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1. Introduction

Though a recurrent cross-linguistic phenomenon, position class morpho-

logy has attracted relatively little attention in the theoretical literature.

Word-internal morpheme ordering itself has been studied in systems where

it reflects syntactic or semantic relations (e.g., Bybee 1985, Pesetsky 1985,
Sproat 1985, Baker 1988, Rice 1990, 1993; Speas 1990); and in systems in

which partial orderings among morphemes correlate with stratification in

the phonology (e.g., Siegel 1974, Allen 1978, Kiparsky 1982, 1985; Moh-

ham 1982, Hargus 1985). Yet neither of these general approaches is

NIMBORAN POSITION CLASS MORPHOLOGY*

The verbal morphemes in the Papua language Nimboran are rigidly ordered; moreover, morphemes with identical ordering properties are in complementary distribution. This suggests that verbal morphemes belong to position classes, each permitting at most one member to surface. Certain morphemes belong simultaneously to more than one position class, with corresponding blocking of all morphemes in the relevant classes. A striking generalization is that position classes blocked in this joint fashion must be contiguous.

The problem is that linear order and blocking diagnose two incompatible orderings for the position classes. The solution rests in reinterpreting verbal position as levels in a fixed morphological hierarchy; we resolve the ordering paradox by exploiting the distinction between dominance and precedence available in a hierarchical structure.

This paper adds new support for the theory of level-ordering and offers a formal theory of position class morphology, a well-known phenomenon which deserves attention in morphological theory. It also covers a large corpus of data — and certain phenomena — not previously discussed in the generative literature.

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suited to morphological systems in which morphemes or morpheme classes are organized into a total linear ordering that has no apparent connection to syntactic, semantic, or even phonological representation. Systems of this latter type often go by the name of ‘templetic’, ‘position class’ or ‘slot-filler’ morphology (see e.g., Bloomfield 1962, Elson and Pickott 1965, Hockett 1958, Matthews 1972, Grimes 1983, Zwicky 1985, Anderson 1986, Simpson and Withgott 1986, Speas 1989, Stump 1991), where position (relative to some base) is construed to function as an abstract entity in the grammar. In this paper we investigate one particular position class system and integrate it into morphological theory.

The point of reference for the discussion will be Nimboran, a language with complex verbal morphology for which I will argue that the traditional notion of ‘position class’ is a descriptive necessity. Somewhat less conventional will be the claim that position class, at least in Nimboran, is a hierarchical construct. I argue that each of the nine surface ‘positions’ in Nimboran verbs is properly identified not with a linearly defined position, but rather with one of eight distinct hierarchical levels. The argument rests on an apparent paradox which only the more flexible hierarchical model can resolve. There are two sources of evidence for position classes in Nimboran: surface linear order and complementarity among morphemes in the same position class. However, the two sources indicate incompatible orderings for the verbal morphemes. Precisely because it is capable of separating out the two dimensions of dominance and precedence, the hierarchical model has the power to resolve the paradox.

The paper thus has three goals, unranked in order of importance. One is to extract the generalizations underlying a very complex morphological system in Nimboran. Another is to argue for a hierarchical implementation of the familiar concept of position class ordering. And the third is to determine what theoretical construct this analysis corresponds to. I ultimately conclude that the theory of Lexical Morphology (Kiparsky 1982), as revised in Inkelas (1988), provides a straightforward account of position class effects in Nimboran, effects of a general type which deserves to play a prominent role in the future evaluation of morphological theories.

2. Nimboran Verb Structure

A Papuan language of New Guinea, Nimboran belongs to the Nimboran Family, which also contains Temtok and the Mekwei-Grest-Kwansu dialects ( Voorhoeve 1975, Wurm 1982, Foley 1985). Of 1981 Nimboran had around 3,500 speakers living to the west of Lake Sentani, near the coast in the northeastern part of the Indonesian province of Irian Jaya

(May and May, 1981). The data we consider come exclusively from a detailed 1965 grammar of Nimboran phonology and morphology by J. C. Aanceaux. In each finite verb in Nimboran may contain a maximum of seven morphemes, including the root and, in certain cases, a co-occurring verbal particle (with which the root forms a semantic unit). The following types of logically independent information may be encoded:

1. subject number: plural (PsSubj), dual (DuSubj), inclusive dual (IncDuSubj)
2. subject person/gender (PsPers)
3. object number/gender: plural (PObj), masculine (MObj)
4. durativity (Dur)
5. particle (Part)
6. direction/location (Loc)
7. iterativity (Iter)
8. tense: present (Pres), past (Past), recent past (RPast), future (Fut)

The specific morphemes belonging to the general categories in (1) are rigidly ordered. A first approximation of that fixed, relative ordering is schematized below:

```
(2) 0 1 2 3 4 5
    root PsSubj DuSubj PObj MObj IncDuSubj Loc
    6 7 8 Iter tense PsPers
```

Morphemes represented in the same column in (2) exhibit the same ordering relations with respect to all other morphemes in the verb. More-
over, they never co-occur—despite apparent semantic compatibility. This
position-based complementarity differs systematically from the seman-
tically based complementarity obtaining among those morphemes which
express incompatible features, in a manner to which we now turn.

With the exception of tense markers and subject person markers, none
of the morphemes in (1) is required for a verb to be well-formed. Of
course, their presence or absence affects the meaning.\(^3\)

(3a. \(\gu\k\-\r\-\b\-\k\-\u\)  \(\Rightarrow\) \(\gu\k\b\\k\u\)  \([\text{p. 56}]
\)
\[\text{bit}-\text{DuSubj-MObj-2Loc-Past-1}\]
\text{We two bit him above’}

b. \(\gu\k\-\k\-\b\-\k\-\u\)  \(\Rightarrow\) \(\gu\k\b\\k\u\)  \([\text{p. 56}]
\)
\[\text{bit}-\text{DuSubj-2Loc-Past-1}\]
\text{We two bit above’}

c. \(\gu\u\-\b\-\k\-\u\)  \(\Rightarrow\) \(\gu\b\\k\u\)  \([\text{p. 62}]
\)
\[\text{bit}\-\text{2Loc-Past-1}\]
\text{‘I bit above’}

d. \(\gu\u\-\k\-\u\)  \(\Rightarrow\) \(\gu\k\u\)  \([\text{p. 56}]
\)
\[\text{bit}\-\text{Past-1}\]
\text{‘I bit (here)’}

The forms in (3) show that the absence of a morpheme imputes a form
with a default semantic interpretation in opposition to the meaning
that the morpheme would have contributed if it were present. The marker \(-k\-\),
which indicates duality of subject in (a–b), is absent in (c–d). By impli-
cation, the subjects of these verbs cannot be dual; they in fact receive a
default interpretation of singularity. Similarly, the absence of the marker
meaning ‘above’ yields the contrastive, default interpretation that the
action is taking place ‘here’ in (3d).

This system of implicature is activated only when a ‘missing’ morpheme
(type) would in principle be available to occur in the word. For example,
implicatures are not generated by arbitrary gaps in the morphological
paradigm. Nimboran possesses a masculine object marker (3a) but has no
(productive) feminine object marker.\(^4\) There is a correlated asymmetry in
the possible meanings of verbs lacking object markers: while such verbs
(as in (3b–d)) can never be construed as referring to a masculine object,
they apparently freely yield the optional interpretation of referring to
a feminine object (Anceaux p. 106). The generalization is that the absence
of a morpheme implies the negation of its corresponding semantic features

\(^3\) Page numbers refer to the source of the cited forms in Anceaux’s grammar. Square brackets
(as in (3)) indicate that the corresponding form is reconstructed, based on a form cited by
Anceaux on the bracketed page. Reconstruction has been kept to a minimum.

\(^4\) A few unproductive, highly restricted feminine object markers exist; see Anceaux p. 165.

only when that morpheme is potentially available—but deliberately not
selected.

The particular concern of this paper is the complementarity among
elements competing for the same position within the verb. And we will find
(in Section 6) that, with respect to the generation of negative implicatures,
the morpheme absence stemming from this type of complementarity patterns
with arbitrary gaps in the paradigm. This is consistent with the generaliza-
tion that a morpheme must be available for use in the verb in order for
its absence to have semantic repercussions. However, it will require us to
formalize the intuitive notions of ‘position class’ and ‘positional comple-
mentarity’.

The next two sections provide necessary background to the main anal-
ysis, which begins in Section 5. In Section 3, we examine the phonological
evidence for internal structure in verbs; Section 4 provides necessary detail
about each of the individual morphemes which comprise the verb. Readers
pressed for time may wish to use Section 4 only as a reference guide,
consulting it as the need arises.

3. PROSODIC STRUCTURE OF VERBS

Nimboran verbs have a simple prosodic structure, consisting of two por-
tions for the purposes of phonological rules. One portion contains the
root, and the other, all post-root morphemes (May and May 1981:10). I
shall refer to these two constituents as the stem and the modifier, respec-
tively. Their separate existence foreshadows a conclusion we will come to
later with regard to the morphological relationship between the root and
the post-root morphemes.

Distribution of accent is the first of two sources of evidence for this
bipartite prosodic constituency. Native words in Nimboran possess exactly
one accent, with the exception of verbs—which possess two.\(^5\) One accent
occurs in the stem and the other in the modifier:

(4a. \([\text{ged}\text{du}\text{u}]\)\(\text{[k-be-k-u]}\)  \(\Rightarrow\) \(\text{[ged}\text{du}\text{u}]\)\(\text{[kebek\text{t}\text{e}]}\)
\[\text{draw}-\text{DuSubj-6Loc-Past-1}\]
\text{‘We two drew from here to above’}
\([\text{p. 189}]\)

b. \(\text{[ged}\text{du}\text{u}]\)\(\text{[k-se-p-am]}\)  \(\Rightarrow\) \(\text{[ged}\text{du}\text{u}]\)\(\text{[kesep\text{am}]}\)
\[\text{draw}-\text{DuSubj-7Loc-RPast-3m}\]
\text{‘They two (m.) drew recently from here to there’}
\([\text{p. 189}]\)

\(^5\) Anceaux characterizes accent as high pitch and loudness (p. 36). May and May (1981)
analyze it as stress, observing that the second of two stresses is more prominent than the
first.
Though apparently lexicalized in roots, accent in the modifier is entirely predictable. When no inherently accented morphemes occur, accent falls on the final vowel, as in (4a–b). Certain modifier morphemes possess inherent accent (5a–b), which overrides the default accent assignment rule. Whenever more than one inherently accented morpheme occurs in a modifier (5c), the rightmost accent prevails. All of this may be attributed to a general Right End Rule (Prince 1985).

\[(5a). \quad [\text{n̥g̊d̃ō]̂\text{p}][\text{k-BA-k-u}] \quad \rightarrow \quad [\text{n̥g̊d̃ō]̂\text{p}][\text{k̥b̃ak]̂\text{u}] \text{p. 187} \quad \text{‘We two drew above’} \]

\[(5b). \quad [\text{n̥g̊d̃ō]̂\text{p}][\text{k-RA-k-u}] \quad \rightarrow \quad [\text{n̥g̊d̃ō]̂\text{p}][\text{k̥k̥ak]̂\text{u}] \text{p. 203} \quad \text{‘We two drew him (here)’} \]

\[(5c). \quad [\text{n̥g̊d̃ō]̂\text{p}][\text{k-RA-k-b-k-u}] \quad \rightarrow \quad [\text{n̥g̊d̃ō]̂\text{p}][\text{k̥̄b̃ak]̂\text{āk]̂\text{u}] \text{p. 203} \quad \text{‘We two drew him above’} \]

There is one class of counterexamples to the generalization that verbs have two accents. As shown in (6), certain modifiers possessing only one vowel are not accented:

\[(6a). \quad [\text{n̥g̊d̃ō]̂\text{p}][\text{k-e}] \quad \rightarrow \quad [\text{n̥g̊d̃ō]̂\text{p}][\text{k̥e}] \text{p. 187} \quad \text{‘You (sg) drew (here)’} \]

\[(6b). \quad [\text{n̥g̊d̃ō]̂\text{p}][\text{p-am}] \quad \rightarrow \quad [\text{n̥g̊d̃ō]̂\text{p}][\text{p̥am}] \text{p. 187} \quad \text{‘He drew recently (here)’} \]

\[(6c). \quad [\text{s̥l̃]̂\text{p}][\text{N-A]-d-u}] \quad \rightarrow \quad [\text{s̥l̃]̂\text{p}][\text{n̥d̃u}] \text{p. 126} \quad \text{‘I drive away (sg)’} \]

These modifiers contain no inherently accented morphemes. The fact that they remain unaccented on the surface shows that units of this small phonological size do not trigger the default assignment of accent.

The proposal that default accent is not assigned to monomoric constituents is further supported by an accentual contrast among monomoric roots. Though some monomoric roots are inherently accented (7), others are underlyingly unaccented (8).

\[(7a). \quad [\text{d̥l̃]̂\text{p}][\text{k-d-u}] \quad \rightarrow \quad [\text{d̥l̃]̂\text{p}][\text{k̥d̃u}] \text{p. 87} \quad \text{‘We two will roast (here)’} \]

\[(7b). \quad [\text{h̥l̃]̂\text{p}][\text{k-d-u}] \quad \rightarrow \quad [\text{h̥l̃]̂\text{p}][\text{k̥d̃u}] \text{p. 124} \quad \text{‘We two will descend (here)’} \]

\[(8a). \quad [\text{i̥l̃]̂\text{p}][\text{b̃k-k-e}] \quad \rightarrow \quad [\text{i̥l̃]̂\text{p}][\text{b̃k̥k]̂\text{e}] \text{p. 156} \quad \text{‘You (sg) bathed above’} \]

\[(8b). \quad [\text{i̥l̃]̂\text{p}][\text{h-A]-d-u}] \quad \rightarrow \quad [\text{i̥l̃]̂\text{p}][\text{k̥d̃u}] \text{p. 125} \quad \text{‘We two will say (here)’} \]

As (8) shows, monomoric stems also fail to undergo default accent assignment; they are in fact the only verb stems to lack accent.

A second phonological effect bounded by the prosodic constituent is a vowel harmony rule which Anceaux terms apophonic. Its general effect is one of fronting, although it also causes vowels in final position to raise. In the final syllable of the modifier, where /i/, /e/, /i/, or /u/ may occur, /i/ and /e/ become /i/ and /u/ becomes /u/ under apohonic conditions. Only underlying /il/, /el/ and /ul/ occur in nonfinal position, and of these, just /il/ alters in apohonic contexts, fronting to /el/.

Though its effects are phonologically predictable, the source of apophonicity is morphological. About one fourth of the modifier morphemes in Nimboran are apohonic [+A]; the presence of one or more of these automatically induces apohonicity throughout the entire modifier (regardless of the position of the apohonic morpheme). The minimal pair in (9) contrasts the apohonic 7Loc with the non-apohonic 7Loc. Potentially affected vowels are shown in boldface:

\[(9a). \quad \text{n̥g̊d̃̄o-maN}[\text{N-A]-d-} \quad \rightarrow \quad \text{n̥g̊d̃̄o-maN}[\text{N-A]-d}\text{̄-} \quad \text{p. 188} \quad \text{‘You and I will draw from here to below’} \]

\[(9b). \quad \text{n̥g̊d̃̄o-maN-se-d-} \quad \rightarrow \quad \text{n̥g̊d̃̄o-maN}[\text{N-A]-d}\text{̄-} \quad \text{p. 188} \quad \text{‘You and I will draw from here to there’} \]

Example (10) exemplifies the inability of apophonicity to affect vowels in the stem:

\[(10). \quad [\text{i̥Ñ]̂\text{p}][\text{k-mA-N[+A]-b̃k-k-e}] \quad \rightarrow \quad [\text{i̥Ñ]̂\text{p}][\text{k̥m̄k̥̄b̃k̥̄k]̂\text{e}] \text{p. 141} \quad \text{‘You ask (duSubj)+Part-2Loc-Frac-2’} \quad \text{‘You two ask him above’} \]

\[4\text{ In principle a verb could consist solely of monomoric constituents; but no examples are given and Anceaux does not discuss the possibility. Other unaccented roots are i̥- ‘here’, ke̥- ‘go’, ke to ‘he’, and i̥ ‘say to’. The failure of default accent assignment to apply to monomoric constituents cannot be attributed to a prohibition on stress clash; for proof, see (3b), (2a) and (7).} \]
I assume that the trigger of apophonicity is a bundle of floating vowel features\(^7\) which link and spread by phonological rule, throughout the modifier. The identity (and quantity) of the source morphemes is thus irrelevant to the phonology. Analysis of [+A] as phonological material is supported by evidence, introduced in Section 4.7, that the phonological substance of certain morphemes consists solely of this entity.

4. INTRODUCTION TO MODIFIER MORPHEMES

This section introduces the salient characteristics of the morphemes composing the modifier, listed earlier in (2).

4.1. Subject Number and Person

Subject person marking, carried out by the rightmost (position 8) suffix in the modifier, is obligatory. As can be seen in (11), Nimboran expresses a distinction between first, second, and third person. Masculine and nonmasculine (neuter) gender are differentiated only in the third person. The suffix glossed as ‘Inc’ (for ‘inclusive’) is used when the subject includes both first person and second person referents.

\[(11)\]  
\[1 - u gguak-k-u \rightarrow gguak \quad \text{p. 59} \]

\[\text{bite-Pres-1} \quad \text{‘I bit (here)’} \]

\(^7\) To be precise, I assume the underspecified underlying representation in (i) for the six surface vowels in Nimboran. Under normal (non-apophonic) conditions, the feature fill-in rules in (ii) apply to produce the surface representations in (iii):

\[(i)\]  
\[
\begin{array}{c|cccc}
\text{UR} & i & e & i & u & o \\
\text{[high]} & + & + & + & + \\
\text{[front]} & - & - & + & - \\
\text{[back]} & - & - & - & + \\
\end{array}
\]

\[(ii)\]  
\[
\text{Default/redundancy rules:} \\
\[\text{[fr]} \rightarrow [+b] \quad \theta \rightarrow [h] \\
\text{[bk]} \rightarrow [+t] \quad \theta \rightarrow [b] \\
\text{[fr]} \rightarrow [-t] \]
\]

\[(iii)\]  
\[
\text{Surface:} \\
\begin{array}{c|cccc}
\text{[high]} & i & e & i & u & o \\
\text{[front]} & + & + & + & - \\
\text{[back]} & - & - & + & + \\
\end{array}
\]

The course of a vowel from UR to the surface is altered in apophonic contexts. If we analyze [+A] as the floating feature bundle [+fr,-h,-b], then we obtain a straightforward account of apophonicity: all three features link to the rightmost vowel in the modifier, [+fr] subsequently spreads leftward to unspecified vowels within the modifier, where its effects are observed on underlying [h].

\begin{align*}
2\quad & - e \quad \text{nguak-k-e} \rightarrow \text{gguak} \quad \text{p. 59} \\
& \text{bite-Pres-2} \quad \text{‘You (sg) bit (here)’} \\
3n\quad & - a m \quad \text{nguak-k-am} \rightarrow \text{gguakam} \quad \text{p. 59} \\
& \text{bite-Pres-3n} \quad \text{‘He bit (here)’} \\
3n\quad & - a m \quad \text{nguak-k-um} \rightarrow \text{gguakum} \quad \text{p. 59} \\
& \text{bite-Pres-3n} \quad \text{‘She/it bit (here)’}
\end{align*}

\[\text{Inc} \quad - a m \quad \text{nguak-maN-k-än} \rightarrow \text{gguakmaänk} \quad \text{p. 80} \]

\[\text{bite-IncSubj-Pres-Inc} \quad \text{‘You (sg) and I bit (here)’} \]

Nimboran also encodes subject number morphologically, distinguishing between singular, dual, and plural. Of these, singular is morphologically unmarked. Inclusive dual subjects, which consist exhaustively of a singular first person and singular second person, show the position 4 IncDuSubj morpheme -man-, while all other dual subjects take the position 2-k.\(^8\) Finally, plural subjects require the position 1 PSubj (i), except when one of the referents is second person, in which case position 2 -k- is used instead.

Information about subject marking is summarized in (12):

\[(12)\]  
\[
\begin{array}{cccc}
\text{label} & \text{UR} & \text{features} & \text{position} \\
\text{IncDuSubj:} & -maN- & \text{[Subj = Sg.1pers and Sg.2pers]} & 4 \\
\text{DuSubj:} & -k- & \text{[Subj = Du] or [Subj = Sg.2pers]} & 2 \\
\text{PSubj:} & -i- & \text{[Subj = Sg]} & 1 \\
\end{array}
\]

These featural representations are maximally underspecified. I assume, following Anderson's (1982, 1986) treatment of similar facts in Georgian, that the Elsewhere Condition ensures the choice of the more general marker only when a more specific marker is unavailable.\(^9\)

Each number marker is always accompanied by the appropriate (position 8) person marker, as exemplified by the following:

\[(13)\]  
\[
\begin{align*}
\text{a.} & \quad \text{Singular:} \\
& \text{ngedaid-o-u} \rightarrow \text{gedaidoodu} \quad \text{p. 186} \\
& \text{draw-sg-Fut-1} \quad \text{‘I will draw (here)’} \\
\text{b.} & \quad \text{IncDuSubj:} \\
& \text{ngedaid-maN-o-än} \rightarrow \text{gedaidoondamän} \quad \text{p. 186} \\
& \text{draw-sg-IncDuSubj-Fut-Inc} \quad \text{‘You (sg) and I will draw (here)’}
\end{align*}
\]

\(^8\) The consonantal DuSubj -k- induces left-epenthesis preceding any consonant other than [h] (the only liquid, see hs. 10).

\(^9\) Evidence in Section 6 confirms that PSubj is the unspecified, elsewhere nonsingular subject marker: in just those cases where the DuSubj marker is unavailable for use, semantically dual subjects are marked in the verb by the PSubj marker 6.)
c. Dual: 
- gge dók-d-u → gge dókukédó p. 186
  draw-DuSubj-Fut-1  ‘We two (1=1 and 3=he) will draw (here)’

d. Plural: 
- gge dók-d-d-u → gge dókidió
  draw.pl-(PISubj)-Fut-1  p. 186
  ‘We (more than two) will draw (here)’

The chart in (14) summarizes subject person/number marking. Each cell contains the modifier morpheme(s) which mark the appropriate subject number (by columns) and person (by rows). Subscripts indicate position.

(14)

<table>
<thead>
<tr>
<th>Patient</th>
<th>Number</th>
<th>dual</th>
<th>plural</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ucá</td>
<td>k₃</td>
<td>uc₃</td>
</tr>
<tr>
<td>2</td>
<td>c₃</td>
<td>k₃</td>
<td>c₃</td>
</tr>
<tr>
<td>3m</td>
<td>um₃</td>
<td>k₃</td>
<td>am₃</td>
</tr>
<tr>
<td>Inc</td>
<td>ma₄n₄</td>
<td>k₃</td>
<td>am₄n₄</td>
</tr>
</tbody>
</table>

Though I have annotated it position 1, immediately following the root, the linear morphological position of the PISubj (i) is in truth ambiguous. As reflected in the angled brackets, the PISubj appears not to correspond to a full segment underlyingly. Two pieces of evidence support this claim.

First, the PISubj surfaces only when the modifier begins with a dental consonant (i.e., /t, d, n, r/, which it follows, as in (15)). Notice that the position of the initial modifier morpheme is irrelevant, ranging here over a tense suffix (15a), an object marker (15b) and (15d), and a Loc marker (15c):

(15a) gge dói-ó-d-u → gge dóidóku p. 186
  draw.pl-(PISubj)-Fut-1  ‘We (many) will draw (here)’

(15b) gge dói-ó-d-d-u → gge dóidókáru p. 218
  draw.pl-(PISubj)-PObject-Fut-1  ‘We (many) will draw them (here)’

(15c) gge dói-ó-se-d-u → gge dóidésédé p. 186
  draw.pl-(PISubj)-7Loc-Fut-1  ‘We (many) will draw from here to there’

When the dental-initial morphemes in (15a—c) are replaced with functionally analogous but non-dental-initial morphemes in (16), the PISubj fails to surface – even though these verbs still refer to a plural subject.11

(16a) gge dói-ó-k-d-u → gge dóiku p. 187
  draw.pl-(PISubj)-Past-1  ‘We (many) drew (here)’

(16b) gge dói-ó-r-d-d-u → gge dóiráru p. 202
  draw.pl-(PISubj)-MOObj-Fut-1  ‘We (many) will draw him (here)’

(16c) gge dói-ó-ba-d-d-u → gge dóibódó p. 188
  draw.pl-(PISubj)-6Loc-Fut-1  ‘We (many) will draw from here to above’

The vowel /i/ can in general follow any consonant (e.g., /préb-/ ‘throw’, /kil-íp/gate’, /bi-íp/ ‘open’, etc.). This predilection for a preceding dental is specific to the PISubj. A second reason to doubt the segmental nature of the underlying representation of the PISubj (i) is that the surface vowel to which it corresponds does not contribute to the mora count of the modifier for purposes of accent assignment. This is illustrated in (17), where the default accent rule fails to apply to (17c) even though the PISubj apparently renders the modifier bimoraic on the surface.

(17a) [gge dói]-[d-u]ₜₜ → [gge dói]ₜₜ dₜₜₜ p. 186
  draw.sg-Fut-1  ‘I will draw (here)’

(17b) [gge dói]-[k-d-u]ₜₜ → [gge dói]ₜₜ kₜₜₜ p. 186
  draw-DuSubj-Fut-1  ‘We two will draw (here)’

(17c) [gge dói]-[b-d-u]ₜₜ → [gge dói]ₜₜ dₜₜₜ p. 186
  draw.pl-(PISubj)-Fut-1  ‘We (many) will draw (here)’

Instead, the accent rule treats (17c) exactly as it treats (17a), whose modifier differs minimally only in lacking the PISubj. The vowel contributed by the PISubj behaves as though it is invisible to the computation of weight at the time accent is assigned.

11 Subject number is encoded via stem allomorphy; see Section 8 for elaboration.
Taken together, the evidence suggests that the PISubj (i) consists in underlying representation of some phonological feature, e.g., [+high]. This feature links by rule to a modifier-initial dental, if there is one, and is vocalized by a rule ordered after accent assignment. If correct, this analysis weakens the postulate that the PISubj occurs in position 1. As a feature, the PISubj marker could theoretically be introduced anywhere—and still link at the edge by phonological rule. I will continue to represent the PISubj as occurring in position 1 but base no crucial claims on this assumption. (The linear order of the PISubj is discussed in more detail in fn. 29).

4.2. Object Marking

Nimboran marks two types of object in the verb. Masculine nonplural objects (MObj) and Plural objects (PIObj). I posit the following underlying forms:

(18)   MObj    -rår
       PIObj    -dår

Nonplural nonmasculine objects lack explicit expression in the verb. As Anceaux observes (p. 107), speakers who wish, for example, to refer to a semantically dual object can choose freely among the MObj, the PIObj, or the absence of any marker.

The MObj and PIObj markers never surface in the form given in (18). Due to a regular phonological process, they appear respectively as -rå:- and -dår- in the penultimate syllable and as -re- and -de- elsewhere. This alternation is illustrated by the following MObj:

(19) a.  nggéo-rår-d-u     → nggéo-rår-u  p. 202
     draw.sg-MObj-Fut-1 "I will draw him (here)"

b.  nggéo-rår-k-u     → nggéo-rår-u  p. 203
     draw.sg-MObj-Past-1 "I drew him (here)"

c.  nggéo-rår-gå-k-u     → nggéo-regpå-u  p. 203
     draw.sg-MObj-3Loc-Past-1 "I drew him below"

I assume the existence of some phonological rule deleting the dår portion of the MObj and PIObj morphemes before a non-final syllable. An inde-

pendently needed rule of -el-epenthesis (see fn. 8) subsequently inserts a vowel, permitting the remaining consonant to syllabify. 12

4.3. Durative Marker

Verbs mark durative aspect with a morpheme which surfaces as -tem- in all contexts.

(20) a.  Durative: -tmf-[+A].

b.  Non-durative: nggèdú-t-u   → nggèdútou  p. 186
    draw.sg-Pres-1 "I draw (here)"

    draw-Dur-Pres-1 "I am drawing (here)"
    (and will continue)"

As can be seen by its effect on the first person subject marker -u in (20c), the durative belongs to the class of morphemes causing apophonocity ([+A]).

4.4. Direction/Location (Loc Markers)

Like other Papuan languages, Nimboran marks the direction and/or location of the action directly in the verb with one of fifteen markers which Anceaux calls 'positions'. Since we use 'position' for the distinct phenomenon of morpheme order, I will rename these the 'directional-locational' markers and gloss them as xLoc, where x varies over the numerals in the lefthand column in (21). Anceaux's designations for the fifteen markers. Loc markers occur in position 5. They are illustrated in examples (3), (4), (9), (10), and elsewhere. 13

12 The passive and passive morphemes undergo the same alternation, suggesting that it is phonological in nature. The final ū is inserted for two reasons. First, these morphemes cause an immediately following future tense suffix -d- to surface as ūl; we can assume that it antedates to a preceding ūl and then undergoes a very productive rule of degemination. Second, other morphemes (e.g., the Loc markers, Section 4.4) and ūl undergo a similar rule but do not alternate with ūl before a nonfinal syllable; this can be handled by making ūl deletion sensitive to ūl. Nimboran has a few syllables ending in ūl but both sources say such codas are rare. (May and May 1981 cite exactly three examples (p. 21)).

13 The 3Loc marker, -gå, yields to an allomorph -går- in the present and recent past tenses. There is no 1Loc marker; Anceaux reserves the designation 'First Position' for the absence of Loc marking, in which case the default interpretation is 'here'.
4.5. Iterative

Verbs express iterativity with a partially infixal morpheme occupying position 6, whose underlying representation I can best characterize as ḩḍkt-. The examples in (22)–(24) give a taste of the intricate manner in which the iterative is integrated into its environment.

(22) a. Non-Iter:  

\[
\text{gedōo-bāN-k-am} \quad \rightarrow \quad \text{gedōobāŋkam}
\]

draw.sg.1Loc-Past-3m
‘He drew from below to here’

b. Iterative:  

\[
\text{gedōo-bāN-ḍkt-k-am} \quad \rightarrow \quad \text{gedōobānkāŋkam}
\]

draw.sg.1Loc-Liter-Past-3m
‘He drew repeatedly from below to here’

(23) a. Non-Iter:  

\[
\text{gedōo-bā-Ō-u} \quad \rightarrow \quad \text{gedōobiāu}
\]

draw.sg.2Loc-Pres-1
‘I draw above’

b. Iterative:  

\[
\text{gedōo-bā-ḍkt-Ō-u} \quad \rightarrow \quad \text{gedōobekāktu}
\]

draw.sg.2Loc-Liter-Pres-1
‘I draw repeatedly above’

(24) a. Non-Iter:  

\[
\text{gedōo-senā-nā-e} \quad \rightarrow \quad \text{gedōoenanāe}
\]

draw.sg.14Loc-Pres-2
‘You (sg) draw from below to there’

b. Non-Iter:  

\[
\text{gedōo-senā-štā-Ō-e} \quad \rightarrow \quad \text{gedōoenangštā}
\]

draw.sg.14Loc-Liter-Pres-2
‘You (sg) draw repeatedly from below to there’

The shape of the iterative is predictable from phonological context.

Crucially, the iterative is never infixed into the stem, as shown in (25):

(25) a.  

\[
\text{ugu-štā-t-u} \quad \rightarrow \quad \text{uguštātu} (\text{‘nguśktū’})
\]

bite.sg.Liter-Pres-1
‘I bite repeatedly (here)’

b.  

\[
\text{gedōo-štā-t-u} \quad \rightarrow \quad \text{gedōštātu} (\text{‘ngedōštātu’})
\]

draw.sg.Liter-Pres-1
‘I draw repeatedly (here)’

Like accent and apophonicity, iterative infixation is bounded by the modifier.

4.6. Tense

Nimboran distinguishes present, past, recent past, and future tenses. Their markers, which are obligatory, occur in position 7. The following minimal pair contrasts future with recent past tense:

(26) a.  

\[
\text{gedōō-k-d-u} \quad \rightarrow \quad \text{gedōōkēdō}
\]

draw-DuSubj-Past-1
‘We two will draw (here)’

b.  

\[
\text{gedōō-k-p-u} \quad \rightarrow \quad \text{gedōōkēpū}
\]

draw-DuSubj-RPast-1
‘We two recently drew (here)’

Tense markers come in three classes, illustrated below:

\[
\begin{array}{ccc}
\text{Future} & \text{I} & \text{II} & \text{III} \\
\text{Present} & \text{δ} & \text{η} & \text{τ} \\
\text{Recent Past} & \text{φ} & \text{θ} & \text{ε} \\
\text{Past} & \text{κ} & \text{ξ} & \text{κ}
\end{array}
\]

Tense class is determined by particular morphemes occurring to the left in the modifier. Class I is the default and predominant class. However, if any of the 2–3Loc morphemes is present (as in, e.g., (23)), then tense markers of class II are used. If, on the other hand, any of the 13-16Loc

For lack of space I cannot go into all the details here, but essentially it appears that the ḩštā portion of the morpheme is insuffixed before the nearest vowel to its left. Je. open initial, ][: voicing, vowel and consonant degemination (needed independently), and stress usually of ḩšt take care of the rest.
morphemes occurs (as in (24)), we find class III markers instead. I assume that this alternation, akin to conjugation class distinctions in other languages, must be handled by a system of diacritic features (see, e.g., Lieber 1980).

4.7. Particles

About half of the approximately 300 Nimboran verb roots cited by Anceaux select, under specified conditions, for a special morpheme which occurs in the modifier. For instance, patâš ‘hold a pig feast’ selects for -râš (28a), while rekêš ‘roll’ selects for -dîeši (28b, c). I will refer to these special morphemes by the generic term ‘particle’. Roots and particles are shown in boldface in (28):^13

(28a) patâš-râš-bâš-k-û
hold pig feast.pls-Part-2Loc-Part-3m
patâšrebâšu p. 127
We held a pig feast above

b. rekêš-dîeši-bâš-r-ûm
turn-Part-2Loc-Fut-3m
rekêšdîešibam p. 130
They will turn above

c. rekêš-k-re-bâš-r-ûm
turn-DuSubj-Part-2Loc-Fut-3m
rekêšklerebâšam [p. 130]
They two (m.) will turn above

Root and particle need not be linearly adjacent. For example, the roots in (28c) and in (29) are separated from their particles by the DuSubj -k-.

(29) a. tûn-k-pe-benâ-nû-am
rise-DuSubj-Part-13Loc-Pres-3m
tûnkepebenanam p. 127
They two (m.) rise to the surface from there to above

b. klêb-k-re-sû-n-t-ûm
signal-DuSubj-Part-12Loc-Pres-3m
klêbsrekûntum p. 130
They two (non-m.) signal from there to here

c. rengkê-k-ran[N+a]-kenô-ê-c
show-DuSubj-Part-3Loc-Fut-2
rengkêrekênekê p. 136
You two show below

The only two examples Anceaux gives of a verb containing a particle and the position 4 InclDuSubj -maN- suggest that the particle occurs to the left of position 4. This is observably true in (31a). (31b) is ambiguous, since the particle in this case is the same underlyingly placeless nasal (N) which appears in (31c). Because of a general phonological rule deleting a placeless nasal before another nasal, the relative order of -N- and -maN- in (31b) is impossible to determine directly (underlying N-maN and maN-N sequences would both result in surface maN). For consistency with (31a), I assume that the IncDuSubj occupies position 4 in (31b) as well:

(31) a. pûkê-râš-maN-û-nû-r-ûm
comemr-Part-InclDuSubj-3Loc-Fut-Inc
pûremgarâm p. 128
“You and I will come below”

b. sâmâm[N+a]-maN-û-dûm
drive away-Part-InclDuSubj-3Loc-Fut-Inc
sâmâm p. 126
“You and I will drive away (from here)”
NIMBORAN POSITION CLASS MORPHOLOGY

(34a) \( \langle k\bar{\imath}p-, -\bar{\nu}\vee \rangle \) 'proceed'

\[
\begin{align*}
& \text{kiōk-r̃-t̃-am} & \rightarrow & \text{kiōk̃r̃t̃am} \quad [p. 128] \\
& \text{proceed-DuSubj-Part-Pres-3m} & \rightarrow & \text{'They two (m) proceed (here)'}
\end{align*}
\]

b. \( \langle k\bar{\imath}p-, -\bar{\nu}\vee\rangle \) 'order'

\[
\begin{align*}
& \text{kiōk-r̃-t̃-[A]-t̃-u} & \rightarrow & \text{kiōk̃r̃t̃-[A]-t̃-u} \quad [p. 138] \\
& \text{order-DuSubj-Part-Inf-1} & \rightarrow & \text{'We two order (here)'}
\end{align*}
\]

c. \( \langle k\bar{\imath}p-, -\bar{\nu}\vee\rangle \) 'crush him'

\[
\begin{align*}
& \text{kiōk-māN-[A]-k-u} & \rightarrow & \text{kiōk̃māN-[A]-k-u} \quad [p. 141] \\
& \text{crush-DuSubj-Part-Past-1} & \rightarrow & \text{'We two crushed him (here)'}
\end{align*}
\]

d. \( \langle k\bar{\imath}p-, +[A]\rangle \) 'gaze'

\[
\begin{align*}
& \text{kiōk-k-[+A]-t̃-e} & \rightarrow & \text{kiōk̃k-[+A]-t̃-e} \quad [p. 124] \\
& \text{gaze-DuSubj-Part-Pres-2} & \rightarrow & \text{'You two gaze (here)'}
\end{align*}
\]

My conclusion is that particles lack inherent meaning. Rather, roots encode in underlying representation the identity of the particle with which they must co-occur; these complex lexical entries form the locus for the listing of underlying meaning.\(^{17}\)

There is nonetheless a certain amount of information lexically associated with particles. In particular, certain particles appear to function as irregular object markers, preventing the use of the regular MOobj or PIobj morphemes. This behavior is evident in examples (35) and (36), which illustrate verbs with masculine and plural objects, respectively. In each example, a root that selects for a particle (a) is contrasted with a root that does not (b).

(35) Verbs with Masculine objects:

a. \( \langle ɨÑ-, -māN+[A]\rangle \) 'ask'

\[
\begin{align*}
& \text{idÑ-k̃-māN+[A]-b̃-k̃-e} & \rightarrow & \text{idÑ-k̃-māN+[A]-b̃-k̃-e} \quad [p. 141] \\
& \text{ask-DuSubj-MOjOBJ-Past-2} & \rightarrow & \text{'You two ask him above (here)'}
\end{align*}
\]

\(^{17}\) The distribution of particles in Nimboran conforms to a pervasive pattern among Papuan languages; for accessible discussion, see, e.g., Section 9 of Foley (1984). Foley notes that many Papuan languages employ complex verbal constructions in which a 'gerundive' is semantically bleached verb combines with a specific noun or verb to produce a semantically coherent complex verb construction. It seems plausible to assume that Nimboran 'particles' derive historically from such a source.
b. (ggedṓi)-‘draw’
  ggedṓi-k-rāː-sā-k-e → ggedṓi-k-rāː-sā-k-e
  draw-DuSubj-MObj-4Loc-Past-2  ‘You two drew him
  there’

(36) Verbs with Plural objects:

  a. (kēn-,-laim[+A])- ‘follow’
    kēn-(-laim[+A]-)-sa[+A]-e → kēn-(-laim[+A]-)-sa[+A]-e
    follow.pl-(FSubj)-PO,Part-8Loc-Pres-2  ‘You (-sg)
    follow.pl from here to below’

b. (ggedṓi)-‘draw’
  ggedṓi(-laim[+A]-)-sā-k-e
  draw.pl-(FSubj)-POObj-4Loc-Past-2  ‘You (-sg)
  drew them there’

As (35) and (36) show, the (a) verbs containing object-marking particles are parallel structurally18 and semantically to the (b) verbs possessing regular object markers. Based on this evidence, a natural conclusion is

that particles are irregular object markers. I shall thus continue the

principle begun in (35) and (36) of glossing MObj-marking particles as MO,Part
and POObj-marking particles as PO,Part

5. Order of Verbal Morphemes

We turn now to the question of how the morphemes which comprise the

Nimboran modifier are all ordered with respect to one another. At least

thus far, ‘position class’ has played a useful organizational role, and in

employing the concept we follow a well-trodden path in the descriptive

literature. For example, Bloomfield discusses ten prefix positions in Menomini
(Bloomfield 1962, p. 101); Grimes motivates fifteen prefix and five

suffix positions in Huichol (Grimes 1964, pp. 22–23); Elson and Pickett
describe three suffix positions in Yagua (Elson and Pickett 1965:14–15);
Kimball refers to fifteen prefix positions and twenty-four suffix positions in
Kossati (Kimball 1991), and Anderson (1982, p. 605, 1986, pp. 7–14)
demonstrates the existence of exactly one prefix position and one suffix

position in the Georgian verb.19

---

18 One structural difference between object-marking particles and regular object markers,
not apparent here, involves the various potential co-occurrence restrictions affecting other
morphemes in the verb. These are discussed in detail in Section 6.

19 For further discussion of position class, or ‘slot-filler’ morphology, see, e.g., Hockett
Anderson (1992). This list is necessarily incomplete.

---

Despite its prevalence as a phenomenon, however, position class has
not played a prominent role in recent morphological theory. With notable
exceptions such as Perlmutt 1970, Anderson (1982, 1986, 1992), Simpson
and Withgott (1986), and Stamp (1991, 1992), theoretical work on
morpheme order has focused mainly on what can be accomplished by
exploiting local dependencies on the one hand, and syntactic or semantic
ordering principles on the other. For example, Muysken (1986) argues
that position class is unnecessary as a formal device for the analysis of
morpheme order in Quechua, relying instead on the interaction of lexicalized
sequences and constraints related to scope to organize morphemes.20

Similarly, although Athapaskan languages have long been characterized as
position class systems (see, e.g., Kari 1989 for a survey of position
classes based on their distribution between 1911 and the present), Speas
(1990 for Navajo) and Rice (1990, 1991, 1993 (for Slave)) have recently
argued that recognizing syntactic structure internal to the verb obviates reference
to (non)syntactic position classes.

Especially in light of the apparent lack of theoretical sympathy for
position classes, it is worth taking a moment to explore the possibility that
the ‘position class’ distinctions in Nimboran verbal morphology, repeated
below, might be reducible to other variables.

(37) 0 1 2 3 4 5

root FSubj DuSubj MObj IncDuSubj Loc

iter tense SubjPers

There are two possible ways in which this reduction could occur. One
possibility is that the total ordering of morphemes might be the intricate
product of a series of local, lexicalized dependencies among morphemes.
The other possibility is that a syntactic or semantic principle might regulate
the distribution of verbal morphemes. We briefly examine both possibilities
in turn.

In a lexical framework such as that of Lieber (1980), each sfix specifies its
lexical entry the identity of its potential sister. A well-formed verb

---

20 Muysken does additionally invoke positive filters (based on Perlmutt’s 1970 treatment
of elision) to order a small set of inflectional suffixes. The slots in these template filters refer,
however, to specific ‘morphological elements or classes of elements characterized by a
particular feature’ (Muysken 1986: 332) and in that sense are distinct from truly abstract
position elements.
is thus one in which the selectional requirements of each of its component morphemes are satisfied. Applied to Nimboran, this approach would work well for certain position classes. Consider, for example, the (position 7) tense markers and the (position 8) subject person markers. These morphemes are obligatory and their order is fixed. The latter fact may easily be expressed by assigning each subject person suffix a selectional frame stipulating that its sister must end in (or be specified for the features contributed by) a tense suffix:

(38) SubPers: [ [ tense:— ] ]

However, an approach of this kind cannot generalize in any plausible fashion to the remainder of the morphemes in the Nimboran verb, for the simple reason that all other morphemes are optional. To illustrate this point, consider the position 6 iterative and the position 7 tense suffixes. When both occur, tense follows iterative. But the iterative is optional – and even in its absence, the order of tense is still predictable. To claim that tense suffixes select for a form containing the iterative would clearly be inaccurate.

Of course, one could suppose that a morpheme selects not just for a specific neighbor, but rather for the exhaustive set of morphemes which it may potentially immediately follow. (39) illustrates the corresponding lexical entries for the tense and iterative under this approach.\(^{21}\)


The fact that tense selects for iterative in (39), and not vice versa, is sufficient to predict the relative order of these two morphemes when they co-occur. Yet the frames also accommodate the optionality of potential neighbors.

The flaw in this account is its redundancy, already apparent in (39). When extended to the rest of the corpus, it requires repeating substrings of (37) in the lexical entry of every single affix, as exemplified below:

\(^{21}\) Whether the sensitivity is to the left, as in (39), or to the right is immaterial to the argument.
the data seen thus far. However, we are about to encounter a new set of
data which will determine whether one dimension is sufficient to account
for morpheme distribution, as in (41), or whether the additional flexibility
of the two-dimensional model in (42) is necessary. The crucial evidence
comes from blocking phenomena.

6. Blocking

Morphemes in Nimboran display a remarkable ability to repel one an-
other. As Ancour and Ancour repeatedly observes, the occurrence of certain
morphemes in the verb is sufficient to block a, or prevent, the occurrence
of certain other morphemes.

A certain amount of morpheme incompatibility is, of course, attribu-
table to semantic or syntactic feature clash. For example, the fact that the
subject of a verb can never simultaneously be dual and plural has the
unexciting consequence that the DuSubj -k- and the PlSubj (l) are in
complementary distribution. But this type of blocking, which we may
characterize as intrinsic or featural blocking, is only a small part of the
story. Of greater interest are blocking effects not attributable to semantic
features: these effects, which I will refer to as extrinsic or morphological
blocking, are the focus of the remainder of the paper. We consider first
two simple, symmetrical cases of blocking.

6.1. Symmetrical Blocking

The first case of morphological blocking involves two familiar morphemes:
DuSubj -k- and PlObj -dar-. These two morphemes are in complementary
distribution. In the presence of a PlObj marker, Nimboran modifiers are
unable to distinguish between dual and plural subjects, resorting to the
PlSubj marker (l) to refer to any nonsingular subject. For exemplification,
compare the full range of subject number marking available in (43), where
no object marker is present, to its reduced counterpart in (44). Each verb
in (44) contains a PlObj marker.

\[(43)\]
\[a. \text{ Sg. Subj: } \text{ggedu}-d-u \rightarrow \text{ggedu}-d-u \quad \text{ p. 186}
\text{draw.sg-Fut-1} \rightarrow \text{I will draw (here)}\]

\[b. \text{ Du. Subj: } \text{ggedu}-k-d-u \rightarrow \text{ggedu}-k-d-u \quad \text{ p. 186}
\text{draw-DuSubj-Fut-1} \rightarrow \text{We two will draw (here)}\]
Crucially, the incompatibility of the DuSubj and PObj markers is not semantically based:

As far as their meaning goes [i.e., PObj verbs with nonsingular subjects], they are no typical Plural Actor forms, as they may have the meaning of Dual Actor, in the case of the Third Person Neutral even exclusively so.\(^{23}\) (Anceaux, p. 107)

The ambiguity of PObj verbs with nonsingular subjects is a hallmark of this morphological type of blocking (see Section 2), distinguishing it from the semantic, or featureal, blocking discussed earlier.

Note that the PObj marker does not block the use of the IncDuSubj marker, `-maN\(^{2}\) as shown in (45). Its blocking abilities extend only to the DuSubj `-k-.

(45)  ngedóu-dár-maN-t-ám
      draw-PObj-IncDuSubj-Pres-Inc

A second case of one-to-one, symmetrical blocking takes place between the durative and the masculine object marker. As shown in (46), the expected contrast between presence (a) or absence (b) of a MObj marker is neutralized in (c) – where the durative is present.

(46)  MObj:  prəb-rár-be-d-u  →  prəbrédut\u00b0  p. 104
      throw-MObj-Loc-Fut-1  'I will throw him from here to above'

\(^{23}\) The last clause refers to the fact that since gender is not contrastive for strictly plural subjects, the presence of the nearer person suffixes – available only when the subject is singular or dual – disambiguates a nonsingular subject verb. See Section 4.1.

(46c) is actually ambiguous between the presence or absence of a masculine object:

Though this is seldom the case, an object may be mentioned in a sentence in which the predicate is a durative form. This object, however, does not have any influence on the verb form, in other words: Durative forms are indifferent to sex or number of the object. (Anceaux, p. 109)

Crucial to the explanation of blocking is an interesting regularity characterizing the two pairs of morphemes which engage in this type of morphological complementarity. Within each pair, the two mutually incompatible morphemes have exactly the same ordering relations with respect to all of the other morphemes with which they potentially co-occur:

\[
\begin{array}{c|c}
\text{mutually blocking morphemes} & \text{position in verb} \\
\hline
\text{PObj (`dár-`), DuSubj (`k-`) } & \text{position 2} \\
\text{Dur (`tom[+A]`), MObj (`rár-`) } & \text{position 3} \\
\end{array}
\]

That is to say, morphemes whose mutual blocking properties we have characterized as morphological in nature appear to belong to the same position class. By contrast, morphemes which block each other semantically do not (necessarily) exhibit this property. For example, the DuSubj `-k-` and the IncDuSubj `-maN-` are obviously incompatible on semantic grounds – yet their respective orderings in relation to the MObj marker `-rár-` are exactly opposed: `-k-` precedes `-rár-` (see, e.g., (5b,c), (35b)), while `-maN-` follows `-rár-` (see, e.g., (42c)). The two clearly reside in different position classes. Similar observations pertain to other sets of semantically complementary morphemes, as shown in (48):

\[
\begin{array}{c|c|c}
\text{semantically incompatible morphemes} & \text{position class membership} \\
\hline
\text{DuSubj (`k-`), IncDuSubj (`maN-`) } & \text{DuSubj } 2; \text{ IncDuSubj } 4 \\
\text{PObj (`dár-`), MObj (`rár-`) } & \text{PObj } 2; \text{ MObj } 3 \\
\text{DuSubj (`k-`), Inc (`dm`) } & \text{DuSubj } 2; \text{ Inc } 8 \\
\text{Dur (`tom[+A]`), Fut (`d-`) } & \text{Dur } 3; \text{ tense } 7 \\
\end{array}
\]
than featural – blocking correlates with shared position class membership, we will have a very simple and restrictive account of morphological blocking, as in (49):

(49) At most one morpheme may occupy any given ‘position’.

Any theory which can successfully formalize the notion of verbal ‘position’ will thus be able both to account for affix ordering and to explain the morphological blocking effects we have noted thus far among verbal morphemes in Nimboran. However, we have not yet seen the full panorama of these effects. We thus postpone a formalization until our working generalization in (49) has been introduced to its next and final challenge, in the following section.

6.2. Asymmetrical Blocking

The simple, symmetrical blocking with which we are now familiar does not characterize all morphological blocking effects in Nimboran verbs. In particular, data introduced in this section shows that we still lack a complete account of the durative marker -tan[+A]-. Already established as a resident of position 3, the durative is known to block the position 3 MObj marker. But as we will see, it blocks the position 2 DuSsubj -r- as well. (50) shows that nonsingular verbs in the durative are unable to distinguish dual from plural subjects:

(50)

a. Du. Ssubj: 
| gerédu-ke-tu   | p. 186 |
| draw-DuSsubj-Pres-1 | | ‘we two draw (here)’ |

b. Pl. Ssubj: 
| gerédu-(0)-t-u | p. 186 |
| draw-pl-(PSsubj)-Pres-1 | | ‘we (many) draw (here)’ |

c. Du/Pl. Ssubj. Dur: 
| gerédu-(0)-tan[+A]-t-u | p. 234 |
| draw-pl-(PSsubj)-Dur-Pres-1 | | ‘we are drawing (here)’ |

Exactly parallel in this respect to verbs containing the PObj -dar-, verbs containing the durative -tan[+A]– are forced to use the PSIsubj marker -t- for all nonsingular subjects (other than the IncDuSsubj). The contrast between (50a) and (50b) is thus neutralized in (50c).

Our existing account of morphological blocking prompts us to locate mutually exclusive morphemes in the same position class, which in the case of the blocked DuSsubj is position 2. Assigning the durative to this position then predicts that it ought to block all other morphemes which can potentially occur there. In particular, the durative is expected to block

the position 2 PObj marker -- and this turns out to be correct. In fact, the durative cannot co-occur with either object marker (Ancens, p. 109); and as we have already observed, the prohibition is not of a semantic nature. An interpretation of plural object is available. The corresponding morphological exponent is not.

But this analysis raises a problem. Assigning the durative to position 2 contradicts our earlier conclusion that the durative – because of its incompatibility within the MObj marker – must occupy position 3. (51) is a reminder that the position 2 DuSsubj and the position 3 MObj can co-occur, in a fixed order, from which it follows that their positions are distinct:

(51) gerédu-ke-k-rarák-ky-tu   → gerédukkáku   p. 203 |
| draw-DuSsubj-MOBJ-PST-tu | | ‘we two drew him (here)’ |

To obtain a straightforward account of the behavior of the durative we must broaden our notion of position membership. The durative differs from the other morphemes we have observed thus far in that it occupies not one position, but two.

Like the PObj marker, the durative is still compatible with the position 4 IncDuSsubj marker, showing that it extends to positions 2 and 3 but to no others. (52) shows a verb with IncDuSsubj, both with (b) and without (a) the durative marker:

(52a) gerédu-mÁn-t-ám   → geréduomán-tám   p. 186 |
| draw.sg-IncDuSsubj-Pres-INC | | ‘you (sg) and I draw (here)’ |

b. gerédu-tan[+A]-mÁn-t-ám   → geréduatemán-tám   p. 234 |
| draw-Dur-IncDuSsubj-Pres-INC | | ‘you (sg) and I are drawing (here)’ |

A second case of asymmetrical blocking emerges from the study of particle and object marker interaction. True of all particles in Nimboran is that they may never co-occur with either of the two productive object markers. This is understandable in the case of those particles which themselves function as irregular object markers, as we saw in Section 4; however, it is also true of those particles which do not encode an object. This complementarity leads to a subtle contrast between those verbs which contain a particle and those which do not.

Consider the representative pair of verbs in (53):
(53a) (iâmêN-, -raN[+A]) ‘teach’

iâmêN-k-raN[+A]-ba-du → iâmênkrembê

 teach-Subj-Part-2Loc-Pres-1 ‘We two teach above’

b. (ggedô=) ‘draw’
ggedô=k-ba-k-um → ggedôkebêkum
draw-Subj-2Loc-Past-3a ‘They two drew above’

Both the verb containing a particle (53a) and its particle-less counterpart in (b) lack object markers and appear parallel in their construction. However, the following data dismantle this illusion. (54a) shows that the same verb root which occurs without an object in (53b) is also capable of occurring with a MObj (54a) or a PIObj (b):

(54)
a. ggedô=k-râr-sâ-k-e → ggedôkresêke p. 203
draw-Subj-MOobj-4Loc-Past-2 ‘You two drew him there’

b. ggedô(i)=ô=dâr-sâ-k-e → ggedôdiesêke p. 218
draw-pl.(PSubj)-PIObj-4Loc-Past-2 ‘You (-sg) drew them there’

The point of this example is that verbs formed from particle-less roots like ggedô= ‘draw’ have the freedom (semantic permitting) to take an object marker (54a, b) or not (53b). But this alternation is not available to verbs containing a particle. They are restricted to one object context only; the context of the verb in (53a) happens to be ‘objectless’.

One might try to characterize those roots selecting particles in the ‘objectless’ context as being inherently intransitive, rather than assuming that the particle imposes this property on the verb. But such an approach suffers from three weaknesses. First, it must treat as accidental the fact that all roots selecting particles are either inherently transitive or inherently intransitive, whereas alternations in transitivity are common among roots not selecting particles. Second, since each particle is specific to one of the three object contexts, encoding object context on roots as well would be redundant. Third, root-particle allomorphy shows that roots can be underspecified for object context, and that it is the particle they select which determines the object reading. Consider the contextual particle selection of the root ‘to beat’:

(55) kil. ‘beat’.

● selects particle -dâr- in objectless context iff (a) or (b) holds:
  (a) subject is 2pers or 3pers plural
  (b) subject is 1pers plural and a Loc morpheme is present

● selects particle -sendâN- in MObj context iff the iterative morpheme is present and the DuSubj and InclDuSubj markers are absent

● Elsewhere, the root occurs without a particle.

We will provide an analysis in Section 6 of the seemingly complex conditions on the co-occurrence of this root (and others) with its various affiliated particles. What is important to note here is that the lexical semantics of the root clearly permits it to take an object; the incompatibility between object markers and the ‘objectless’ particle -dâr- must originate elsewhere, i.e., with the particle.

A partial explanation is already at hand: if, as we have hypothesized on the basis of ordering facts (Section 4.7), particles occur in position 3, then they are predicted to block the position 3 MObj marker anyway. However, this still leaves us without an explanation for the incompatibility of particles with the position 2 PIObj marker. We cannot suppose that particles occupy both positions 2 and 3, since (even ‘objectless’) particles freely co-occur with the position 2 DuSubj marker (see, e.g., (28)–(29)).

One possibility is to suppose that the PIObj, like the durative, spans more than one position. Assigning the PIObj to positions 2 and 3 would be consistent with its failure to co-occur with the position 2-3 durative or with the position 3 MObj, and it explains the complementarity between all particles and the PIObj. However, an alternative hypothesis is simply that each particle is associated with a particular syntactic valency, inherited by the verb as a whole. Under this hypothesis, the prohibition against object markers in verbs with ‘objectless’ particles would be a syntactic, not a position-based, phenomenon. At present, there is little evidence for either hypothesis over the other. Let us thus remain neutral as to the source of object-particle incompatibility; we return to this issue in Section 7.

A revised list of Nimboran position class memberships is given below, incorporating the asymmetrical blocking of the durative:

(56)

<table>
<thead>
<tr>
<th>Position</th>
<th>root</th>
<th>PSubj</th>
<th>DuSubj</th>
<th>MObj</th>
<th>InclDuSubj</th>
<th>Loc</th>
<th>Iter</th>
<th>tense</th>
<th>SubjPen</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
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<td></td>
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<tr>
<td>-Dur-</td>
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<td></td>
</tr>
</tbody>
</table>

In their voracious occupation of positions, the durative and PIObj morphemes resemble certain prefixes in another position class system, the Uto-Aztecan language Huichol. As Grimes has shown, Huichol verbs admit fifteen preformal positions (Grimes 1964:22ff.).
Most affixes are restricted to a single position; for example, the subject number/person prefixes always appear in position 14. However, several mode prefixes (m(-e) - (plurals), n(-e) - (suppositive), z(-ka- - (conditional)) straddle positions 13 and 12, apparently blocking other prefixes which ordinarily appear in one or the other position (Grimes 1964, pp. 22-29).

According to Stump (1992), another potential case of a positional portmanteau occurs in Swahili, where at least three prefix positions may be distinguished (Ashton 1944, pp. 70ff):

\[(58) \text{III} - \text{II} - \text{I} - \text{root} \ldots\]

Position III is the locus of negative polarity prefixes, position II of subject agreement markers, and position I of tense prefixes. However, one prefix, *si-, encodes both negative polarity and 1 sg subject agreement. It occurs to the left of position I and cannot co-occur with any morpheme from positions II or III. Stump (1992) analyzes this morpheme as a 'positional portmanteau', simultaneously filling positions II and III. *si- would thus appear to pattern with the position 2-3 Durative and PLOB in Nimboran, or with the mode prefixes in Huichol. However, it must be noted that there is an alternative explanation for the blocking exhibited by *si-: it encodes precisely the constellation of semantic properties that the prefixes in positions II and I would together contribute. That is to say, *si- is a morphosyntactic, or featural, portmanteau. 'Elsewhere' blocking by a portmanteau of the regular compositional morphology is common cross-linguistically;\(^{24}\) it occurs independently of whether or not a language has position classes in the morphology. Thus, although the blocking effects induced by Swahili *si- are consistent with multiple position occupation, they may not strictly require it.

In sum, although the Huichol data suggest that the ability of a single affix to span positions is an attested feature of position class-based morphologies, the Swahili facts show the potential for this behavior being a secondary effect of feature-based blocking. I leave for future research the task of evaluating the applicability of the Nimboran analysis to other, superficially similar systems.

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\(^{24}\) Examples are too numerous to cite fully, but see Kiparsky (1982) and Anderson (1986, 1992) for prominent discussions of the role of the 'Elsewhere Condition' in morphology.

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6.3. Most Complex Blocking: Particles

Although particles exhibit the same kind of blocking that we have already seen, they do so with a complexity that will force us to refine our representation of position class.

In his impressively detailed discussion of the conditions under which roots and particles can co-occur, Aneaux frequently makes observations like the following, taken from a description of roots selecting for the particle -N- (p. 126):

\[(59) \text{"peb - 'call names' [selects for -N only in] forms of the First Position category, the other Position categories being blocked by members of the -meq- category..."}\]

By 'First Position', Aneaux means a verb lacking a Loc morpheme (see fn. 13). Thus, the constraint he observes on the co-occurrence of peb- and -N- is that verbs containing the pair may not also contain a Loc morpheme. Similarly, he observes that the particle -de- co-occurs with the root tabi 'gather' only when iterative and Loc are absent (p. 145).\(^{25}\)

Restrictions of this kind in fact characterize most of the pairings between the approximately 70 particles and the approximately 150 roots that select for them. Although the number and variety of such restrictions may initially appear daunting, closer inspection reveals striking regularities. In particular, the types of restrictions a particle can encode are independent of - and differ systematically from - the types of restrictions a root can encode.

Particle-specific restrictions can be isolated by compiling a list of all roots with which a given particle could occur and extracting the common element (if any) from all of the contexts in which co-occurrence is prohibited. For example, the only restriction common to all pairings between the particle -tər- and the roots with which it occurs is that the DuSubj -k- is prohibited (60a). We can thus conclude that the particle -tər- is incompatible with the DuSubj morpheme. Proceeding further, common to all pairings of the particle -a[+A]- and its co-occurring roots is the

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\(^{25}\) Aneaux characterizes this unaccented particle not as -de- but as 'shifted accent', presumably because of its segmental harmonization with the form that the accented PLOB takes before non-fnal syllables. However, the resemblance occurs accidental; the particle exhibits none of the alternations associated with the PLOB (see Section 4.2).
restriction that both DuSubj -k- and Loc are prohibited (60b); common to all verbs containing the MObj particle -temaN- is the impossibility of the IncDuSubj -maN- (60c). All of these restrictions can be laid at the feet of the respective particles. In contrast to these three sets, however, there is no special co-occurrence constraint common to all verbs containing the particle -räm[ + A]- (60d). This particle may be considered unrestricted. A full list of the particles appearing in Anceaux’s grammar and their inherent restrictions appear in Appendix 1. In (60) is a summary of the lexical restrictions on the particles mentioned just above (excluding the pan-particle constraint against co-occurring with an object marker).

<table>
<thead>
<tr>
<th>(60)</th>
<th>Particle</th>
<th>Special constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>-där-</td>
<td>DuSubj -k- prohibited</td>
</tr>
<tr>
<td>b.</td>
<td>-d[ + A]-</td>
<td>DuSubj -k-, Loc prohibited</td>
</tr>
<tr>
<td>c.</td>
<td>-temaN-</td>
<td>IncDuSubj -maN- prohibited</td>
</tr>
<tr>
<td>d.</td>
<td>-räm[ + A]-</td>
<td>-</td>
</tr>
</tbody>
</table>

Not all contextual restrictions on root-particle co-occurrence can be attributed to particles. Consider the root-particle pair (rē-, -räm[ + A]-) ‘go, proceed’. These two co-occur only when the subject of the verb is plural (61a) — although the very same particle occurs with other roots (e.g. idā ‘seek’ and kip ‘order’) regardless of the number of the subject. In fact, we have already labeled -räm[ + A]- as unrestricted (60d). Similarly, though the only common property of verbs containing the MObj particle -temaN- is that they may not also contain the IncDuSubj marker (60c), the specific root-particle pairing (kakrōu-, -temaN-) obeys the additional constraint of having to occur in the context of the iterative marker (61b).

Since we cannot ascribe the property of iterativity to the particle -temaN-, we must instead ascribe it instead to the root kakrōu-. A full list of root-particle restrictions appears in Appendix 2; below are the examples just cited. Again, object restrictions are omitted here:

<table>
<thead>
<tr>
<th>(61)</th>
<th>Root-particle</th>
<th>Gloss</th>
<th>Special constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>(rē-, -räm[ + A]-)</td>
<td>‘go’</td>
<td>Subject must be (marked as) plural</td>
</tr>
<tr>
<td>b.</td>
<td>(kakrōu-, -temaN-)</td>
<td>‘cover’</td>
<td>Verb must be (marked as) iterative</td>
</tr>
<tr>
<td>c.</td>
<td>(bekēi-, -dāN[ + A]-)</td>
<td>‘rise’</td>
<td>Verb must contain 2, 3, 4, or SLoc</td>
</tr>
<tr>
<td>d.</td>
<td>(hrēi-, -N-)</td>
<td>‘copulate’</td>
<td>Subject is Sg., tense is future</td>
</tr>
</tbody>
</table>

Once both lists are fully complete, certain generalizations emerge. In contrast to the clutter of conditions that characterize root-particle pairings, those conditions specific to particles fall into six categories — succinctly formulable in terms of what morphemes a particle blocks. These categories are presented in (62), with sample particles for illustration (to demonstrate that object status does not predict blocking behavior, sample particles are given from all three object classes).

<table>
<thead>
<tr>
<th>(62)</th>
<th>Morphemes blocked</th>
<th>Sample particles (by object context)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>IncDuSubj</td>
<td>-maN[ + A]-</td>
</tr>
<tr>
<td>b.</td>
<td>DuSubj, IncDuSubj</td>
<td>-dāmaN[ + A]-</td>
</tr>
<tr>
<td>c.</td>
<td>-dāN[ + A]-</td>
<td>-dā[ + A]-</td>
</tr>
<tr>
<td>d.</td>
<td>Att Loc, Iter</td>
<td>-räm[ + A]-</td>
</tr>
<tr>
<td>e.</td>
<td>DuSubj, all Loc, Iter</td>
<td>-maN[ + A]-</td>
</tr>
<tr>
<td>f.</td>
<td>DuSubj, all Loc</td>
<td>-dā[ + A]-</td>
</tr>
</tbody>
</table>

No particle exhibits blocking effects beyond those represented here.

While listing individual blocked morphemes (or morpheme types) is a step in the right direction, closer examination of (62) reveals a further generalization. In particular, the lists of morphemes are not of random composition; rather, they consist of entire position classes. The restatement of (62) in terms of positions is shown in (63), where for diagrammatic simplicity only ‘objectless’ particles are exemplified.

<table>
<thead>
<tr>
<th>(63)</th>
<th>Blocks positions 4</th>
<th>-maN[ + A]-</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>Blocks positions 2 and 4</td>
<td>-dāmaN[ + A]-</td>
</tr>
<tr>
<td>c.</td>
<td>Blocks positions 2</td>
<td>-dāN[ + A]-</td>
</tr>
<tr>
<td>d.</td>
<td>Blocks positions 5 and 6</td>
<td>-N-</td>
</tr>
<tr>
<td>e.</td>
<td>Blocks positions 2, 5 and 6</td>
<td>-maN[ + A]-</td>
</tr>
<tr>
<td>f.</td>
<td>Blocks positions 2 and 5</td>
<td>-te[ + A]-</td>
</tr>
</tbody>
</table>

This restatement of the blocking effects explains why no particle blocks, for example, only one, or two, or seven of the fifteen Loc morphemes; either all are blocked or none is blocked. This follows from saying that a particle either blocks position 5 or it does not. The position class analysis of blocking allows no middle ground.

The position class perspective on particle blocking has the further advantage of relating the particle-specific effects to the more general constraint that no particle may co-occur with an object marker. Both types of constraint are formulable in terms of position class.

In contrast to these particle-based constraints, the types of properties localized to specific root-particle pairings do not begin to yield to a position-based description. For example, the root bekēi ‘rise’ co-occurs with
the objectless particle -dar- only when one of the 6th–16th Loc morphemes is present, and with the objectless particle -dan[+A]-- when one of the 2nd–5th Loc morphemes is present or when a Loc morpheme is lacking (64a). This is a plausible restriction on semantic grounds; the root selects -dar- when a directional action is to be denoted, and it selects -dan[+A]-- in the context of a locative interpretation (including that of the default 'here'). But all Loc morphemes belong to the same position; the distinction between directional and locational Loc morphemes plays no (other) morphological role in Nimboran. Another example of a restriction unrelated to position class is the requirement on the root particle pair (hirit-, -N-) 'copulate' that the relevant verb must be in the future tense (64b).

Although the generalized category of tense functions in the positional system, there is no (other) evidence for isolating future tense for purposes of blocking or ordering. As a third case, a number of root-particle pairs place conditions on subject person. For example, the root-particle pair (pul-, -dar-) is usable only when the subject of the verb is singular or dual; when the subject is plural, an allomorph of the root which selects for no particle is used instead (64d). The particle -dar- is not itself incompatible with plural subjects; see kakredi-kl-amb 'they will die here' (p. 128), which involves an unrestricted pairing between the particle -dar- and the root kakredi-. All of these root-based restrictions require semantic featural restrictions in lexical entries:

(64a. \(\text{oqhar-}, -dar\)) 'tie' + directional pp. 132, 136
(b) (birri-, -N-) 'copulate' (c) (\(\text{pui}\)) 'come'
(kiri-) Sub: sg; Tns = future
\(\text{pui}\), -dar) Sub: plural
(\(\text{pul}\), -dar) (\(\text{qar}\), -dar) (\(\text{qar}\), -dar) (\(\text{qar}\), -dar)

It is true that a small number of the negative restrictions on root-particle combinations could be stated either in terms of position classes or in terms of semantic features. For example, a few root-particle pairs occur only in non-iterative contexts. As the iterative morpheme is the sole occupant of its position class, we could relate its prohibition to the blockage of position 6. However, good cases of this restriction are scarce (the best examples are (\(\text{qar}\), -dar) 'hear', (kakredi-, -dar) 'die'); are semantically unlikely to be iterative in the first place; and are outnumbered by the ca. 28 root-particle pairs that can occur only when the verb is positively specified for iterative. This latter restriction is not stated in terms of positional blocking since it requires the presence, not the absence, of a morpheme — and must be captured featurally. To take another example, a few root-particle pairs occur only in verbs lacking a Loc morpheme (\(\text{dab},

\(\text{dab}\), -dar) 'smell', (\(\text{lab}\), -dar) 'take', (\(\text{ka}\), -[+A]--) 'to be', (\(\text{kra}-, -dar) 'build', (\(\text{peb}, -N[+A]--) 'call names'). In none of these cases is the particle in question generally incompatible with Loc morphemes. Noting that these five root-particle pairs are far outnumbered by the root-particle pairs which require the presence of particular Loc morphemes, one might suppose that in these few marked cases, the meaning of the lexical entry includes the 'here' location, and is thus semantically incompatible with any Loc morpheme. Some support for this comes from the fact that there is one root, (\(\text{kr}\)--) 'close', which selects for no particle at all — yet still imposes the same restriction against a Loc morpheme on verbs containing it.

In sum, the generalization is that root-particle requirements are of a featural nature, whereas particle-based constraints involve whole position classes. Since the former, as they involve features on individual root allomorphs, are uninteresting from the positional perspective, we will now focus exclusively on the blocking effects that particles exert within the verb.

Just as we realized that the lists of morphemes that particles block yield to further generalization, so it is true that the lists of positions which particles block are not random. Inspection of (63) reveals the striking generalization that the targets of those particles inducing mass blocking are, with only two exceptions, sets of contiguous positions.

(65) Near-true generalization: any set of positions blocked by the same morpheme consists of a substring of the ordered positions in (65).

This would suggest that Nimboran follows the same pattern as, e.g., Huichol: there too, where it appears that a given prefix occupies more than one position in the verb, those positions are always contiguous (Grimes 1964, p. 22). But to make this stick for Nimboran, we must deal with the two loose ends, namely positions 3 and 4.

The problem posed by position 3 is epimenal. It is true that, according to the chart in (63), position 3 poses a discontinuity in the sets of positions which a given particle may block. However, recall that position 3 is exactly the one allocated on the basis of ordering facts to particles themselves. Thus, all particles presumably block position 3, a fact which should be incorporated into a restatement of (63).26

26 A prediction of this account is that the durative should be in complementary distribution with particles. Unfortunately, even in the same thirty-three pages devoted exclusively to the morphological constraints in which particles may and may not occur, Anceas does not mention the durative at all. What inference, if any, to draw from this I cannot be sure.
Position 4, which contains the IncDuSubj marker -maN-, represents a more formidable discontinuity. In particular, particles of the type in (63f) apparently block morphemes to the left and to the right of -maN- but do not block -maN- itself. A22 A particular oddity involving position 4 is that when it does join other positions as the target of mass blocking, it joins only with positions to the left (2 and 3) but never with those on the right (e.g., 5). Except for its linear realization (66), -maN- is paradoxically patterning as though it belonged to a position to the left of position 2 (67):

\[(66) \quad \text{gredım, m.e. maN-} + \text{ši, ba-} + \text{e-en} \rightarrow \text{gredım, m.e. maN-}
\]

\[(67) \quad \text{draw, sg, MOBj, IncDuSubj, Loc, Part, Inc}
\]

You (sg) and I drew him above.

The paradox in (67) is fatal for a one-dimensional, precedence-based template approach such as the one in (41), which directly imposes a total linear ordering on the morphemes it organizes. We are faced with a choice: either abandon the idea that position classes can account both for morphological blocking and for linear order — or opt for the alternative, two-dimensional formalization of morphological ‘position’ in (42).

7. A Lexical Hierarchy

The advantage of a hierarchical model over a precedence-based template is that it accounts for linear ordering in an indirect, more flexible fashion. Ordering is the product of two kinds of information: the distinction between prefixes or suffixes (precedence) on the one hand, and the level of attachment (dominance) on the other (see, e.g., Sproat 1985, 1988; Marantz 1988). 28 We have seen the futility of the restrictive attempt to characterize modifier morphemes as a string lacking internal organization. In this section we reject this assumption and exploit to the greatest power of a hierarchical model.

First, I follow the lead of the phonological evidence presented in Section 3 and treat the modifier as a morphological constituent in its own right, with its own internal organization, from which the root is excluded. Second, I abandon the idea that all modifier morphemes are suffixes (as assumed even in (42)), instead analyzing those morphemes in positions 2, 3 and 4 as prefixes. 29 The effect of these two moves on the structure of the modifier is depicted in (68). Familiar linear position appears on the horizontal axis, while the proposed new levels, distinctively renamed, occupy the vertical dimension:

\[(68) \quad \text{DuSubj MOBj IncDuSubj}
\]

\[ \text{Loc, ter tense Subj, Pers} \]

This structural change makes sense of the formerly problematic behavior of the IncDuSubj morpheme. Though still medial in terms of precedence, this morpheme is now peripheral — on the vertical dimension. This explains why it patterns more closely with positions 2 and 3, adjacent in the tree, than it does with position 5, which is nonadjacent in the tree. The reanalysis in (68) also removes the discontinuity which position 4 formerly presented in the positions which particles block. It permits the important descriptive generalization that all sets of massively blocked positions are now contiguous — if only the vertical dimension is considered. We now turn to the implementation of this solution.

7.1. Lexical Entries

In a model of stratum ordering which conceptualizes ‘stratum’ as hierarchical category (Inkelas 1989), each suffix is associated with a subcategorization frame indicating both direction and level of attachment. 30 Thus, the

---

22 Anceaux includes only two actual examples including both an IncDu subject and a particle; these were presented back in (31), and neither involves a restricted particle. However, from the many specific cases Anceaux cites in which -maN- is blocked by a particle, one clearly infers that -maN- is normally possible.

28 In dealing with recalcitrant ordering phenomena in English and other languages, Sproat (1985, 1988) and Marantz (1988) have proposed models in which dominance is reexpressed in morphological structure, while precedence is reexpressed in the phonological component. While I assume the general correctness of this claim, in the interest of notational economy I will continue to refer to a single constituent structure whose two dimensions are correlated with the information contributed by the morphological and the phonological components.

29 Because of its peripheral position, position 4 IncDuSubj could be either a prefix or a suffix. I have represented it as a prefix here only because the other subject number markers are also prefixes. The current discussion also omits the positionally ambiguous PISubj (6). In view of the fact that any blocking effects involving the PISubj would help determine its morphological position, I present here the sparse but intriguing distributional
quids involving PStrbj. As I will conclude, all are related, but none involves a genuine case of position blocking.

Puzzle 1: Staring (i)

There is no surface contrast between presence and absence of PStrbj (i) in verbs containing the particle -ni^[A]-:

    see-PStrbj-Po:Part-Loc-Past-3m
    ‘To see them there’

        see-PStrbj-Po:Part-Loc-Past-3m
        ‘They saw them’

(iii).  sec-(PStrbj)Po:Part-4Loc-Past-1m  → rekündikši
        ‘They saw them’

(iii).  reki-(PStrbj)Po:Part-4Loc-Past-1m  → rekündikši
        ‘We saw them (here)’

Since ni sequences are possible elsewhere (as in (ii)), the absence of surface (i) in (iii) might be due to positional blocking. However, no positional account could explain why the other particle which behaves in this manner (-ni^[A]-) (p. 152) also has (i) as its first vowel.

Puzzle 2: Misplaced (i)

In verbs containing certain particles, (i) surfaces not after the modifier initial-but rather after the initial dental of the morpheme immediately following the particle. This occurs in (iiiia) and (iiib):

(iiiia).  bni^[A]-daNI^[A]k-u
    wait-pl-(PStrbj)Po:Part-Pres-1
    ‘We wait for them (here)’

(iiiib).  bni^[A]-daNI^[A]k-e-k-am
    wait-pl-(PStrbj)Po:Part-Loc-Fut-3m
    ‘They (m.) will wait for them there’

(iiiia).  bni^[A]-daNI^[A]k-u
    wait-pl-(PStrbj)Po:Part-Pres-1
    ‘We wait for them (here)’

Reversibility of PStrbj and particle, as is apparently the case in (a) and (b), would falsify a position class account. However, note that (c) exhibits the expected order between particle and PStrbj, yet differs from (iiiia) only in tense. Positional reversal of PStrbj and the particle -daNI^[A]- could not explain this.

Puzzle 3: Spurious (i)

Finally, certain particles like the one in (iiiia) induce a surface (i) immediately after the immediately following dental (here, a tense suffix) – even when the subject is singular (a)

(iii).  rekün-daNI^[A]k-e-k-am
    clean-Pl-Po:Part-Fut-2
    ‘You (sg) will clean them (here)’

(iii).  rekün-daNI^[A]k-e-k-am
    clean-Pl-Po:Part-Fut-2
    ‘We cleaned them (there)’

I suggest a unified explanation for these three puzzles: a second source for surface (i), coupled with a phonological constraint against multiple (i)’s in the same word.

Let us suppose that, like -ni^[A], the phonological entity (i) may be affiliated underlyingly with particular particles. Let us further assume that (i), which happens to be homophonous

level D Loc selects for a leftward sister of level D (69a), while the level C DStrbj -k- requires a level C sister to its right (69b):

(69a).  [[[i] D] n]
       [[k] C]

In employing lexical selection of the type in (69), Nimboran joins a long list of other level-ordered languages, including English (Siegel 1974, Allen 1978, Pesetsky 1979, Kiparsky 1982, Halle and Mohanan 1958, Malayalam Mahanna 1982, 1986, Icelandic Kiparsky 1984, Sekani (Hargus 1985), and Tumil (Chrsfts 1988), among others. These languages have all been reported to distinguish minimally between affixes which attach at level 1 and those which attach at level 2. But they differ from Nimboran in one crucial respect. In English et al., affixation to any given level is recursive, meaning that the affixation of a level 1 affix produces another level 1 constituent which is prepared to undergo level 1 affixation again. What distinguishes Nimboran is that it permits at most one instance of affixation at any given level: self-embedding is never an option.

I propose to locate this parametric difference in lexical representation. In particular, while affixes in English are level-preserving, those in Nimboran are level-changing, a difference we can accommodate by labeling outer branches in lexical entries to capture the level of the constituent

with the PStrbj marker, is linearly orderable and that it is initial in some particles but final in others, as in (iv):

(iv)  Originally hypothesized UR    Revised UR    Relevant example

-ann^[A]-        -DStrbj^[A]-        -ni^[A]-        (i)
-ann^[A]-        -DStrbj^[A]-        -ni^[A]-        (ii)
-ann^[A]-        -DStrbj^[A]-        -ni^[A]-        (iii)

We already know from studying the PStrbj (Section 4.1) that (i) surfaces only when the adjacent constituent is dental. Assuming an additional rule which deletes the leftmost of two (i) entities in the same word (the mysterious distributions of (i) in (i)-(iii), above. The (i) in (i) is part of the particle, not the PStrbj marker; the (i)’s in (ii) and (iii) surface whenever the particle precedes a dental (a, b, or c). We thus reduce an apparent morphological attestation to a purely phonological one.

I have located this analysis in a footnote because the data are too sparse. However, if supportable, the analysis clarifies the position of PStrbj. The conclusion that (i) is linearly orderable conforms the original contention that PStrbj occupies a fixed, prefinal position; its compatibility with all particles includes a home at level E or above.

produced by affixation. In English, the outer bracket of a suffix which subcategorizes for a level i sister will also be labeled level i. But in Nimboran, the type of constituent produced upon affixation at level i will be a constituent of type i + 1, one level higher in the hierarchy.31

(70a) a. English level 2 suffix: \[[ \_ \_ ]_{n} \_ \_ \_ ]_{2}
b. Nimboran level D suffix: \[[ \_ \_ ]_{0} + [c]_{1} ]_{2}

The asymmetry in the levels of the constituent attached to and produced prevents recursive affixation in Nimboran. (71) shows the ill-formedness of one such attempt to combine two level C morphemes (the PObj and DuSubj, respectively):

(71) \[ [d\_ \_ ] _{0} + [c] _{1} ]_{2} - [a][d\_ \_ ] _{0} + [c] _{1} ]_{2}

Notice that (71) is ruled out by a prohibition against feature clash which we need independently in the theory; it is precisely what rules out the occurrence of a level 2 affix inside a level 1 affix in English.

We have now reduced the relevant difference between English and Nimboran to the lexical contrast between level-preserving and level-changing affixation. But there are further distinctions yet to be drawn within Nimboran. In particular, if all Nimboran affixation is level-changing, then what distinguishes the cases of simple blocking from those of mass blocking?

I propose that the difference lies in the number of levels by which the inner and outer brackets differ in the lexical entry of each individual affix. We have already established that all such bracket sets must differ minimally by one degree if blocking is to be achieved. But we have not derived any upper bound, yielding the potential for the inner and outer brackets of some affix to differ by more than one level. I claim that this is precisely what we need to say about morphemes like the durative affix, which 'straddles' positions 2 and 3. In particular, the durative affixes to a constituent of type B and produces one of type D. It has the properties of a position 2 (level C) (a) and a position 3 (level B) (b) affix – fused into a single morpheme (72c).

(72a) a. DuSubj: \[[k] _{0} + [c] _{1} ]_{2}
b. PObj: \[[m] _{0} \_ \_ ]_{1} + [c] _{1} ]_{2}
c. Dur: \[[\_ \_ \_ ]_{0} + [c] _{1} ]_{2}

31 A terminological note: I define a level i affix as one which attaches at level i. The level of the resulting complex form is not determined by this naming convention.

The labeling of outer brackets in subcategorization frames is thus demonstratively contrastive, justifying their existence in underlying representation.

Extended to its logical extreme, this proposal finally provides an explanatory account of the mass blocking attributed to certain particles. As we have seen, these may occupy a considerable range of positions – just so long as the corresponding levels are vertically adjacent in the tree.

(73)

The bracketed segments of the tree in (73) correspond to the spans of positions blocked by the different particles in (74) (from (68)):

(74) Positions (levels) blocked Examples

a. Blocks A \[ [n\_ ]_{0} + [A] _{1} ]_{2} \_ \_ ]_{2}
b. Blocks A–C \[ [d\_ ] _{0} + [A] _{1} ]_{2} \_ \_ ]_{2}
c. Blocks C \[ [\_ \_ \_ ] _{0} + [c] _{1} ]_{2}
d. Blocks D–E \[ [\_ \_ \_ ] _{0} + [c] _{1} ]_{2}
e. Blocks C–E \[ [\_ \_ \_ ] _{0} + [c] _{1} ]_{2}
f. Blocks C–D \[ [\_ \_ \_ ] _{0} + [c] _{1} ]_{2}

Notice that under this account, there is no single position reserved exclusively for particles (not even the position 3 suggested earlier).32 Rather, particles occupy some vertical segment of the tree, whose contiguity follows directly from lexical subcategorization frames: these specify only the level an affix attaches to and the level of constituent produced. It is obligatory in this model for attachment at all intervening levels ('positions') to be bled and thus for morphological blocking to take place.33

32 This conclusion enables us to choose between the two competing analyses of object-particle asymmetry discussed in Section 6.2. Given that not all particles do indeed occupy the positions allocated to object markers, the syntactic account is favored.

33 For those willing to classify particles as 'inflectional', then Anderson's 1982, 1986, 1992 rule-based theory of inflection would be a logical alternative implementation of the hierarchy in (68). Anderson proposes that inflectional rules are organized into a conjunctive series of internally disjunctive rule blocks, each corresponding to a given 'position' (1986, p. 3).
7.2. Modifier Base and Default Augmentation

The minor issue of nonmaximal affixation remains to be addressed. At present the only means of augmenting the level of a derived form is by attaching a (level-changing) affix to it, but this leaves unexplored the case of affixation at non-consecutive levels. For example, the modifier in (75) possesses affixes attaching at levels C, F and G, but none at levels D and E:

\[
\text{gedő-k-d-e} \rightarrow \text{gedőkedé} \quad \text{p. 186}
\]

draw-DuSubjC-FutE-2o

"You two will draw (here)"

Some default augmentation process will be required to increment the level of the base from level D to level F in this case (and an infinite number of similar examples). I thus assume a rule of the sort in (76):

\[
\text{[ ]} \rightarrow \text{[[ ]]}, 1
\]

This process complements affixation, applying only to levels at which no affix is attached:

\[
\text{(77) output of D affixation: a. [k-ná]_D, b. [k-ná]_E, E affixation: [l[k-ná]]_E, Default augmentation: [l[k-ná-gákt]_k], F affixation: [l[k-ná-gákt]_k]}, \ldots
\]

(76) is exactly the rule formulated in Inkelas (1989) for accomplishing the transition between levels. In English, the process applies once per level and corresponds to the assumption of Lexical Morphology that every form passes through each level regardless of whether or not it undergoes affixation. In Nimboran, of course, the process is tied by level-changing affixation, and applies only as a default.

In conclusion, let us finally turn to the modifier and the question of the origin of its missing base. One possibility is to posit that at the origin of every modifier is a phonologically null constituent of the lowest level (A), to which either affixation (as in (78)) or default augmentation subsequently takes place.

\[
\text{[[ngedő] [[[[[Ø]]]_a manN ál[]_o ná]_2 k]_d]_2} \am\text{ draw} \quad \text{Ø IncDuSubj SLoc Past Inc}
\]

"You (sg) and I draw far away"

The null pivot serves merely as an organizing entity. A less abstract alternative would be to relax the interpretation of subcategorization frames so that they constrain the properties of the base if there is one. However, the results would be the same.

8. Evidence for Compound Structure

Evidence from blocking has caused us to hypothesize that the modifier is an (internally complex) constituent of its own, rather than a string of suffixes attached to the root. This raises the compelling question of when and how roots and modifiers ultimately combine.

In this section I propose that the stem and modifier form a compound, drawing supporting evidence from modifier allomorphy, stem alternations, and phonology.

8.1. Evidence from Phonology

Assigning Nimboran verbs a compound structure, with the stem and modifier as constituents, explains a number of implicit and explicit facets of the preceding data. First of all, the compounding hypothesis explains the palatal phonological boundary between the stem and modifier (Section 3).

It has been widely observed that compounds in many languages consist of two prosodic constituents; two cases discussed recently are Italian (Nespore and Vogel 1986) and Indonesian (Colin 1989). Evidence from languages like Malayalam (Mohan 1982, Sprout 1986) suggests that this behavior is a property only of some, but not of all, types of compounds, leading Inkelas (1989) to propose that the assignment of prosodic status to its daughters may be a marked property associated with a specific compounding rule:

\[
\text{Pcompounding: } [x]_m, [y]_m \rightarrow [xy]_m, [x]_m[y]_m
\]

The effect of such a rule on the stem and modifier constituents would be
properties of the modifier – a conclusion which strongly disfavors the suffixation account.

8.2. Root Allomorphy

Following a pattern common among Papuan languages (Foley 1986: 182ff.), many verbal roots in Nimboran exhibit alternate forms whose use is determined by the number of the verb’s subject. A root has at most three such allomorphs, corresponding to the distinction between singular, dual and plural:33

<table>
<thead>
<tr>
<th>Root</th>
<th>Dual Subject</th>
<th>Singular Subject</th>
<th>Plural Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>'draw'</td>
<td>aggedó-</td>
<td>aggedó-</td>
<td>aggedóí-</td>
</tr>
<tr>
<td></td>
<td>bédó-</td>
<td>bétú-</td>
<td>bétúí-</td>
</tr>
<tr>
<td>'pull out'</td>
<td>sádog-</td>
<td>sádog-</td>
<td>sádog-</td>
</tr>
<tr>
<td></td>
<td>súdý-</td>
<td>súdý-</td>
<td>súdý-</td>
</tr>
<tr>
<td>'hee'</td>
<td>kř-</td>
<td>kř-</td>
<td>kř-</td>
</tr>
<tr>
<td>'say to'</td>
<td>u-</td>
<td>u-</td>
<td>i-</td>
</tr>
</tbody>
</table>

I will refer to these allomorphs as the S(in)gular, the Du(al) and the PI(ural) roots, using corresponding annotations in glosses. (For reasons to be explained momentarily, Du roots are glossed without a number specification.)

Looking only at verbs whose subject number marking in the modifier is unimpeded by morphological blocking, one might assume that root allomorphy reflects (semantic) subject number directly. Sq roots are used when the subject is semantically singular (or inclusive dual, marked by the InclDuSubj in the modifier); Du roots are used when the subject is dual, and PI roots are used when the subject is plural.

(82a). | SgSubj: | aggedó- d u | → | aggedódu | p. 186
<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>draw.sg-Fut-1</td>
<td>'I will draw (here)'</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(82b). | InclDuSubj: | aggedó- ma-n-d-ím | → | aggedóma-n-d-ím | p. 186
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>draw.ag-InclDuSubj-Fut-1-nc</td>
<td>'You (sg) and I will draw (here)'</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(82c). | DuSubj: | aggedó- d u | → | aggedódu | p. 186
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>draw-DuSubj-Fut-1</td>
<td>'We two will draw (here)'</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(82d). | PISubj: | aggedó- e-í-d-í-m | → | aggedóe-í-d-í-m | p. 186
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>draw.PI-PISubj-Fut-1</td>
<td>'We (many) will draw (here)'</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
This initial assumption is falsified by the following data. (83) shows verbs whose modifiers contain the level C durative marker; note that, despite the fact that the subjects are semantically identical to those in (82), the root allomorphy is markedly different. In particular, the Du root is used instead of the Sg root (83a, b), and the Pl root is used in place of the Du root (83c). Only the verb with a semantically plural subject (83d) displays the same root in (83) as its counterpart does in (82).

(83)

<table>
<thead>
<tr>
<th>Subject number</th>
<th>Root</th>
<th>Modifier</th>
<th>Root</th>
<th>Modifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sg</td>
<td>Ø</td>
<td>Du</td>
<td>Ø</td>
<td>Du</td>
</tr>
<tr>
<td>Du</td>
<td>DuSubj</td>
<td>Pl</td>
<td>PIsubj</td>
<td>PIsubj</td>
</tr>
</tbody>
</table>

The root alternations in (82) and (83), summarized in (84), constitute the full range of number-related root allomorphy in Nimboran. The environments of the two patterns are easy to isolate: the pattern in (84b) = (83) is found whenever any affix other than DuSubj -k- occupies level C in the modifier, and the pattern in (84a) = (82) is found everywhere else.

(84) Subject number allomorphy in root and modifier

<table>
<thead>
<tr>
<th>Subject number</th>
<th>(a) Level C free</th>
<th>(b) Level C blocked</th>
</tr>
</thead>
<tbody>
<tr>
<td>Root</td>
<td>Modifier</td>
<td>Root</td>
</tr>
<tr>
<td>singular</td>
<td>Sg</td>
<td>Ø</td>
</tr>
<tr>
<td>dual</td>
<td>Du</td>
<td>DuSubj</td>
</tr>
<tr>
<td>plural</td>
<td>Pl</td>
<td>PIsubj</td>
</tr>
</tbody>
</table>

Ignoring for a moment the marking of singular subjects, the pattern of root selection seen in (84) has a straightforward explanation: the morphosyntactic exponent of subject number in the root must agree perfectly with that in the modifier.

(85) stem and modifier must agree in subject number exponent

When the blocking of level C in the modifier forces the substitution of PIsubj for DuSubj, this blockage in turn, by (85), indirectly triggers the selection of PI root in the stem.

Straightforward though this account may be for Du-Pl root alternations, it is not immediately clear how it will extend to the Sg-Du root alternation occurring in the same context. If singular subjects are unmarked in the modifier to begin with, as we have been assuming (Sections 2 and 4.1), blockage of level C should have no effect on satisfaction of the condition in (85).

Suppose, however, that we reject the assumption that 'subject = singular' is simply the interpretation of the absence of subject marking in the modifier and instead posit a phonologically null level C SgSubj modifier:

(86)

<table>
<thead>
<tr>
<th>morpheme</th>
<th>phonological</th>
<th>morphosyntactic</th>
<th>level</th>
</tr>
</thead>
<tbody>
<tr>
<td>label</td>
<td>representation</td>
<td>features</td>
<td>occupied</td>
</tr>
<tr>
<td>SgSubj</td>
<td>Ø</td>
<td>[Subj = Sg]</td>
<td>C</td>
</tr>
<tr>
<td>IncDuSubj</td>
<td>maN</td>
<td>[Subj = Sg,1pers and Sg,2pers]</td>
<td>A</td>
</tr>
<tr>
<td>DuSubj</td>
<td>k</td>
<td>[Subj = Du] or [Subj = Sg,2pers]</td>
<td>C</td>
</tr>
<tr>
<td>PlSubj</td>
<td>i</td>
<td>[Subj = -Sg]</td>
<td></td>
</tr>
</tbody>
</table>

Under this analysis, the prohibition on Sg roots fits right into the more general pattern. As with the DuSubj marker, the occurrence of the SgSubj is impeded by the presence of any other level C affix. The corresponding blockage of the Sg root falls out simply from the original hypothesis that modifiers and stems must agree perfectly in subject number. Exactly when the SgSubj is unavailable, the Sg root is also prohibited, as illustrated below:

(87a) suin-Ø-d-u → suându p. 105
  water-Sg-SgSubj-Fut-1 'I will water (here)'

(87b) sàon-dàr-d-u → sàondàru p. 105
  water-Pl-Obj-Fut-1 'I will water them (here)'

The parallel to DuSubj and Du root blockage is almost exact. But there is one small problem, namely the appearance of the Du root as a default replacement for the Sg root in examples like (87b). This makes no sense if the Du root is blocked (albeit indirectly) by the same level C morphemes that block the Sg root.

Anceaux offers an explanation: the Du root plays a dual role. In addition to encoding duality of subject, it also functions as the 'elsewhere' root allomorph. The Du root is the one from which infinitives (which do not encode subject number) are formed, and it is the one which shows up in passivized verbs (regardless of subject number, which in these constructions is marked only in the modifier). Apparently it is the allomorph of last resort in active, finite verbs as well. To account for this behavior, I assume that the subject number features of the Du root, already known
to be disjunctive, are also optional. The Du root is simply the ‘elsewhere’ root.\footnote{This proposal is empirically indistinguishable from one in which there exists a fourth root allomorph, homophonous with the Du root, but devoid of subject number features.}

The table below summarizes the revisions we have made to the featural composition of morphemes encoding subject number in Nimboran:

\begin{equation}
\begin{array}{ll}
\text{label} & \text{features} \\
\text{SgSubj, Sg root:} & \text{[Subj = Sg]} \\
\text{PlSubj, Pl root:} & \text{[Subj = -Sp]} \\
\text{IncDuSubj:} & \text{[Subj = Sg.1pers and Sg.2pers]} \\
\text{DuSubj:} & \text{[Subj = Du] or [Subj = -Sp.2pers]} \\
\text{Du root:} & \text{[Subj = Du] or [Subj = -Sp.2pers] or $\emptyset$}
\end{array}
\end{equation}

We may now finally complete the argument that root allomorphy supports the compounding over the suffixational account of stem-modifier combination. It is clear that root allomorphy may straightforwardly be explained under a compounding account: that root is selected which agrees with the exponent of subject number in the modifier. But is a compounding analysis required?

To see that it is, let us consider the consequences of adopting a suffixational account. In the interest of avoiding look-ahead powers on the part of the root, such an account would have to posit free insertion of root allomorphs, requiring only that the feature values for subject number agree for the word as a whole. That is to say, the role of (some version of) (85) would be as a surface filter.

The first problem for this account arises with regard to the ungrammatical examples in (89), both of which employ insufficient subject number marking. In order to rule out the form in (89a), the surface feature filter must ensure that any subject marking on the root be duplicated by some nonroot morpheme. In order to rule out the form in (89b), the filter must ensure that any subject marking contributed by any nonroot morpheme be duplicated by the root:

\begin{equation}
\begin{align}
(89a) & \text{a. } *\text{negdöi-d-u} \\
& \text{draw.pl(PISubj)-PObj-Fut-1} \\
& \text{Intended: ‘We (many) will draw (here)’} \\
\text{cf. negdöidiu} \\
(89b) & \text{b. } *\text{negdöa(i)-d-u} \\
& \text{draw-(PISubj)-Fut-1} \\
& \text{Intended: ‘We (many) will draw (here)’}
\end{align}
\end{equation}

The forms in (89) are ungrammatical not because the values for subject number clash, but rather because insufficient marking is present. It is thus clear that the requisite filter must do more than ensure featural compatibility within the verb; it also ensures that whatever subject marking (if any) occurs in the root is replicated by some nonroot morpheme. But accomplishing this requires reference by the surface filter to the contrast between root and non-root morphemes. Leaving aside the fact that ‘non-root’ morphemes do not even form a constituent to which a constraint in the suffixational account could refer, late access to the internal structure of words is clearly undesirable in a constrained theory of morphology.

Granting for the moment that the suffixational account can filter out all but the appropriate root-Subj marker pairs, we turn to a second problem from which it suffers: restricting their distribution. Consider the verbs in (90). Both show the same plural morphology, but only one of them is grammatical in a construction whose subject is semantically dual:

\begin{align}
(90a) & \text{a. } \text{ngedödi-i-dar-d-u} \\
& \text{draw.pl-(PISubj)-PObj-Fut-1} \\
& \text{‘We (two or more) will draw them (here)’} \\
& \text{p. 216} \\
(90b) & \text{b. } \text{ngedöa-i-d-u} \\
& \text{draw-(PISubj)-Fut-1} \\
& \text{‘We (two) will draw (here)’} \\
& \text{p. 186}
\end{align}

The reason (a) but not (b) is permitted in a dual context is that only in (a) is the exponent of DuSubj blocked by the level C PObj in the modifier, a fact captured straightforwardly by the compounding account. Level C blockage in the modifier drives the default choice of PISubj, which in turn drives the choice of a Pl root.

However, the same generalization fares badly under a suffixational account, in which it would simply have to be stipulated that the mismatch between plural morphology and dual subject is permitted only when a level C morpheme is present in the modifier. Such an account is not only nonexplicatory, but also – as before – requires access by a surface filter into the internal structure of the word.

By contrast, ruling out the ungrammatical forms in (89) and (90) raises no theoretical specters in a compounding treatment. Because perfect agreement between stem and modifier is a precondition for compounding, the forms in (89) will never be generated in the first place. Similarly, because the Elsewhere Condition ensures that DuSubj will be selected over PISubj whenever the subject is semantically dual and level C is unoccupied, the ungrammatical compound in (90b) will never arise. In summary, since the compounding model generates no ungrammatical forms, it requires no global, stipulative filters to rule them out.

Root allomorphy thus patterns with modifier allomorphy, phonology,
and blocking effects in supporting the analysis of the Nimboran verb as a compound, in both the morphological and the phonological sense.

8.3. Zero Roots

In the final set of data we will consider, zero roots provide support for two foregoing proposals. First, they affirm the existence of phonologically null morphemes in Nimboran, supporting the invocation of this apparatus for the SgSubj marker (Section 8.2) (and perhaps also for the modifier base (Section 7.2)). Second, they support the notion of modifier as constituent.

Listed in the lexicon of Anceaux’s grammar are some twelve ‘zero’-roots, the diversity of whose meanings is demonstrated below:

(91) \( \emptyset \)

- ‘be’
- ‘become’
- ‘brings’
- ‘dream’
- ‘extend’
- ‘go’
- ‘heart’
- ‘kiss’
- ‘laugh’
- ‘make cat’s cradles’
- ‘say’
- ‘sleep’

Verbs formed from these roots consist, on the surface, only of modifier morphemes.27 They are disambiguated by the different particles for which each zero root selects:

(92)

a. \( \emptyset \)-t\(\)rd-b\(\)d-\(\)u

\( \rightarrow \) te\(\)b\(\)d\(\)u

‘make cat’s cradles-Part-1’

b. \( \emptyset \)-t\(\)rd-be\(\)d-\(\)u

\( \rightarrow \) reb\(\)b\(\)d\(\)u

‘will bring from here to above’

c. \( \emptyset \)-t\(\)rd-gk\(\)b\(\)t\(\)t\(\)u

\( \rightarrow \) rek\(\)b\(\)d\(\)u

‘laugh’

d. \( \emptyset \)-t\(\)rd-\(\)j\(\)l\(\)k\(\)t\(\)t\(\)u

\( \rightarrow \) j\(\)l\(\)b\(\)d\(\)u

‘laugh’

(93) shows that when the DuSubj marker occurs in a zero-root verb, it occurs at the left edge, respecting the normal order between DuSubj and particle. Crucially, the DuSubj does not follow the particle, as it would if the particle were in fact functioning as the root:

(93)

\( \emptyset \)-\(\)k\(\)r\(\)b\(\)k\(\)d\(\)k\(\)-\(\)u

\( \rightarrow \) k\(\)r\(\)b\(\)k\(\)d\(\)k\(\)

‘make cradle’

p. 129

[52]

A comparison of the three forms in (94) (with (92a), (92b)–c) and (92d), respectively, shows that the particles co-occurring with zero-roots belong to the same set from which regular, nonnull roots select:

(94)

a. \( \emptyset \)-\(\)k\(\)r\(\)b\(\)k\(\)d\(\)k\(\)-\(\)u

\( \rightarrow \) k\(\)r\(\)b\(\)b\(\)k\(\)d\(\)k\(\)

‘make cradle’

p. 123

b. \( \emptyset \)-\(\)k\(\)r\(\)b\(\)k\(\)d\(\)k\(\)-\(\)u

\( \rightarrow \) k\(\)r\(\)b\(\)k\(\)b\(\)k\(\)d\(\)k\(\)

‘it is entangled (here)’

p. 127

c. \( \emptyset \)-\(\)m\(\)\(\) \(\)k\(\)r\(\)b\(\)k\(\)d\(\)k\(\)-\(\)u

\( \rightarrow \) m\(\)\(\) \(\)k\(\)r\(\)b\(\)k\(\)d\(\)k\(\)

‘sheuck her eye (here)’

p. 119

Evidence that the particles found in zero-root verbs are the same as those which occur in overt root verbs – known to be semantically empty – suggests that the verb’s meaning does not include the particle, but rather with a phonologically null root. Nonetheless, a skeptic might try to assign the particles in examples like (92) and (93) an optional semantics, accessed only when an overt root is lacking.

There are two reasons to reject this attempt at avoiding null roots. The first is that lexical restrictions on those particles appearing in verbs lacking overt roots are of the featural, not the positional kind. That is, they are exactly the kind of restrictions which we have observed to hold on pairings between overt roots and particles. Examples follow.28

(95)

<table>
<thead>
<tr>
<th>Root Particle</th>
<th>Gloss</th>
<th>Restrictions</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \emptyset )-t()rd-()k()l() ()+()k()l()</td>
<td>‘he brings’</td>
<td>Subj = Sg, -Iter</td>
</tr>
<tr>
<td>( \emptyset )-t()rd-()k()l()</td>
<td>‘bring’</td>
<td>+Dir (i.e., 6-16Loc)</td>
</tr>
<tr>
<td>( \emptyset )-t()rd-()k()l()</td>
<td>‘dream of’</td>
<td>-Dir (i.e., 1-5Loc)</td>
</tr>
<tr>
<td>( \emptyset )-()t()rd-()k()l()</td>
<td>‘kiss’</td>
<td>Subj = Sg</td>
</tr>
<tr>
<td>( \emptyset )-t()rd-()k()l()</td>
<td>‘laugh’</td>
<td>+Iter</td>
</tr>
<tr>
<td>( \emptyset )-t()rd-()k()l()</td>
<td>‘make cat’s cradles’</td>
<td>-Dir (i.e., 1-5Loc)</td>
</tr>
<tr>
<td>( \emptyset )+()k()l()</td>
<td>‘say to’</td>
<td>Subj = Pt, +Iter</td>
</tr>
</tbody>
</table>

As seen in (95), the zero root–particle pair (\( \emptyset \), -t\(\)rd-\(\) ‘bring’) occurs only when the action of the verb is directional, while the pair (\( \emptyset \), -t\(\)rd-\(\) ‘make cat’s cradles’) occurs only when the action is non-directional. These semantic restrictions are of exactly the same type that characterize overt roots, examples of which are repeated below:

27 Comparable Memonini zero-root verbs are discussed in Bloomfield (1962). For example, the forms in (i) consist only of inflectional material added to a phonologically null root, and contrast minimally with the overt-root verbs in (ii). Bloomfield (1962, p. 63). Roots are indicated:

(i) \( \emptyset \)-\(\)k\(\)l\(\) | ‘he uses it’ |
\( \emptyset \)-\(\)k\(\)l\(\) | ‘if he uses it’ |
\( \emptyset \)-\(\)k\(\)l\(\) | ‘I use it’ |

(ii) \( \ell \)-\(\)k\(\)l\(\) | ‘he brings it’ |
\( \ell \)-\(\)k\(\)l\(\) | ‘if he brings it’ |
\( \ell \)-\(\)k\(\)l\(\) | ‘I bring it’ |

28 Starred particles impose their own additional (positional) constraints; see Appendix 1.
<table>
<thead>
<tr>
<th>Root</th>
<th>Particle</th>
<th>Gloss</th>
<th>Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>beké-</td>
<td>-dár-</td>
<td>‘rise’</td>
<td>-Dir (i.e., 1-5Loc)</td>
</tr>
<tr>
<td>kép-</td>
<td>-tár-</td>
<td>‘follow’</td>
<td>+Dir (i.e., 6-16Loc)</td>
</tr>
</tbody>
</table>

Such restrictions never characterize particles directly, as argued earlier. This argues strongly for the existence of a root morpheme in the zero-root verbs.

Second, evidence from root allomorphy supports positing null root morphemes. A subset of zero roots have PI root allomorphs consisting of the vowel \(i\), as in (97)–(98):

(97) a. Ø-temN-d-u  
  hear.sg-MO.Part-Fut-1  
  \(\rightarrow\) temându  
  p. 144  
  ‘I will hear him (here)’

b. i(-i)-temN-ba-Ø-áms  
  hear.pl-(PI)Subj-MO.Part-2Loc-Pres-1  
  \(\rightarrow\) iitemambam  
  p. 144  
  ‘We hear him above’

(98) a. Ø-rár-ogkát-t-u  
  laugh.sg-Part-Iter-Pres-1  
  \(\rightarrow\) rekátu  
  p. 129  
  ‘I laugh repeatedly (here)’

b. i(-i)-rár-se-ogkát-k-u  
  laugh.pl-(PI)Subj-Part-4Loc-Iter-Past-1  
  \(\rightarrow\) irekákáu  
  p. 129  
  ‘We laughed repeatedly there’

(99) a. Ø-rár-be-d-u  
  bring.sg-Part-6Loc-Fut-1  
  \(\rightarrow\) rebédá  
  p. 129  
  ‘I will bring from here to above’

b. i(-i)-rár-be-ogkát-k-u  
  bring.pl-(PI)Subj-Part-6Loc-Iter-Past-1  
  \(\rightarrow\) irebékákáu  
  p. 129  
  ‘We brought repeatedly from below to here’

If the meaning ‘hear’ or ‘laugh’ or ‘bring’ were inherent in the particles in the (a) examples above, and if no null root morpheme were postulated, then we would be at a loss to explain the appearance of the PI root \(i\) in the (b) examples. By contrast, given the initial hypothesis that (97a), (98a), and (99a) contain zero roots, the root allomorphy exhibited in the corresponding (b) examples is exactly what we would expect. The only unusual property of the roots in (97)–(99) is that their Sg allomorphs happen to be phonologically null.

9. Summary of Analysis

The analysis developed here attributes the distinct but related phenomena of linear order and blocking to the same basic source: hierarchical stratification among morphemes in Nimboran and a restriction against more than one morpheme per level in surface forms. Massively blocking particles are just a special case of regular morphemes in that they occupy not one level, but more than one. All morphemes attach to a constituent of type \(i\) and produce one of type \(i + n\). Whether \(n\) is instantiated as 1, 2, or 3 corresponds to the various blocking behaviors attested by Nimboran particles. That levels which are blocked en masse are always contiguous follows from the intrinsic maximum of two annotations that lexical entries allow: the upper and the lower level are all that can be specified.

To the extent that this analysis is correct, it gives new life to the theory of level-ordering by introducing a whole range of new phenomena for which the theoretical device can yield insightful analyses. However, it does raise questions as to the nature of level ordering more generally. In analyzing the Nimboran data, we have made a number of theoretical decisions taking us somewhat far afield from classical Lexical morphology and Phonology (e.g., Kiparsky 1982). Let us step back and summarize our position.

First, we must clearly abandon any notion that the number of morphological levels is universally fixed at some small maximum, as has implicitly been assumed to be desirable in Lexical Phonology. Hargus (1985), for example, suggests that by posting fourteen levels for Sekani it would be possible to order all thirteen of the prefix position classes (p. 72, see also Speas 1990, p. 250), but ultimately rejects the idea—presumably on grounds of wishing to avoid the proliferation of levels. However, if level ordering is indeed the appropriate theoretical implementation of position class, then there is no more reason to expect a theoretical upper bound on levels than there is to expect an upper bound on the numbers of positions in a morphological system. This is actually a good result for level-ordering theory, which has always lacked any means of deriving an upper bound on lexical stratification in any case.

Second, employing level ordering for position class ordering requires a reduction in the emphasis placed by the standard theory on phonological
corroboration of each morphological level distinction. The assumption in the past has been that any segregation of morphemes into morphological strata must correlate with some difference in the phonological rules affecting those subgroups of morphemes. But in Nimboran, the levels motivated by the morphology far outnumber those required by the phonology.\textsuperscript{40} 

Again, divergence from classical Lexical Phonology need not automatically be interpreted as a defect. Motivated by phenomena entirely unrelated to position class, various proposals are already in place for the logical and structural segregation of morphological and phonological structure. The work of Booij (1985), Sproat (1986), Cohn (1989), Inkelas (1989) and others argue variously that (phonological) compounding, cliticization, and extrametricality effects may all involve mismatches between morphological and phonological constituent structure. It would be consistent with this general trend to expect discrepancies between the number of distinct levels in morphological and phonological structure as well.\textsuperscript{41} The Nimboran level-ordering system bears out this expectation.

**Appendix**

Underlying representations and positional restrictions, accessible only with considerable effort from Anceaux’s description, are provided here for all particles (I) and particle-selecting roots (II) which Anceaux cites. Question marks indicate that an inference had to be made for which positive evidence is lacking. There are further details beyond the ones presented here to be found in Anceaux’s grammar.

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\textsuperscript{40} A reviewer suggests that the categories required for Nimboran are actually more closely related to the X’ levels of Selkirk (1982) than to the levels of Lexical Phonology. While remaining agnostic as to the superiority of an X’ approach, I would certainly agree that if we assign to X’ categories in Nimboran all of the properties I have ascribed to morphological levels in Nimboran, the two types of analysis would be hard to distinguish. I leave this topic for future research (though see Stump 1992 for the view that phrase structure rules are unsuited to the insightful description of position class).

\textsuperscript{41} Interestingly, even canonical versions of Lexical Phonology incorporate strict constraints enforcing similarity among consecutive phonological levels. For example, the Strong Domain Hypothesis of Kiparsky (1984) specifically requires a phonological rule applying at some given level to apply at earlier levels as well (see also the Strong Domain Hypothesis of Mohanan 1982 and the ‘persistent rules’ hypothesis of Myers 1991). Taken to its logical extreme, the emphasis on continuity brings the standard theory to the threshold of describing a language in which the phonological rules associated with two consecutive morphological levels are identical. But of course, such a description would be indistinguishable from one in which two different morphological levels are associated with the same phonological level— the possibility we are entertaining here.
II. Roots

Brackets enclose the entries of allomorphs of a given root. Root allomorphy governed by subject accessibility is accessible from Anceaux and thus omitted here. Dots indicate that one root allomorph is clearly an elsewhere case of another (a topic worthy of future attention).
<table>
<thead>
<tr>
<th>NIMBORAN POSITION CLASS MORPHOLOGY</th>
<th>621</th>
</tr>
</thead>
<tbody>
<tr>
<td>tekui</td>
<td>'meet'</td>
</tr>
<tr>
<td>tendig</td>
<td>'peel'</td>
</tr>
<tr>
<td>toegfigx</td>
<td>'lead way'</td>
</tr>
<tr>
<td>test</td>
<td>'fall off'</td>
</tr>
<tr>
<td>toq</td>
<td>'jump'</td>
</tr>
<tr>
<td>tóng</td>
<td>'rise to surface'</td>
</tr>
<tr>
<td>trig</td>
<td>'call'</td>
</tr>
<tr>
<td>ré</td>
<td>'deep'</td>
</tr>
<tr>
<td>ré-</td>
<td>'go, proceed'</td>
</tr>
<tr>
<td>ré-</td>
<td>'many'</td>
</tr>
<tr>
<td>ré-</td>
<td>'toast (many)'</td>
</tr>
<tr>
<td>ré-</td>
<td>'put on clothes'</td>
</tr>
<tr>
<td>ré-</td>
<td>'turn, roll'</td>
</tr>
<tr>
<td>ré-</td>
<td>'turn around'</td>
</tr>
<tr>
<td>ré-</td>
<td>'cheek'</td>
</tr>
<tr>
<td>ré-</td>
<td>'show'</td>
</tr>
<tr>
<td>ré-</td>
<td>'tell'</td>
</tr>
<tr>
<td>ré-</td>
<td>'drive away'</td>
</tr>
<tr>
<td>ré-nim</td>
<td>'chew'</td>
</tr>
<tr>
<td>ré-nim</td>
<td>'pich'</td>
</tr>
<tr>
<td>ré-nim</td>
<td>'choke'</td>
</tr>
<tr>
<td>ré-nim</td>
<td>'shake'</td>
</tr>
<tr>
<td>ré</td>
<td>'swim'</td>
</tr>
<tr>
<td>ré</td>
<td>'help'</td>
</tr>
<tr>
<td>ré</td>
<td>'fly, bake'</td>
</tr>
<tr>
<td>ré-</td>
<td>'trouble'</td>
</tr>
<tr>
<td>ré-</td>
<td>'give (loc) to'</td>
</tr>
<tr>
<td>ré-</td>
<td>'give (?)'</td>
</tr>
<tr>
<td>ré</td>
<td>'move (tr.)'</td>
</tr>
<tr>
<td>ré</td>
<td>'move'</td>
</tr>
</tbody>
</table>
SKELETAL VERSUS MORAIC REPRESENTATIONS IN SLOVAK

It is argued that compensatory vowel vocalization and the rule of Depalatalization in Slovak crucially require reference to a representation at the skeletal tier. In the former case, a consonant deletes, and simultaneously a floating melodic segment is vocalized as a short vowel. In the latter case, adjacency must be established between consonants across a floating segment. Both of these facts can be straightforwardly accounted for in the X-skeletal theory but not in the moraic framework, regardless of the variant of the moraic theory.

0. Introduction

In this article we look at two rules of Slovak, Compensatory Vocalization and Depalatalization, in order to see how they are handled by several current theories of skeletal and moraic representations. Two questions raised by these representations are investigated:

(i) Should consonants be viewed as having skeletal slots or moras, regardless of the role that they play in the consideration of weight?

(ii) In their derivation of syllable structure, should syllabification rules report to intermediate constituents such as moras, or rather should they ignore moras and report to syllable constituents proper (whatever they may be): the syllable node alone, the nucleus and the syllable node, or the nucleus, the rhyme and the syllable node?

The interest of looking at various skeletal and moraic representations is limited only to those aspects of the current theories which make different predictions with regard to the questions just raised. That is, we will limit our presentation and discussion of the current theories to the claims that bear in crucial ways on the analysis of our data.

In what follows we focus our attention on five theoretical theories. These include two skeletal theories: the CV skeleton (Clements and Keyser 1983) and the X-skeleton (Levin 1985), and three moraic theories that we dub the weight/unit theory (Hyman 1985), moraic theory I (Hayes

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