss some readjustment rules of Potawatomi, which differ from those in (10) in applying to affixes rather than stems. Finally, as discussed briefly in connection with the Georgian plural **/-t/** suffix in section 2.2, there are rules of impoverishment that delete morphosyntactic features of morphemes in the context of other morphemes. We discuss rules of impoverishment from Potawatomi in this section as well. As pointed out below, the facts captured by readjustment and impoverishment constitute a major sort of problem for affixless theories like Anderson's.

Consider first a simple example of the interaction of morphemes in Potawatomi. The **/-mun/** suffix **(35b)** for 1st person plural subject agreement in Agr, appears to block the further affixation of the $\mathbf{Agr_3}$ suffixes **/-n/** and **/-k/.** This is shown in (39a–b), where the expected forms with final **/-n/** and **/-k/** are ungrammatical and must be replaced by the forms without **/-n/** and /-k/ for the same arrangement of arguments. We will argue that this blocking effect is the result of the deletion—impoverishment—of Agr, in the environment of the features on Agr, that trigger the insertion of **/-mun/.** It is not just any suffix under Agr_2 that forces deletion of Agr,. Unlike **/-mun/, /-nan/ (35a),** which **realizes** $\mathbf{Agr_2}$ with the features of 1st person plural objects, does not block **/-n/** and **/-k/,** as shown in **(39c–d). (39e–f)** show that 2nd person plural subject $\mathbf{Agr_2}$ **/-wa/** (35c) does not block **/-n/** or **/-k/** either.

(39) a.	***n-wapm-a-mun-uk**	'we see them'		n-wapm-a-mnn
b.	*n-wapm-a-mun-un	'we see him (obv)'		**n-wapm-a-mun**
c.	n-wapm-uk-nan-uk	'they see us'		
d.	n-wapm-uk-nan-un	'he (obv) sees us'		
e.	**k-wapm-a-wa-k**	'you (pl) see them'		
f.	**k-wapm-a-wa-n**	'you **(pl)** see him (obv)'		

As shown by the examples in **(40),** adding the preterit morpheme *wapunin* appears to complicate the analysis of **Agr,** deletion.

(40) a.	*n-wapm-a-mn-(w)apunin-uk n-wapma-mn-apun	'we saw them'
b.	*n-wapm-a-mn-(w)apunin-un **n-wapm-a-mn-apun**	'we saw him (obv)'
c.	**k-wapm-a-m-wapunin-uk**	'you (pl) saw them'
d.	**k-wapm-a-m-wapunin-un**	'you **(pl)** saw him **(obv)'**

Although the preterit Tns morpheme appears between **/-mun/** and the $\mathbf{Agr_3}$ **/-k/** or **/-n/,** still the presence of **/-mun/** blocks the /-k/ and **/-n/** even "over" the preterit, which has the allomorph **/-(w)apun/** after /-mun/ and **/-(wa)punin/** before **/-k/, /-n/** (see the discussion of Potawatomi readjustment below). (40a–b) show the blocking effect of **/-mun/** over **/-wapunin/,** and **(40c–d)** show that it is not the combination of any $\mathbf{Agr_2}$ **suffix** and the preterit that blocks **/-k/, /-n/** but only **/-mun/.** Note in (40c–d) that the 2nd person plural subject $\mathbf{Agr_2}$ shows up as **/-m/ (35d)** instead of **/-wa/** before **/-wapun(in)/,** as it did in **(39e–f).**

To avoid an analysis in which an affixal morpheme with certain features, Agr,, deletes another morpheme, $\mathbf{Agr_3}$, one might propose that the deletion or blocking of the **/-n/** and **/-k/** suffixes is triggered by the phonological sequence **/-mun/,** not by a particular morpheme. However, a further set of facts defeats this proposal. The distinction between **/-nan/** and **/-mun/** is lost before **/(w)apun(in)/;** even with a 3rd person subject and **1st** plural object, we find **/-mun/** for Agr,, not **/-nan/,** before the preterit, as shown in **(41).** Compare **(41a–b)** with **(39c–d).** This **/-mun/** for 1st person plural objects, like the **1st** person plural object affix **/-nan/** but

d. [+obv] ↔ /-n/
[+anim]

e. [+pl] ↔ /-k/

Recall that the DP subject in [Spec, IndP] in (25) and the DP object in the VP will be pronominal, consisting only of features under the D node. Overt DPs (adjuncts) outside the CP may bind the pronominal arguments. Non-[−obv] arguments are phonologically null pro's ("identified" by Agr,). As explained above, the [−obv] argument pronominals in independent order cliticize to the front of CP, before certain adverbials that may appear inside the CP and before the verb, as in (17). The clitics fuse together (as explained in section 2.1 for Georgian), and the Vocabulary items in (33) compete to spell out the resulting node. Again, the difference between [−obv] and other DP arguments is that the [−obv] arguments have Vocabulary items to spell them out whereas the non-[−obv] arguments must be pro.

(33) Clitic

[+2] ↔ /k-/
[+1] ↔ /n-/
[−obv] ↔ /w-/[24]

These competing items must be ordered as shown in (33), either explicitly or because of language-specific or universal priority relations among the features involved. If [±1] universally takes priority over [±2], the same results could be ensured by giving /n-/ the feature [−2] as well, making it come first in the ordering, as suggested by Noyer (1992a).

The need for the ordering in (33) becomes particularly clear when we examine the form of verbs with 1st person inclusive arguments, that is, arguments meaning 'you and I'. A slightly simplified MS structure for such a verb prior to Vocabulary insertion is shown in (34a). In (34b) we show the individual Vocabulary items that are inserted in the different terminal nodes. The positions in the word will still be fully specified with the features shown in (34a) after Vocabulary insertion even though the Vocabulary items themselves are underspecified, since insertion is "feature-filling" rather than "feature-changing."

(34) 'You and I (we) see him.'

a. Cl-	[[V	Agr_1]	Agr_2]
[+1], [+2]		[−1], [−2]	[+1], [+2]
NOM, [+pl]		ACC, [−pl]	NOM, [+pl]

b. k-	wapm	-a	-mun
Cl-	V	$-Agr_1$	$-Agr_2$
[+2]		ACC	[+1], pl

As shown in (34a), the Clitic position for [−obv] arguments contains the features [+I] and [+2] for a 1st person inclusive subject; the Agr_2 agrees with this [−obv] argument in all features. The competition among the morphemes in (33) for insertion in the Clitic node must end with the [+2] prefix /k-/ as the winner. However, the competition among the Agr_2 affixes, which are shown in (35), ends with the [+1]-carrying /-mun/ as the winner. In particular, the prefix with the [+2] feature must win over the prefix with the [+1] feature even when both are present. This outcome is ensured by the ordering in (33). As is shown in (35) and in many examples below, the form for Agr_2 without the [+1] feature in a string like (34) would be /-wa/, not /-mun/. The choice of /-mun/ for Agr_2 in (34b), then, indicates the presence of the [+1] feature on both Clitic and the Agr_2 that agrees with the Clitic argument.

There is a great deal of allomorphy for the affixes inserted under the Agr_2 node, as partially indicated by the Vocabulary items that compete for this node listed in (35).

(35) *Agr_2*

a. [+1] ↔ /-nan/ / ϕ ___
[+pl]
[ACC] or [GEN]

b. [+1] ↔ /-mun/ / Ind ___
[+pl]

c. [−obv] ↔ /-wa/ / ϕ ___[25]
[+pl]
[case]
add /na/ before /-wa/ for verbal stems when ϕ includes [−anim]

d. [−obv] ↔ /-m/ / Ind ___
[+pl]

e. [−obv] ↔ /-n/ / Ind ___
[−anim]
deletes before [+preterit]

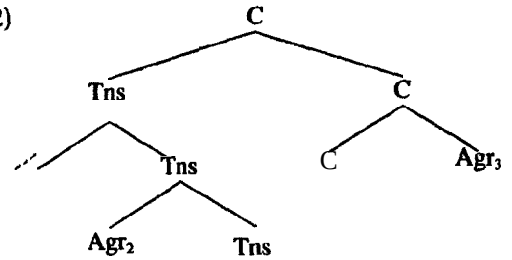
Note that the Vocabulary entries in (35) will compete for the Agr_2 node with the affixes whose phonological forms are given in table 1, where the realizations of Agr_2 in conjunct order are listed. To ensure that the items

unlike the 1st person plural subject affix **/-mun/,** does not block further affixation of **/-n/,** /-k/, as shown in (41). Thus, it is not the phonological piece **/-mun/** that blocks the **/-n/** or **/-k/** realization of Agr_3; rather, it is the presence of a **1st** person plural subject **Agr_2.**

(41) a. n-wapm-uk-mun-(w)apunin-uk 'they saw us'
b. n-wapm-uk-mun-(w)apunin-un 'he (obv) saw us'

Although Agr, (subject **/-mun/)** seems to affect Agr, **(/-k/, /-n/)** non-locally, over the Tns **(/-pun/)** morpheme, when the hierarchical structure of the inflected verb is examined, it becomes clear that Agr, governs **Agr_3** in the technical sense. Consider the relevant portion of an independent order inflected verb from **(26),** reproduced as (42).

(42)



On the technical definition of c-command used, for example, in Chomsky 1993, Agr, c-commands Agr,; since Agr, is adjoined to Tns, it is not dominated by every segment of Tns and may c-command constituents dominated by C. Since Agr, is adjoined to C, it is not dominated by every segment of C and C may not serve as a barrier to government of Agr_3 by Agr,. The adjunction structures that result from head movement and adjunction in the syntax and from the adjunction of Agr to functional heads at MS allow for more government relations among terminal nodes than the linear string of morphemes might suggest.

We propose that the effect of **/-mun/** on Agr, is a form of impoverishment—the deletion of certain morphosyntactic features in the presence of other such features in the same or in a governing morpheme. In particular, we tentatively propose the radical impoverishment rule in (43).

(43) Agr, → **∅** / governed by **Agr_2**
[+1]
[+pl]
[NOM]

Although we now have an account of why **Agr_3** is not realized in the presence of 1st person plural subject **/-mun/,** we have not explained why 1st person object Agr, shows up as **/-nan/** in (39c–d) but as **/-mun/** before the preterit affix in (41). It seems that **/-mun/** is the unmarked form for a **1st** person plural Agr,, and we have given it just the features **[+1], [+pl]** in (35); thus, the change from **/-nan/** to **/-mun/** represents a retreat to the general case. There is another special **form** for **1st** person plural **Agr_2** that disappears before the preterit; for 1st person plural objects when the subject is 2nd person, there is a special form **/-ymun/** that also retreats to **/-mun/** before the preterit, as shown in (44).

(44) a. k-wapm-uymun 'you (sg or pl) see **us'**
b. **k-wapm-umn-(w)apum** 'you (sg or pl) saw us'

Suppose that **/-nan/** carries the feature [ACC], as in (35a), and that the **/y/** of **/-ymun/** in **(44a)** is inserted by a readjustment rule, **(45),** that is triggered by the same [ACC] feature.

(45) ∅ → /y/ / ___ **/mun/**
[ACC]

We can now propose an impoverishment rule as in (46) to delete the feature **[ACC]** from a **[1]** Agr, next to [+preterit]. This impoverishment rule will take **/-nan/** out of the competition for the phonological realization of Agr, before a preterit Tns, since **/-nan/** depends on the presence of [ACC] in **Agr_2.** In addition, (46) will bleed the readjustment rule in **(45).**[26]

(46) [ACC] → ∅ / ___ [+preterit]
[+1]

One other alternation was observed above to occur before the preterit: the alternation **/-wa/ ~ /-m/** for the 2nd person plural **Agr_2. /-wa/** occurs for **[−obv]** plural subjects or objects as long as they exclude the 1st person (recall that the **1st** person affixes for plural **Agr_2** are ordered before those for the plain [−obv] affixes in (35)). The distribution of **/-wa/** is illustrated in (47).

(47) a. **k-wapm-a-wa** 'you (pl) see him'
b. w-wapm-a-9-n 'they [−obv] see him (obv)'
c. **k-wapm-uk-wa** **'he sees you (pl)'**
d. **w-wapm-uk-wa-n** 'he (obv) **sees them [−obv]'**

Elsewhere the unmarked form for a [−obv] plural **Agr_2** is **/-m/.** Where otherwise we would expect **/-wa/, Agr_2** reverts to **/-m/** before [+preterit] for plural subjects, but not for plural objects, as shown in (48). **(48c–**

d) exhibit an additional feature: **/-wa/** deletes before the **/-wa/** part of **/-wapun/** in a type of haplology, since the **/-wa/** of **/-wapun/** is also a plural **/-wa/,** as shown in (53).

(48) a. **k-wapm-a-m-wapun** 'you (pl) saw him'
b. w-wapm-a-g-wapunin-un 'they [−obv] saw him (obv)'
c. **k-wapm-uk-(wa)-wapun** **'he saw you (pl)'**
d. **w-wapm-uk-(~a)-wapunin-un** 'he (obv) saw them [−obv]'

If we suppose that the **/-wa/** spell-out of plural $\mathbf{Agr_2}$ requires a case feature (either **[NOM]** or **[ACC];** see **(35c)),** then the impoverishment rule in (49) will account for the examples in (48a–b). Note that this rule is very similar to (46) except that it deletes **[NOM]** instead of [ACC].

(49) **[NOM]** → ∅ / ___ [+preterit]
[−obv]
[−1]

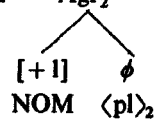
In our analysis of the influence that individual morphemes have on other morphemes, we have thus far proposed mainly impoverishment rules that take place before the insertion of Vocabulary items (the exception is the readjustment rule in (45) that must occur after the insertion of **/-mun/).** The impoverishment rules delete features of terminal nodes in the presence of other morphosyntactic features; obviously, the deletion of such features in a morpheme affects the set of Vocabulary items that might compete for the phonological realization of that morpheme. Deleting the [ACC] feature of Agr, before the preterit in **(46),** for example, takes **/-nan/** out of the running for the $\mathbf{Agr_2}$ node. By contrast, the readjustment rule **(45),** which changes the phonological features of a morpheme, must be ordered after Vocabulary insertion, which provides phonological features for morphemes.

To complete the analysis, we need some additional readjustment rules, rules that change the phonological form of morphemes after Vocabulary insertion. The first rule adds **/-n/** (or **/-non/** after Neg) to Agr, when $\mathbf{Agr_2}$ contains two sets of **ϕ-features (i.e.,** when both the arguments of a transitive verb are **[−obv])** and the subject is **1st** person. The output of this rule can be seen in (50), and we have attempted to formulate it in (51). The curious addition of another **/-n/** to the basic **/-n/** (or to the **/-non/** after Neg) when the mentioned **ϕ-features** include plural is illustrated in **(50b,e)** and produced by the second set of angled brackets in rule (51).

(50) a. **k-wapm-un** **k-wapm-un-napun**
'I see you' 'I saw you'

b. **k-wapm-unum** **k-wapm-unnum-wapun**
'I see you (pl)' **'I** saw you **(pl)'**
c. **k-wapm-unmun** **k-wapm-unmun-wapun**
'we see you **(sg/pl)'** 'we saw you **(sg/pl)'**
d. **k-wapm-us'-non** **k-wapm-us'-non-napun**
'I don't see you' 'I didn't see you'
e. **k-wapm-us'-nonum** **k-wapm-us'-nonnum-wapum**
'I don't see you (pl)' 'I didn't see you (pl)'
f. **k-wapm-us'-nonmun** **k-wapm-us'-nonmun-wapum**
'we don't see you **(sg/pl)'** 'we didn't see you **(sg/pl)'**

(51) ∅ → /⟨no⟩$_1$-n⟨n⟩$_2$/ / ⟨Neg⟩$_1$ ___ $\mathbf{Agr_2}$ ⟨preterit⟩$_2$



In addition to readjusting $\mathbf{Agr_2}$ in some cases, we need to account for the appearance of the preterit **/-pun/** in various environments. First, /-pun/ becomes **/-punin/** before **/-k/** or **/-n/.** More generally, Hockett claims the addition of /-in/ occurs before any suffix.

(52) ∅ → **/in/** / pun ___ **/segment/**

Second, **/wa/** is added before /-pun/ when Ag, is **[+pl].** Recall that haplology appears to delete one of two **/wa/'s** in a row if such a **sequence** is produced by (53).

(53) 0 → **/wa/** / **[+pl]** ___ pun

Finally, /-pun/ shows up as **/-wapun/** or **/-napun/** after a **phonologically** overt Agr, (for examples of **/-napun/, see (38c), (50a,d)).** We have shown that **/-wapun/** occurs after an overt **[+pl]** $\mathbf{Agr_2}$**.** The examples in (54a–b) from the animate transitive paradigm and the examples in **(54c–f)** from the intransitive animate paradigm would suggest that **/-napun/** occurs after a nonovert [−obv] Agr, as well. Compare these examples with the intransitive examples in **(54g–j)** where there is no [−obv] argument—and thus no [−obv] $\mathbf{Agr_2}$**—and** the preterit is **/-pun(in)/** rather than **/-napun(in)/.**

(54) a. **k-wapum-∅** 'you see me'
b. **k-wapm-∅-unapun** 'you saw me'
c. **n-kaskumi-∅** 'I start running'
d. **k-kaskumi-∅** 'you start running'

e. **n-kaskumi-∅-napun** 'I started running'
f. **k-kaskumi-∅-napun** 'you started running'
g. kaskumi 'he starts running'
h. kaskumi-n 'he (obv) starts running'
i. kaskumi-pun 'he started running'
j. **kaskumi-punin-un** 'he (obv) started running'

Although a **[−obv] Agr$_2$** in the singular (even one that is **phonologically** null) seems to trigger **/-napun/** in **(54b,e,f),** when **Agr$_1$** has **φ-features (i.e.,** in transitive contexts where one of the arguments is 3rd person pro), an agreeing **[−obv]** Agr, will not trigger **/-napun/,** as shown in (55).

(55) a. n-wapm-a-$-pun 'I saw him'
b. **n-wapm-uk-∅-pun** 'he saw me'

If we propose another impoverishment rule (56) that deletes the [−obv] feature of a singular **Agr$_2$** adjacent to animate **φ-features (i.e.,** after an agreeing **Agr$_1$** for transitive animate verbs), then we could add the readjustment rule in (57) to account for the distribution of **/-napun/**. For transitive inanimate verbs, singular Agr, spells out as **/-n/ (35e)** and we get **/-napun/** for [+preterit] rather than /-pun/; see the examples in (38). This indicates that we do not want to delete Agr, when the **φ-features** of **Agr$_1$** include [−anim]; rather, with inanimate **Agr$_1$** we want to trigger (57).

(56) $[-\text{obv}] \rightarrow \emptyset \;/\; [+\text{anim}] \underset{[-\text{pl}]}{\_\_\_}$

(57) ∅ → /na/ / [−obv] ___ pun

5.4 Anderson's Analysis of Potawatomi a d Georgian

The phenomena treated above by recourse to readjustment and impoverishment constitute a major stumbling block for Anderson's **(1992)** theory. Some of these difficulties were noted in section 3.2 with regard to English inflections. Equally serious problems arise from the facts of Potawatomi and Georgian.

Recall that Anderson does not recognize the existence of affixal morphemes; all the features that we have attributed to affixes in Potawatomi, Anderson would consider features of the verbal stem (after the syntax). The only mechanism Anderson's theory has available for the phonological realization of these features is the ordered sets of WFRs. The effects of impoverishment, Vocabulary insertion, and readjustment alike must be handled through these rule blocks. Since the mechanism of WFRs is unconstrained, Anderson could in principle mirror our analysis of

Potawatomi using such rules, some of which would simply delete **morphosyntactic** features (impoverishment) without changing the phonology of the stem. However, Anderson's own analysis of **allomorphy** in **Potawatomi** follows a rather different tack. Noting that **/-mun/** blocks the **affixation** of **/-n/** and **/-k/** for obviative and plural of a 3rd person argument, Anderson includes **in the** block of rules that adds **/-n/** and **/-k/** a zero affixation rule, **/Xmun/ → /Xmun/.** We reproduce this rule block from Anderson's analysis (1992: 169) in (58).

(58) a. $\begin{bmatrix} +\text{Verb} \\ + \quad [\,] \\ + \end{bmatrix}$ /XmUn/ → /XmUn/

b. $\begin{bmatrix} -\text{me} \\ -\text{you} \\ +\text{anim} \\ +\text{pl} \end{bmatrix}$ /X/ → /Xk/

c. $\begin{bmatrix} \begin{bmatrix} -\text{me} \\ -\text{you} \end{bmatrix} \\ \begin{Bmatrix} +\text{pl} \\ +\text{obv} \end{Bmatrix} \end{bmatrix}$ /X/ → /Xn/

The rule **(58a)** does nothing to a stem; it is a zero **affixation** rule. However, since it occurs as the first rule in a disjunctive rule block, it prevents the application of the other rules in the block whenever its features are met. Anderson adds features to this rule to limit it to the **cases** in which **/-mun/** has been added by a previous WFR in the environment of 1st person plural subjects. In particular, the [+Verb] feature and the empty square brackets in **(58a),** interacting with other rules, will ensure that **(58a)** applies only when there is a 1st person plural subject and a 3rd person object.

The blocking effect of **/-mun/** across an intervening **/-pun/,** as demonstrated in **(40a–b),** indicates that Anderson should have omitted **/-mun/** from rule **(58a),** replacing it with simply **/X/ → /X/;** a stem need not end in **/-mun/** for it to block further affixation of **/-n/** or **/-k/.** However, now it is clear that it is the features **1st** person plural subject that are blocking the remaining rules in **(58),** not **/-mun/.** Anderson's framework would allow any arbitrary set of features to trigger a zero affixation rule like **(58a)** and thus block all the other rules in any disjunctive rule block. He makes clear the blocking potential of any morphosyntactic features in his theory: "we posit such a formally empty **rule** just in case some set of rules must be

precluded from applying in the presence of certain morphosyntactic features" (p. 169).

In DM, *random* morphosyntactic features may not trigger deletion (impoverishment) of features and thereby block the insertion of affixes bearing the deleted features. Impoverishment and other rules of the morphology are subject to locality constraints; they involve structurally adjacent morphemes (i.e., a morpheme may act as the context for the impoverishment of another morpheme if it governs the latter morpheme). We showed earlier that Agr_2 does govern Agr_1, yielding the proper relation between the morphemes for the impoverishment rule (43). Interactions between structurally adjacent morphemes are widespread cross-linguistically, but since Anderson does not recognize that affixes are morphemes, his theory cannot capture this fact but instead must resort to the notation of /X/ → /X/ rules that allow it to express blocking relations between random sets of features and random rule blocks.

Anderson's treatment of what amounts to allomorphy triggered by adjacent morphemes runs counter to his analysis of blocking across rule blocks, introduced in his analysis of Georgian in Anderson 1986 and repeated in Anderson 1992. To account for the sort of Georgian data we briefly surveyed in (2), Anderson's theory requires that when a particular WFR changes /X/ → /gvX/ in Georgian in the presence of 1st person plural object features, this WFR blocks a rule in a later rule block that changes /X/ → /Xt/ in the presence of a plural feature (recall the analysis in section 2.1). His version of the "elsewhere" principle that has this blocking effect across rule blocks is given in (59).

(59) ***"Elsewhere" Principle***

Application of a more specific rule blocks that of a later more general one. (p. 132)

According to this principle, a WFR in a later rule block whose features are a subset of those of a WFR from an earlier block will be blocked by that earlier rule, even though the rules are not in the same disjunctive block.

The general problem for this principle in the analysis of conditioned allomorphy will be illustrated with another example from Potawatomi. We have shown that [−obv] plural /-wa/ does not occur before the preterit when the [−obv] argument is the subject; instead, we find the /-m/ allomorph of Agr_2. Some relevant examples are repeated in (60). Anderson's WFR introducing /-wa/ (/X/ → /Xwa/) must be prevented from applying by another WFR in the same rule block that changes /X/ → /Xm/

when the [+pl] feature mentioned in the latter rule is a feature of the subject and the verb is [+preterit]. Note that the /wa/ in (60a–b) corresponds to the /m/ before the preterit /wapun(in)/ in (60c–d).

(60) a. k-wapm-a-wa 'you (pl) see him'
b. w-wapm-a-wa-n 'they see him (obv)'
c. k-wapm-a-m-wapun 'you (pl) saw him'
d. w-wapm-a-m-wapunin-un 'they saw him (obv)'

The problem for Anderson's theory is best illustrated by the form in (60c). Although the Agr_1 in (60c) takes on a special form /m/ with the feature [+preterit], this same feature finds its unmarked spell-out following a [+pl] Agr, in (60c). Thus, in the rule block that adds the phonological material /wapun/, Anderson's analysis will have a WFR something like /X/ → /Xwapun/ when there is a [+preterit] and a [pl] feature. But, by Anderson's version of the elsewhere condition, this rule must be blocked by the WFR that spells out /m/ in the previous block because this previous rule will mention [+preterit] plus [pl] and a few other features while the [+preterit] rule will mention only [+preterit] and [pl], a proper subset of the features of the earlier rule. In general, Anderson's approach to situations in which one morpheme influences the phonological realization of an adjacent morpheme will fall victim to this type of difficulty since the features of the influencing morpheme will be mentioned in the WFR that spells out the conditioned allomorph of the morpheme being influenced, in many cases blocking the spell-out of the influencing morpheme itself.

Anderson's own analysis of Potawatomi repeatedly violates his principle (59). For example, to account for the /-ymun/ form of Agr_2 that occurs with 1st person plural subjects and 2nd person objects (see (44a)), this analysis has the WFR (61a) in one block to add the /y/ and the WFR (61b) in a later block to add the /mun/ (compare our (35b) and (45)).

(61) a. $\left[\left[\begin{matrix}+\text{me}\\+\text{pl}\end{matrix}\right]\right]$
/X/ → /Xy/

b. $\left[\begin{matrix}+\text{me}\\+\text{pl}\end{matrix}\right]$
/X/ → /Xmun/

Clearly the rule in (61a) is more specific than the rule (61b) and should block it. However, both rules are required to apply. We leave it to the reader to verify that Anderson's analysis requires other violations of (59).

Anderson's analyses of Georgian and Potawatomi are intended as the major empirical support for the **affixless** theory. In examining these analyses, we discover that Anderson's account of Georgian crucially relies on the "elsewhere" principle (59) to capture the distribution of the plural /-t/ suffix. However, as we have just shown, his account of Potawatomi relies just as crucially on violating this very same principle. Jointly, then, his analyses of Georgian and Potawatomi fatally **undermine** the theory that they were intended to support.

5.5 What's in Paradigm?

A chief issue for a word-and-paradigm approach such as Anderson's is what forms to include in the paradigms that are accounted for by a particular set of ordered blocks of WFRs. On a strict **"lexeme-based"** theory, one would presumably put together all and only the rules that apply to particular **lexemes,** that is, to particular N, V, and A stems. The leading idea behind this approach is that the rules relate forms of a word, not different words. These basic intuitions behind a word-and-paradigm approach call Anderson's Potawatomi analysis into question for what it includes and what it excludes. As we have illustrated, Potawatomi distinguishes a number of verb classes; these classes determine the form of inflectional morphology as well as the syntax of sentences in which the verbs occur. Intransitive verbs with animate subjects, intransitive verbs with inanimate subjects, transitive verbs with animate objects, and transitive verbs with inanimate objects all constitute separate classes. One could argue that there are often derivational relations between, say, transitive animates and transitive inanimates **(e.g.,** *wapum* 'see' (animate object) in most of the examples vs. wapur 'see' (inanimate object) in (38)) or between transitive animates and intransitive animates; therefore, the same stems may be involved in more than one class and the different inflectional paradigms for the different classes might be considered forms of the same word (stem) in some general sense. However, some argument must be made for including the inflectional rules for all these classes in the same **rule** blocks, as Anderson does. It is not sufficient to point out that much of the inflectional morphology is similar across these classes (although the similarities between, say, intransitive inanimates and the rest are slight here; see the examples in (21)). Moreover, Anderson includes the WFRs for nouns in the same rule blocks as the WFRs for the various verb classes. If nouns and verbs are in the same blocks, why not all the WFRs of the language? These choices make a significant difference in Anderson's theory, since numerous issues—how the WFRs are formulated, how they

are ordered, which features they must mention, and what sort of blocking can occur between rules in different blocks—all depend on particular details of the full range of morphology under consideration.

Although Anderson mixes verb classes and nouns and verbs in his WFR blocks, he leaves out negation and the preterit, both central to **allo-**morphy and the final phonological form of the Potawatomi independent order verb. He also leaves out the conjunct order inflection. Clearly the negative, preterit, and various conjunct inflections constitute **different** "forms of a **verb"** and are more obvious candidates for the verbal inflectional rule blocks than the nominal inflections that Anderson does include.

This is not an idle point. Adding these other inflections does not simply add more rules to the analysis; it changes the analysis entirely. In particular, in Anderson's analysis of Potawatomi, the disjunctive rule blocks do not correspond to morphemes we have identified in our analysis. Two of his blocks in particular seem to spell out heterogeneous sets of inflectional features. Once we add the negative and preterit affixes to the paradigms, however, we find that Anderson's blocks must be split, resulting more or less in a one-to-one correspondence between his blocks and the morphemes of our analysis. For example, Anderson includes spell-outs of pieces of $\mathbf{Agr_2}$ affixes in the same block as what we have identified as phonological realizations of Agr,. The **/a/** and the **/uk/** of $\mathbf{Agr_1}$, shown in **(62a,b),** are put in the same rule block as the highlighted **/n/** in **(62c)** and the highlighted **/y/** in **(62e).** However, the Neg morpheme comes *after* Agr, (62a–b), whereas it comes ***before*** these **/n/** and **/y/** pieces of Agr, **(62d,f).**

(62) a. **n-wapm-a-s'i** 'I don't see him'
Cl-see-$\mathbf{Agr_1}$-Neg

b. **n-wapm-uk-s'i**
Cl-see-$\mathbf{Agr_1}$-Neg 'he doesn't see me'

c. **k-wapm-un** 'I *see* you'
Cl-see-Agr,

d. **k-wapm-us'-non** 'I don't see you'
Cl-see-Neg-$\mathbf{Agr_2}$

e. k-wapm-uymun 'you *see* us'
Cl-see-$\mathbf{Agr_2}$

f. **k-wapm-us'-imun** 'you don't *see* us'
Cl-see-Neg-$\mathbf{Agr_2}$

Thus, the unusual grouping of features in Anderson's disjunctive rule blocks is a function of the limited range of paradigms that he included in his analysis. No child acquiring Potawatomi could make such arbitrary and limiting decisions about which "forms of a word" to include in his or her grammar of the language.

6 Summary and Postscript: Distributed Morphology and "Checking Theory" within Chomsky's "Minimalist" program

In DM, a verb stem is assumed to pick up inflectional features, bundled in terminal nodes, through various mechanisms that are either syntactic or rely on syntactic structure. Head movement and adjunction, a syntactic operation, may affix an inflectional morpheme to a stem. In addition, head merger under structural adjacency, also a syntactic operation, may affix inflectional morphemes to verbs. The addition of Agr and other morphemes at MS, followed by the copying of features in agreement, depends on the syntactic structure. In all cases, these manipulations of structure operate on terminal nodes organized into hierarchical structures and yield terminal nodes organized into hierarchical structures, Relations between terminal nodes in these hierarchical structures, relations such as government and structural adjacency, are syntactic relations. All terminal nodes—lexical and functional, those present at DS and SS and those added at MS, those whose integrity has been maintained in the grammar and those that have been subject to fusion or fission—are subject to Vocabulary insertion at MS in exactly the same way.

In general, then, DM claims that inflectional features are picked up in prepackaged morpheme bundles in the grammar, not in the "lexicon" or Vocabulary, and that word formation is syntactic and postsyntactic, not lexical. By having the terminal nodes containing inflectional features obey the same structural principles as other terminal nodes and undergo the same Vocabulary insertion, DM accounts for the distribution of syntactic/semantic and phonological information in words and in sentences. The correlation between the distribution of syntactic/semantic information and of phonological information is mediated by Vocabulary items in all cases; the Vocabulary entries are responsible for assigning phonological and morphophonological information to sets of syntactic/semantic features. All information is bundled into terminal nodes that are realized phonologically in the same way. In the grammar, the bundles of information inside words interact in the same manner as the word-size bundles of information in phrases.

In contrast to the picture presented by DM, Chomsky (1993) suggests that the interface between a verb's internal morphological structure and the syntax involves a system of feature checking rather than feature addition. Such a theory is perhaps most comfortably wed with a Lieber-style lexical morphology (although, technically, words are not actually formed in the lexicon under Lieber's theory; still, the inflected verbs are built up, featurally and phonologically, from lexical pieces, not from head movement, merger, and so on, in the syntax). On the simplest view of a "checking theory," all the features of an inflected verb float around in one pot (unordered set) of features. As the verb raises to functional heads in the syntax, it matches and checks features from this pot with the features of the functional heads to which it adjoins. Affixation in the lexicon prior to lexical insertion would provide the inflected verb with all the features for its pot but would not impose any particular structure on the organization of these features.

Immediately, the question arises for Chomsky's proposal that arises for affixless theories: why does the internal hierarchy of inflectional affixes on a verb seem to reflect a bundling of features into morphemes, some of which correspond to functional heads in the syntax? Recall that in a checking theory, an inflected verb could be an amorphous mass of features; the connection between the internal phonological structure of the verb (the internal structure of stem and affixes) and the inflectional features of the verb has no consequences for the rest of the grammar.

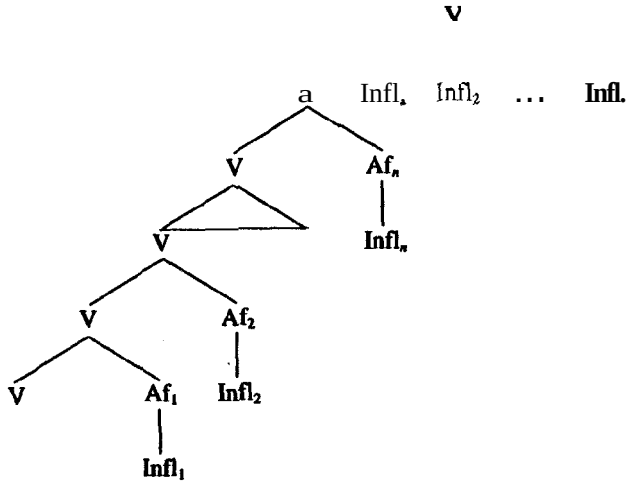
For the checking theory, the worst possible state of affairs would be for some strict version of Baker's (1985) Mirror Principle to accurately describe the relation between affixes on a verb and the hierarchy of functional categories in the syntax that check the features of these affixes (Noam Chomsky, personal communication). Baker's principle implies that the order of affixes is just the order that would be derived by raising the verb to each dominating functional head in turn and affixing that functional head to the verb. Since checking theory insists that the functional heads to which a verb raises are not the inflectional affixes on the verb—the affixes are added in the lexicon—checking theory would lack an account for the fact that head-to-head raising in the syntax recapitulates affixation in the lexicon, were the Mirror Principle accurate.

Chomsky (1993) claims that, even were this worst-case scenario (accuracy of the Mirror Principle) to hold, checking theory could provide an acount: "Suppose that Baker's Mirror Principle is strictly accurate. Then we may take a lexical element—say, the verb V—to be a sequence V = $(\alpha, Infl_1, \ldots, Infl_n)$, where a is the morphological complex [R-$Infl_1$-...-

$Infl_n$], R a root and Infl, an inflectional feature. The PF rules only 'see' a. When V is adjoined to a functional category F (say, Agr_O), the feature Infl, is removed from V if it matches F; and so on." (p. 28).

In other words, Chomsky is proposing that inflected words come from the lexicon with a structure like that in (63).

(63)



The node a is the hierarchical structure derived by affixing prefixes and suffixes to stems in the lexicon. These prefixes and suffixes come with inflectional features in bundles—$Infl_i$—and phonological forms. Therefore, "a" is the familiar inflected Verb, ready for phonological interpretation of its phonological structure. The inflectional feature bundles of the affixes attached to the Verb are arranged in a sequence with "a" itself, with the features of the most deeply embedded affix Infl, coming first in the sequence and the order of the rest of the features following the embedding structure of the affixes. The last affix (Af_i) added to the Verb in the lexicon provides the last features ($Infl_i$) for the sequence.

This sequence, considered a lexical item in its entirety, is inserted in the syntactic derivation of a sentence. The functional heads in the syntax (e.g., Tns and Agr) do not contain lexical items but only inflectional features. As the Verb sequence raises to functional heads in the course of a derivation, it checks the inflectional features in its sequence bundle by bundle, starting with the first bundle ($Infl_1$)—that is, starting with the bundle contributed by the most deeply embedded affix on the inflected Verb. Thus, by stipulation in a checking theory, features are checked in the order in which they were provided to the verb via affixation in the lexicon, the features of the innermost affix being checked first.

Crucial to the success of such an analysis of Mirror Principle effects is that Baker's Mirror Principle be "strictly accurate." However, as our discussion should have made clear, Baker's principle is not strictly accurate. If head-to-head movement and adjunction were the only process of inflectional affixation, then Baker's principle would appear to be more or less accurate and Chomsky's checking solution to mirroring would seem sufficient. We have shown, however, that in addition to head-to-head movement and adjunction, the interaction between the syntax and morphology includes head merger, the insertion of morphemes at MS, morpheme fusion, and morpheme fission. All these processes are sensitive to syntactic structure and obey strict locality conditions. Moreover, Vocabulary insertion (i.e., the assignment of phonological form to morphosyntactic features) must follow all the changes to morphological structure that lead to violations of a strict Mirror Principle.

A checking theory could, of course, mimic DM's account of the distribution of information within inflected verbs. In place of the inflectional affixes in (63), we could add within a terminal nodes that include just the syntactic/semantic features of the functional heads that will check them in the syntax (if we add the wrong terminal nodes, the derivation will crash). Now checking proceeds as Chomsky describes in the quotation above. However, within a—within the combination of the verbal stem and the terminal nodes containing inflectional features—we perform the various syntactic and MS operations that would be required under the DM account, followed by Vocabulary insertion into the resulting terminal nodes.

This checking version of DM enforces a disturbing split among terminal nodes in the grammar. The functional heads that contain checking features (e.g., Tense and Agr) are never phonologically instantiated via Vocabulary insertion but bear a special relation with respect to a set of terminal nodes within a verb that do undergo Vocabulary insertion. Otherwise, all terminal nodes behave alike with respect to such operations as head raising and adjunction, merger, fusion, and fission. In fact, the functional heads are also subject to head raising and adjunction, while the terminal nodes within the verb that they check (within a) are subject to everything else that terminal nodes might be subject to, including Vocabulary insertion. This checking version of DM, then, fails to capture the central claim of DM: that terminal nodes mediate the connection between syntactic/semantic information and phonological information in a uni-

form manner, regardless of the source or identity of the terminal node—a morpheme is a morpheme is a morpheme. Even if the Mirror Principle were strictly correct and the mechanism Chomsky outlines were sufficient to account for the connection between the hierarchical structure of affixes and the hierarchical structure of functional heads in the syntax, the checking theory would be making a distinction between the terminal nodes of the inflectional system, which implicate a set of nodes that never correspond to Vocabulary items, and the remaining terminal nodes in the grammar. DM locates its main dispute with checking theory in the latter's nonuniform treatment of the connection between terminal nodes and Vocabulary items.

Of course in addition to these perhaps conceptual differences between the theories, a major contrast in analyses separates them along lines that should lead to an empirical confrontation. According to checking theory, since a verb need not pick up its inflectional affixes on the way from DS to PF, the verb may remain separate from a functional head at PF but nevertheless bear an affix that contains features to be checked by this functional head. In this case, raising of the verb to the functional head at LF will allow for feature checking. On the other hand, since the functional heads in DM carry the features that serve as the locus of Vocabulary insertion, the verb in DM must join with a functional head on the way from DS to PF in order to bear the affix that instantiates the features of this functional head.

This difference between LF raising in a checking theory and affixation between DS and PF in DM shows up in the analysis of English tense. It is a fact that main verbs in English do not raise to the Tns node on the path between DS and PF. Under a checking theory, Tns need not be lowered onto or merged with main verbs to account for the fact that the tense affix appears on such verbs in English. Rather, English main verbs may raise to Tns at LF and check the tense features of the affix. In DM, on the other hand, as described in section 4, the Tns morpheme must be assumed to merge with English main verbs at MS. Here we appeal to the theory of merger developed in Marantz 1984,1988,1989. If merger is not a possible operation between terminal nodes or if the principles of merger prove inappropriate for English tense on main verbs and other similar structures, then DM loses out to the checking theory. Clearly research should be focused on those constructions that require raising to a functional head at LF in a checking theory, but necessitate head merger at MS within DM.

Notes

We thank Eulàlia Bonet, Noam Chomsky, Rolf Noyer, and especially Sylvain Bromberger for inciting and clarifying many of our thoughts on morphology. Mark Aronoff, Robert Beard, Andrew Carstairs-McCarthy, Norbert Hornstein, and Rolf Noyer contributed crucial comments on an earlier draft of this paper.

1. The term *Distributed* Morphology and the general view that it incorporates resulted from discussions with David Pesetsky; see also Pesetsky, to appear.

2. Here we are in general agreement with similar approaches presented in Baker 1988 and Borer, to appear.

3. For this work, see Marantz 1984, 1988 and Halle 1990, 1991.

4. In some of the Indo-European languages (e.g., Russian) case and number are copied onto the adjectival suffix whereas gender and animacy are copied onto the adjective stem. It is worth noting at this point that the feature-copying operation appears to be subject to the constraint that it cannot modify already existing feature values; it can only add new ones. This constraint on the formal power of concord rules has interesting empirical consequences. For example, as detailed in Halle's (1990) discussion of concord in Russian number phrases, in Russian the numerals 1–4 are adjectives whereas the numerals 5–20 are singular class III (feminine) nouns. Being class III singular nouns, the numerals 5–20 have inherent gender, animacy, and number, and cannot be supplied with any of these features by concord. As a result, these numerals agree with the head noun of the phrase only in case. By contrast, the numerals 1–4, being adjectives, have no inherent gender, animacy, or number. These numerals therefore agree with the head noun not only in case, but also in number (1 = sg, 2–4 = pl), animacy, and gender (which for morphophonological reasons is not overtly expressed in 3, 4).

5. Some of the mechanisms employed in this analysis will be explained at greater length in the sections to follow.

6. In "inversion" contexts, a 3rd person dative subject may trigger the plural /-t/. We believe that in the correct analysis of Georgian a rule assigns to 3rd person subjects of verbs whose object is also 3rd person a morphosyntactic feature otherwise carried only by 1st and 2nd person arguments; see the analysis of Potawatomi in section 5, where a similar solution is required. Given independently motivated interactions among morphemes, this analysis correctly predicts that a 3rd person argument will trigger the plural /-t/ only when the 3rd person argument is a dative subject and there is a 3rd person nominative object in the clause.

7. We assume here that fission of a morpheme M that is a sister to a stem S yields a ternary-branching structure with the two pieces of M and S as sisters under the original mother node. Thus, if a prefix is inserted under one piece of M and a suffix under the other, as in Georgian, a phonological "circumfix" results. Other assumptions about fission are possible.

8. Noyer (1992a) defends a different theory of morpheme splitting. one that allows the Vocabulary entries themselves to control the splitting in some instances.

9. In addition to deleting features, it may be necessary to allow morphosyntactic features to be changed at MS, leading, for example, to the generation of appar-

ently "wrong" cases, where the appearance of the anomalous case has no effect on the syntax. For example, in Russian the (syntactically motivated) accusative case is implemented as genitive if the stem is animate, and as nominative if the stem is inanimate. This happens in all nouns and adjectives in the plural and in nouns and adjectives of the second (masculine-neuter) declension also in the singular. These genitive- and nominative-marked objects behave alike syntactically, as do the objects that are marked with the "real" accusative case. (For discussion, see Halle 1990, 1992.)

10. We of course extend this separation to stems (lexemes) as well as affixes. An important difference between the current version of DM and the one outlined in Halle 1990, 1991, 1992 is that in the latter theory inflectional affixes are "inserted" at MS but other morphemes are inserted, with their phonological features, at DS. We believe that this procedure encounters conceptual difficulties that arise primarily in connection with morphemes generated in the course of the derivation of MS from SS. In DM all insertion of Vocabulary items takes place at MS; no Vocabulary items appear at DS, only bundles of features in terminal nodes.

11. Technically, in a lexicalist model an affix need not carry all the features necessary to explain the syntactic behavior of the words created by the affix; some of these features might be provided via default rules. See Noyer 1992a for some discussion on this point.

12. In this paper we distinguish two sorts of readjustment rules treated as a single class in Halle 1990. One class manipulates morphosyntactic features in the environment of other such features. When these rules delete features, we have called them *impoverishment rules,* after Bonet 1991. These rules are logically prior to Vocabulary insertion, which finds Vocabulary items with morphosyntactic features nondistinct from those of the already "readjusted" terminal nodes. The second set of readjustment rules, to which we will now apply that term exclusively, change the phonological form of already inserted Vocabulary items and thus logically follow Vocabulary insertion.

13. Here and below we have utilized the convenient data collection found in Bloch 1947. On the diacritic "^," see the text below.

14. For a different view on the inflectional classes of English verbs, see Noyer 1992b.

15. Two verbs that optionally take a ∅ suffix in the past finite take the default /-d/ suffix in the past participle: *crew* or *crowed, had crowed, dove* or *dived, had dived.* As with the optionality of the /-n/ participle with some stems, it is not clear here whether the different past forms occur in the dialects of individual speakers and in the same semantic/syntactic contexts.

16. For some details, see the Appendix in Halle and Mohanan 1985. Although the changes induced by the different verbal inflections of English do not straightforwardly fall into classes, the individual stem changes are phonetically plausible. The majority of the changes affect only the stem vowel or the stem-final consonant; in a minority of cases the entire rime is replaced. Neither of these processes would justify the "bizarre conclusions" alluded to by Anderson (1992:61–62) in his brief discussion of the English irregular verbs.

17. Carstairs-McCarthy has published critiques of Anderson's theory that overlap with the remarks made in this section. See Carstairs-McCarthy 1992 and the references cited there.

18. It is readily seen that, with proper generalization to all morphemes, both affixes and stems, Anderson's principle (19) is equivalent to the Pāṇinian principle we have assumed governs the competition among Vocabulary items for insertion at a given terminal node (with "Morphosyntactic Representation M"). We contend that this is the only morphological principle of "disjunction" or complementarity that UG contains.

19. We follow Hockett's transcription of Potawatomi in using /u/ for what is phonetically [a]. The appearance of these /u/'s is apparently predictable; see Hockett's and Anderson's clear discussions of this issue. For the most part, we have given the phonological form of Vocabulary items without these or other vowels that come and go in various forms. It might be necessary to include a vowel, perhaps a vowel unspecified for other features, in the Vocabulary entries in some cases to predict the surface distribution of vowels in the language. The distribution of vowels in Potawatomi is not critical for any of the following discussion.

20. Anderson chose Potawatomi primarily to support his treatment of "inversion" in Georgian; specifically, he claims that the proper analysis of Potawatomi involves manipulating the agreement features on verbs much the same way as for Georgian. Although our analysis shows why "inversion" of agreement features is unmotivated in Potawatomi, this will not be the main thrust of our remarks.

21. We thank Rolf Noyer for suggesting this analysis to replace one in an earlier version of this paper.

22. The ordering of these inanimate Agr_3s and the preterit suffix /-pun/ is not straightforward. We leave this problem to further research.

23. There are various ways to collapse the Vocabulary entries (32c–d); however, no such attempt will be made here.

24. Here the [−obv] feature would not be necessary if the presence of a Clitic node is dependent on the presence of a [−obv] argument in the clause.

25. In (35c–e) the [−obv] feature would be unnecessary if an Agr_2 node appears only when there is a [−obv] argument in the clause.

26. Rule (46) thus changes the grammatical case realized on Agr_2. This effect of (46) is similar to the case changes of the Russian accusative mentioned in note 9.

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