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Impoverishment Theory and Morphosyntactic Markedness

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Theories of morphology differ in the means by which they account for morphological neutralization.¹ One means of deriving neutralization is through underspecification of affixes (or, of rules introducing affixes). This paper discusses a second means of expressing neutralization, namely Impoverishment (Bonet 1991, Noyer 1992, Halle & Marantz 1993, 1994, Harris 1994, Calabrese 1994). Whereas underspecification is a modification of the content of morphological signals such as affixes, Impoverishment is a simplification operation on information in the morphosyntactic positions corresponding to these signals. In this sense, Impoverishment shares important properties with Rules of Referral (Zwicky 1985, Stump 1993). Essentially, Rules of Referral are feature-changing readjustments, potentially interspersed with rules of exponence, whereas Impoverishments are normally assumed, following Bonet (1991), to be feature-deleting and to precede all spell-out rules.

I show here that feature-deleting Impoverishments are insufficiently expressive to explain neutralizations, and I propose instead that Impoverishment may effectively have feature-changing capability, but crucially is limited to moving from more marked to less marked representations, thus differing importantly from Rules of Referral. If the present proposal is correct, the space of possible grammars available to the language learner is more restricted than on Stump's (1993) theory, a desirable and important result. In this sense, the present paper hopes to contribute to the line of research begun by Carstairs (1983, 1987), that is, to provide a substantive theory of possible morphological syncretisms in natural language.

Sections 1–5 set out the assumptions of the morphological model I will employ, introduce what I will call “the paucity of marked values problem,” and compare Impoverishment with Rules of Referral. In sections 6–8 I discuss the interactions of three neutralizations in the verbal morphology of Nimboran (Inkelas 1993). In section 9, I show that the syntagmatic use of Impoverishment obviates the need for arbitrary position classes based solely on disjunctivity of morphemes.

¹Many ideas presented here emerged in discussion with Morris Halle, Alec Marantz, and Mark Johnson. In addition, I would like to thank audiences at Yale University and the University of Düsseldorf for helpful comments.

1 Underspecification of Signals

All theories of morphology make use of underspecification in some form or another to express certain neutralizations. Consider for example the various forms of the Romanian adjective (Farkas 1990, Lumsden 1992):

(1) Romanian adjectival desinences

	SG	PL
MASC	-∅	-i
NEUT		
FEM	-ă	-e

As seen in the table above, the masculine and neuter are syncretized in the singular, whereas the neuter and feminine are syncretized in the plural. In analyzing these facts, Lumsden (1992) draws on the important Jakobsonian contrast between morphosyntactic *positions* and the morphological *signals* which occupy or realize these positions. He suggests that neutralizations such as those in the Romanian declension are neutralizations of the signals and not of the morphosyntactic positions, which are fully specified.

We might then ascribe the following content to the signals in (1).²

- (2)
- | | |
|----|-------------|
| -i | [+pl +masc] |
| -e | [+pl] |
| -ă | [-pl +fem] |
| -∅ | Elsewhere |

The paradigm cells in (1) represent the range of syntactically generable feature combinations. At S-structure — after the application of agreement rules — the morphological signals in (2) compete for insertion for fully-specified positions. Only affixes consistent with the fully specified underlying position may be inserted. Beyond this, priority is given to more fully specified affixes following the principle of descending specificity (Panini; cf. the Elsewhere Condition of Kiparsky 1973).³

An important assumption underlying this view, which underlies all work now called Distributed Morphology (Halle & Marantz 1993), is that

²The following diverges from the account given in Lumsden (1992) in certain details. See Farkas & Zec (19xx) for further discussion.

³In the event that two affixes are compatible but neither's structural description is fully contained in the other's, a feature hierarchy must be consulted to determine which affix has priority (Noyer 1992, Lumsden 1992).

the morphological signals are provided (inserted) after syntactic rules have applied. In this sense, this model resembles other realizational theories of morphology, including Matthews 1972, Anderson 1981 and following work, and Zwicky 1985. In a rule-based realizational framework, the idea that affixes are underspecified amounts simply to the possibility that the structural description of realization rules will not exhaustively detail the environment in which the rule may apply.

2 The Paucity of Marked Values Problem

In contrast to realizational theories, affix-based lexicalist theories of morphology such as Lieber 1980, Williams 1981, and DiSciullo & Williams 1987 assume that word formation applies presyntactically. In accordance with the Lexical Integrity Hypothesis, it is assumed that syntax is permitted to see only those properties of a word which are represented in its complex symbol (feature matrix). As a result, the complex symbol must contain all the syntactically relevant information. Problems arise for this approach when percolation of values from the affixes, along with redundancy rules supplying unmarked values, does not provide enough values to ensure the correct distribution of forms in sentences. We may call this the *paucity of marked values problem*.

Consider again for example the Romanian adjectival desinences in (2). The elsewhere affix percolates no features, so any form created with $-\emptyset$ in the lexicon should (incorrectly) be able to agree with any noun, as long as feature compatibility (Unification) is the only condition on licensing of such forms. In the present case, one might attribute content to the $-\emptyset$, excluding it from the $[-pl \text{ } -fem]$ cases. But such a strategy is useless in detailing the heterogeneous distribution of true elsewhere affixes such as the German weak adjectival *-en* (Zwicky 1985, Carstairs-McCarthy 1992:209–210), or the Ugaritic prefix *y-* (Noyer 1992). The only option for a lexicalist account in such cases is to abandon the notion of elsewhere and to set up a variety of accidentally homophonous lexical items.

To avoid the use of accidental homophony, it might be proposed that the most specific form must be used where two lexical forms are compatible (cf. Inkelas 1993:567). But the question here is: compatible for what? Because the lexical items themselves project the space of syntactic possibilities, there can be no space of possibilities autonomous from the resources of the lexicon. As soon as positions or situations autonomous from those created by lexical resources are invoked, we are already dealing with some variant of a realizational theory, since the question is what form will be realized (or inserted) in a given autonomously generated situation.

3 Impoverishments and Rules of Referral

To avoid the paucity of marked values problem, I will assume here a realizational model like that of Halle & Marantz 1993, concentrating on the question of what operations might apply to (abstract) morphemes prior to spell-out. Such operations will manipulate only morphosyntactic features: phonological material is unavailable until spell-out.

To my knowledge, operations of this kind were first proposed in Zwicky 1985 under the heading *rules of referral* and were developed further in Stump 1993.⁴ A Rule of Referral, according to Zwicky (1985:372), stipulates ‘that certain combinations of features have the same realization as certain others.’

Rules of Referral correspond roughly to what Bonet (1991) termed *morphological impoverishment*. There are two important differences between Zwicky’s Referrals and Bonet’s Impoverishments. First, Referrals amount to feature changing operations while Impoverishments are typically feature-deleting operations. Second, Referrals may be interspersed with rules of exponence. Impoverishments on the other hand are assumed to apply in a block before any spell-out takes place.

For example, Zwicky (1985:378) proposes a Rule of Referral to account for the syncretism of nominative and accusative nominal (“nounal”) desinences in German, such as in *klein-es* (nom/acc sg neut ‘small’). The proposed rule and its interpretation are as follows:

- (3) In the context of [CAT:Nounal], [Case: acc] has the same realization as [Case:nom].

The feature-changing nature of (3) is made clear by the fact that the rule effects a feature substitution (Zwicky 1985:378). Thus (3) is equivalent to:

- (4) [acc] → [nom] / [Nounal ____]

However, the accusative and nominative are not always syncretized. Specifically, the two cases are distinguished in the masculine singular, hence: *klein-er* [masc nom sg strong] vs. *klein-en* [masc acc sg strong], and *klein-e* [masc nom sg weak] vs. *klein-en* [masc acc sg weak]. For this reason, Zwicky crucially orders rule (3) after the realization rules

⁴The idea that certain paradigm positions have the same realization as others has been explored in some detail by other authors, in particular Carstairs (1987) and Wurzel (1988). In these works, syncretisms are normally expressed by *static equations* which assert the identity of two positions, e.g. cell A = cell B.

introducing the accusative affixes. A fragment of the proposed rule system is shown below (notation altered):

- (5) a. [acc masc sg] → *en* □ Zwicky's rule (1')
b. [weak dir] → *e* □ Zwicky's rule (2')
c. [acc] → [nom] □ Zwicky's rule (10)

The affixes of e.g., *klein-en* [masc acc sg strong] and *klein-e* [masc acc sg weak], are introduced by rules (5a) and (5b) respectively, before the syncretism (5c) takes place.

Bonet (1991), investigating the realization of clitics in Romance and elsewhere, also proposes adjustments of morphosyntactic representations prior to realization. For example, Bonet observes that in Warlpiri there is a specific form of the reflexive only for the 1st person singular. In all other persons and numbers, a default reflexive is used. To obtain this distribution, she proposes that the values [1 pl] are deleted from a 1st person plural reflexive:

- (6) [1 pl] → ∅ / [reflexive]

The morphological readjustment rule (6) Impoverishes a [1 pl] reflexive morpheme, making the insertion of the specific [1 refl] clitic impossible. This exemplifies the general pattern: Impoverishment *deletes* certain values and bleeds a later insertion process.

4 Representations and Expressiveness

So far, the achievements of Impoverishment (and, by implication, of Referral) seem rather unimpressive, limited to the omission of one or two cases of accidental homophony from the vocabulary list. We might liken such cases to what Steriade (1995) has called “opportunistic” or unmotivated underspecification.

Moreover, in many cases, an enriched theory of representations (i.e., morphological features) allows for syncretisms to be expressed by the vocabulary items themselves. The grammar of Warlpiri will need no Impoverishment rule (6), if the distribution of the first person singular reflexive clitic could be obtained *representationally* by specifying it as [-pl]. On the other hand, if bivalent features are not admitted (Stump 1993), the class of phenomena that cannot be treated representationally expands.

But Zwicky (1985) and Stump (1993) both argue that representational solutions are inadequate for a second reason, namely that although they are capable of generating the correct word forms, they fail to capture a broad

pattern of neutralization, and hence are not explanatorily adequate. More concretely, for the analysis of Romanian given in (2), one must conclude that the only reason there are no specifically neuter adjectives or determiners is because there happen to be no vocabulary items which express [+neut] forms. In other words, the generalization is ascribed to a conspiracy of the lexicon. The point becomes more pressing the more extensive the conspiracy happens to be.

On the other hand, Rules of Referral and Impoverishment are both capable of expressing the relevant generalizations. Specifically with regard to Romanian, we have recourse to the following Impoverishment rule:

(7) [+neut] → Ø / [Adjective ___]

This rule asserts, effectively, “there are no specifically neuter adjectives.” But there is in fact no reason that (7) must apply. It could equally well be understood as a static redundancy rule over vocabulary items (cf. Jackendoff 1975). What (7) in fact captures is not only that there are no neuter adjective signals, but moreover *that there could not be any* and that this proposition is part of speakers’ knowledge of Romanian.

Because rules like (7) plays no active role in morphology, the more interesting scenarios arise when representational solutions are inadequate, and a rule of Impoverishment or Referral does some crucial work in the grammar. Sections 6–7 provide a striking example of this from Nimboran.

Because all Impoverishments precede spell-out —by hypothesis — and are limited to feature-deletion operations, it is clear that Impoverishment is less expressive than Referral. Put differently, Referral can express any syncretism which Impoverishment can but not vice versa. Formally speaking there is nothing to prevent Referral from converting any morphosyntactic representation into any other. As Carstairs-McCarthy (1992:203) puts it, “if unconstrained, the mechanism is suspiciously powerful.” The possibility of extrinsic ordering of Referrals within the realizational rule block adds further possibilities.

On these grounds alone we should be prepared to reject Referral in favor of Impoverishment, provided it can be shown that Impoverishment accounts for all the systematic inflectional syncretisms in natural language. This is the question I pose here. Anticipating the conclusion, the answer I provide is that feature-deleting Impoverishment is not in fact powerful enough: there appear to be cases where conversion of one category to another is unavoidable. However, it may be possible to constrain Rules of Referral to moving from more marked to less marked representations, thereby cutting in half the hypothesis space of the learner. This will be accomplished here formally by allowing unmarked values to be reinserted by

independently needed persistent redundancy rules after Impoverishments delete marked values: [mF] → ∅ → [uF]. The net effect is a conversion of [mF] → [uF]. Conversion of [uF] → [mF] will however be strictly unavailable. Thus we predict an important correlation between markedness relations — whether universal or learned — and grammars of neutralization.

5 The Morphological Category Alphabet

One important use of Impoverishment, discussed in Noyer 1992, is to provide the formal expression of the alphabet of morphological categories in a language. The following is a simple example.

Classical Arabic has no 1st person dual, although 1st person dual verbs might conceivably be formed by affixation of ʔ- [+1] and -ā [+dual] to a verb in the ‘prefix conjugation’:

- (8)
- | | | | |
|----|---------------------|--------------------|----------|
| a. | *ʔ-aktub-ā | ‘we (dual) write’ | |
| b. | ʔ-aktub | ‘I write’ | |
| c. | t-aktub-ā | ‘you (dual) write’ | (Arabic) |

The South Arabian languages Mehri and Soqotri in fact do precisely this (Johnstone 1987, Bittner 1918), although in most respects their verbal affixes are roughly isomorphic to those of classical Arabic:

- (9)
- | | | | |
|----|--------------------|-------------------------|---------|
| a. | ə-rəkz-ō | ‘we (dual) straighten’ | |
| b. | ə-rūkəz | ‘I straighten’ | |
| c. | tə-rəkz-ō | ‘you (dual) straighten’ | (Mehri) |

The difference between Mehri/Soqotri and Arabic is simply that Arabic has rule (21) and Mehri and Soqotri do not:

- (10) [dual] → ∅ / [1]

Because (10) is not in force, Mehri and Soqotri have innovated 1st dual pronouns as well. Unless the restriction (10) is assumed as a default during acquisition, there is no explanation for why speakers of Arabic failed for many centuries to innovate a category which the affixal resources could readily produce. Cases like these, which are not rare, call into question theories in which the space of paradigmatic possibilities is generated solely by the set of affixes (signals), as suggested by Wunderlich & Fabri (1993).

Rules such as (10) must also be directional. Directional rules (Gazdar et. al. 1985:28-29) are superior to a system of static filters or feature-value cooccurrence restrictions like $\text{*}[+1\text{Dual}]$ because filters do not predict what

substitution speakers will make. More precisely, the question is why expression of duality is sacrificed in favor of person and not vice versa. Every theory of morphology must somehow address this issue.⁵

To summarize, only generalized and directional rules of neutralization correctly derive the morphosyntactic category alphabet. Impoverishments then have a triple function in the theory of grammar: (1) to express the set of morphological categories; (2) to derive what form is substituted in a formally possible but excluded category; and (3) to express systematic syncretisms within the inflectional morphology of a language.

6 Three Neutralizations in Nimboran

A compelling case for Impoverishment comes from the verbal morphology of Nimboran (New Guinea: Anceaux 1965), analyzed in some detail in a lexicalist framework by Inkelas (1993). For reasons of space, I will restrict attention here to three neutralizations: (a) the neutralization of [dual:plural] in the 2nd person (b) the neutralization of [masc:nonmasc] in the 3rd person plural and (c) the levelling of [singular:dual:plural] to [unmarked:plural] in the context of certain morphemes.

Consider first the subject agreement affixes for person and number:

(11) Subject Agreement Affixes of Nimboran

	singular [+sg -pl]	dual [-sg -pl]	plural [-sg +pl]
1	... <i>u</i>	<i>k</i> ... <i>u</i>	<i>i</i> ... <i>u</i>
12	<i>maN</i> . . . <i>ám</i>	<i>k</i> ... <i>ám</i>	
2	... <i>e</i>	<i>k</i> ... <i>e</i>	
3m	... <i>am</i>	<i>k</i> ... <i>am</i>	<i>i</i> ... <i>am</i>
3fem/inan	... <i>um</i>	<i>k</i> ... <i>um</i>	

⁵It might be possible to attribute the directionality of such rules to generalized preference strategies determining which values ‘want’ to be expressed most. But such preferences are not likely to be universal; for example, Harris (1994:327) shows that Latin American Spanish neutralizes the opposition between 2nd and 3rd person in the plural for “every syntactically second person plural item.” The distinction of person here is neutralized in the context of number, violating any universal expectation about a hierarchy of preferences. On the other hand, as Prince & Smolensky (1993) have shown, the fact that a given constraint is violated does not mean that the constraint is not present. In other work, Noyer 1993, I have derived the directional effects of Impoverishment through constraints on the output of syntax, but will not explore this issue further here.

I am denoting by [ⁱ] an autosegmental entity whose effect is to induce a palatalization of nearby segments. The affixes designated above appear discontinuously in a complete verbal form, although their precise positions will not concern us here. For concreteness, let us assume that the three Nimboran genders are represented by the following features:

(12) Nimboran Gender Features

	±masc	±anim
masculine	+	+
feminine	-	+
neuter	-	-

Of particular interest to the present discussion is the distribution of the number affixes [ⁱ] vs. *k* and the gender affixes *um* vs. *am*.

Consider first the number affixes. Affix *k* appears in the dual forms of all arguments and in the plural of the [+2] (i.e., 2nd person or 1st inclusive) arguments. Affix [ⁱ] occurs in the remaining plural arguments. It should be clear by now that, aside from accidental homophony, there are two ways of accounting for this distribution, one representational (13) and the other by means of Impoverishment (14a) and the signals in (14b):

- (13) [ⁱ] [+pl -2]
k [-sg]

- (14) a. [+pl] → ∅ / [+2 -sg ___]
 b. [ⁱ] [+pl]
k [-sg]

Exactly similar considerations apply to the distribution of *am* vs. *um*. In the representational analysis in (15), the affix *um* appears to be restricted to [-masc] arguments in the nonplural; *am* can then be treated as the default realization of 3rd person:

- (15) *um* [-masc -pl]
am Elsewhere

The Impoverishment analysis (16) on the other hand will derive the restriction of *um* to the nonplural arguments by deleting the distinction [±masc] in the plural:

- (16) a. [□ masc] → Ø / [+pl -sg ___]
 b. *um* [-masc]
am Elsewhere

The representational analyses seem much simpler for both cases, but in fact become problematic in the face of the more complex data that follows.

The distribution of affixes and of verb root allomorphs shifts dramatically when certain particles, the plural object morpheme *dar*, or the durative affix *tam* appear in the verb root (underlining denotes that the affix triggers an ablaut of following affixes). Consider first the root allomorphs.

As shown by Inkelas, the Nimboran verb root exhibits an allomorphy which is conditioned by the number of the verbal subject:

- (17) a. *ŋgedúo-d-u*
 draw[A]-FU-1 'I will draw (here)'
 b. *ŋgedóu-k-d-u*
 draw[B]-NONSG-FU-1 'We (excl, dual) will draw (here)'
 c. *ŋgedói-i -d-u*
 draw [C]-PL-FU-1 'We (excl, plur) will draw (here)'

Inkelas labels these allomorphs {A, B, C}. Examples are repeated below:

- (18) Nimboran root allomorphs

root	B	A	C
'draw'	<i>ŋgedóu</i>	<i>ŋgedúo</i>	<i>ŋgedói</i>
'pull out'	<i>betáo</i>	<i>betuá</i>	<i>betaói</i>
'water'	<i>sáon</i>	<i>suán</i>	<i>saóin</i>
'flee'	<i>kri</i>	<i>kri</i>	<i>kri</i> □
'say to'	<i>u</i>	<i>u</i>	<i>i</i>

The B allomorph appears to be the underlying form; the C allomorph is ablauted and the A allomorph shows metathesis of the final syllable nucleus if complex. As shown in (17) normally the A allomorph appears with singular subjects, the B allomorph with dual subjects and the C allomorph with plural subjects. To derive these effects I will simply assume that morphophonological stem formation rules of metathesis and ablaut are sensitive to the values [+sg] and [+pl] respectively (19).

- (19) a. [+sg] \square metathesis rule
 b. [+pl] \square ablaut rule (informal implications)

Note in (18) that the underlying form of the stem appears in the dual since neither allomorphy rule applies.

In the special environment associated with the durative and certain other particles, the distribution of root allomorphs shifts:

- (20) Roots allomorphs in normal and special environment

subject number	normally	special case
singular	A	B
dual	B	C
plural	C	C

The following examples illustrate the shift for the “special case” (durative):

- (21) a. *ɲgedóu-tam-t-u*
 draw[B]-DUR-PR-1 ‘I am drawing’
 b. *ɲgedói-ⁱ-tam-t-u*
 draw[C]-PL-DUR-PR-1 ‘We (excl, dual/plur) are drawing’

The first peculiarity of the special case is that the B allomorph now appears in the singular as in (21a). Inkelas observes that the B allomorph also appears in verb forms which appear to be passive. Given the heterogeneous distribution of the B allomorph, the B allomorph must be the elsewhere allomorph, as already suggested by the phonology of the stem forms.

A second peculiarity of the special case is that the distinction between dual and plural number is neutralized as shown by (21b). In both duals and plurals the C allomorph — restricted to [+pl] in the normal case — appears.

7 Impoverishment Analysis of Nimboran

I propose here to derive this shift by the following Impoverishment rules, which are triggered by features residing in the durative, plural object, and certain other particles:

- (22) a. [-pl] $\rightarrow \emptyset$
 b. [\square sg] $\rightarrow \emptyset$

The deletion of [-pl] has the effect of neutralizing the contrast between the dual category and the plural category. But to ensure that duals in fact become featurally equivalent to plurals, it is necessary that once the marked value [-pl] is deleted from a dual argument, the value [+pl] is automatically inserted by a persistent redundancy rule (23):

(23) [-sg] → [+pl]

The proposed redundancy rule expresses the universal markedness of [-pl] in the context [-sg] (the combination of which gives rise to dual). In the unmarked case a language will distinguish only two numbers, as predicted by (23). I return in section 10 to a discussion of the use of redundancy rules of this sort.

The Impoverishment of a category labelled “dual” is then as follows:

(24) [-sg -pl] underlying: dual label
 [-sg] Special Impoverishment (46a)
 [-sg +pl] Redundancy Rule: [-sg] → [+pl]
 [+pl] Special Impoverishment (46b)

The effects of Special Impoverishment on the representation of underlying positions in Nimboran are illustrated below:

(25) The Effects of Special Number Impoverishment

	normal case				special environment		
		±sg	±pl		±sg	±pl	
singular	A	+	-	→	∅	∅	B
dual	B	-	-		∅	+	C
plural	C	-	+		∅	+	C

The distribution of root allomorphs is now accounted for. Specifically, the metathesized A allomorph is conditioned by the value [+sg], which is deleted by Special Impoverishment (22b). Similarly, the dual is converted to the plural by the combined force of Special Impoverishment (22a) and the Redundancy Rule (23) supplying [+pl] to [-sg] arguments. The ablated C allomorph therefore appears in both the dual and the plural. Affix *k* [-sg] never appears in the special environment since it will be inserted only if [-sg] is present (cf. 21b). Special Impoverishment (22b) deletes all values for [-sg], bleeding the insertion of *k* [-sg] in all instances.

Turning now to the pattern of agreement affixes in the special case, we find a change in the distribution of both the number *and* the gender affixes. Specifically, [i] now appears in the 2nd person forms, although normally it does not:

- (26) *ɲgedó-i -t-am -t-e*
 draw [C]-PLUR-DUR-PR-2
 ‘You (dual, plural) are drawing’

This shows that the representational analysis for the distribution of [i] (13) cannot be correct. Recall that on this analysis [i] is specifically restricted to [-2] contexts, which would exclude it from ever occurring in a form such as (26). Consider however the Impoverishment analysis:

- (27) [+pl] → Ø / [+2 -sg __]

The inclusion of [-sg] in the structural description of (27) ensures that Plural Impoverishment applies only when the distinction [\pm sg] is present.⁶ In virtue of Special Impoverishment (22b), all values for [\pm sg] are deleted in the special case environments. Consequently neither the [+sg] root allomorph A nor *k* [-sg] ever appear in this environment. In addition, Special Impoverishment (22b) will prevent Plural Impoverishment (27) from applying (a bleeding relation). When Plural Impoverishment does not apply, nothing prevents [i] [+pl] from being inserted in the second person. This accounts for the anomalous appearance of this affix in (26).

Exactly parallel results hold for the gender affixes — an important fact not discussed by Inkelas. The following example shows that *um* appears in the plural in the special environment, although normally it is restricted from the plural:

⁶It should be noted that the Elsewhere Condition prevents the persistent Redundancy Rule (23) from ‘re-inserting’ [+pl] where Plural Impoverishment (14a = 27) deletes this value. These two rules are disjunctive since one inserts a value which the other deletes: Plural Impoverishment is more specific and therefore takes precedence. An important implication of this is that marked values can be deleted (rather than replaced by unmarked values), only if unmarked values are also deleted. There are therefore three scenarios:

- | | | |
|-----|--------------------|---|
| (i) | [mF] → [ØF] → [uF] | Deletion plus insertion of unmarked value |
| | [□F] → [ØF] | Deletion of both marked and unmarked values |
| | [uF] → [ØF] | Deletion of only unmarked value |

- (28) *ηgedoi-ⁱ-~~tam~~-t-um* → *ηgedóitientým*
 draw[C]-PL-DUR-PR-3.NONMASC
 ‘They (dual or pl, fem or inan) are drawing’ (Anceaux 1965:234)

Again this shows that the representational solution (15), restricting *um* to specifically [-pl -masc] contexts, cannot be correct. In (28) *um* must appear in the plural, and will do so because the deletion of [\pm sg] by Special Impoverishment (22b) bleeds the application of Gender Impoverishment (16a) in the special environments. The [-masc] *um* affix appears automatically when not prevented from doing so by Gender Impoverishment, yielding such forms as (28).

8 Lexicalist Analysis of Nimboran

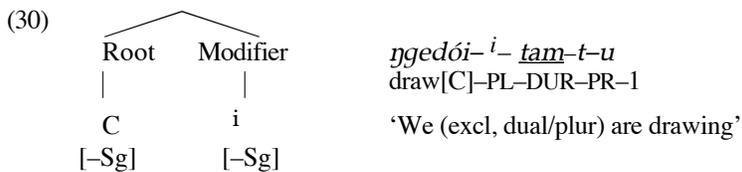
Let us now compare the analysis offered here to that of Inkelas 1993. Inkelas proposes that what I have called the special environment arises whenever durative *tam*, plural object *dar*, and certain other particles block the appearance of the number affixes *k* or \emptyset ‘singular’. This occurs because these affixes all happen to occupy the same level in word formation, and no two affixes can attach at the same level.

She analyzes *k* as ‘Dual’ or ‘2.-sg’ (effectively, as an accidental homophony), and [$\overset{1}{1}$] as ‘-Sg.’ To obtain the shift in pattern of root allomorphs, Inkelas proposes that the root must agree precisely in number and person features with the affixes, which comprise a constituent she names ‘Modifier.’

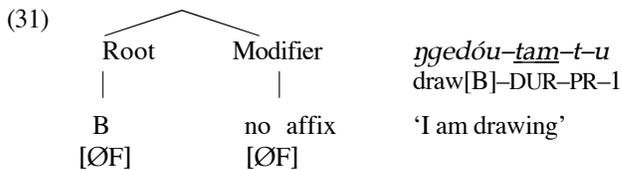
Inkelas’ analysis relies on the following featural representations of the root allomorphs:

- (29) A = [Sg]
 C = [-Sg]
 B = [Du] or [\emptyset F] or [2.-Sg]

Since by hypothesis in the special environment *k* ‘Dual’ or ‘2.-sg’ cannot attach, the only way to express nonsingulars is by attaching [$\overset{1}{1}$] [-Sg]. This means that both Duals and Plurals will have C roots, since C is the only root which can agree with [-Sg]:



Similarly, since \emptyset [+sg] is blocked from attaching in the special environment, the only way to express singular is to leave out number entirely. Accordingly, the B affix in its [ØF] form must be chosen to agree with a modifier unmarked for number:



A serious objection arises to this alternative however. Although Inkelas acknowledges that the B allomorph is the elsewhere or unmarked allomorph, her analysis takes no account of this observation, since it is crucially necessary to assume that the B allomorph is *triple accidentally homophonous* between a featurally unmarked [ØF] case and forms with ‘Dual’ and ‘2.-Sg’ specifications. The fact that *k* is also (accidentally) homophonous between ‘Dual’ and ‘2.-Sg’ is treated as a further accident, although surely the recurrence of ‘Dual’ and ‘2.-Sg’ in both cases demands some more systematic explanation. This is a clear example of the paucity of marked values problem: the B allomorph is evidently the elsewhere allomorph, yet it “requires” certain marked values in order to agree with the Modifier, given Inkelas’ assumptions.

A second problem relates to the distribution of gender affixes. Inkelas proposes that it is positional blocking of *k* and \emptyset by durative, plural object, and other particles that leads to the skewing of number allomorphy in the roots. The anomalous appearance of [i] in the 2nd person is a consequence of the fact that *k* ‘2.-Sg’ is prevented from appearing, allowing the less specified [i] ‘-Sg’ to attach. But no such account can be given for the redistribution of gender affixes, which is totally unexpected. First, the gender affixes are realized peripherally at the very end of the Modifier constituent far away from the number affixes’ position, so positional blocking cannot be in any way responsible. Second, neither *am* nor *um* is blocked in the special environment; rather, it is their distribution that shifts.

Third, the expansion of *um* to the plural cannot be a consequence of the failure of *k* to appear in the dual, since these facts are totally unconnected.

The Impoverishment analysis, on the other hand, although somewhat complicated, derives the redistribution in a straightforward way without appeal to accidental homophony while capturing the systematicity of the neutralizations. Effectively, it has been proposed that the special environments are characterized by a neutralization of number features: the opposition [singular:dual:plural] is levelled to the opposition [unmarked:pl] as exhibited most obviously in the distribution of root allomorphs. Impoverishment rules which derive the neutralization of the distinction [dual:plural] in the [+2] arguments and the neutralization of gender in the [plural] arguments cannot apply if the opposition [dual:plural] is not in force. The neutralizations effected by these Impoverishment rules therefore also cease to be in force and the environments of insertion for [i] [+pl] and *um* [-masc] expand automatically. It is especially noteworthy that a distinction in gender [masc:nomasc] that is not present in the “normal environment” *emerges* in the plural in the “special environment.”

Unlike neutralizations that are best captured by underspecification of morphological signals, Impoverishments apply generally and — in the cases of greatest interest — affect the distribution of affixes or stem allomorphs across-the-board. Nimboran provides ample evidence for such general shifts. Specifically, we have seen it is not simply the case that in a certain special environment certain distinctions are neutralized. Rather, the entire pattern of affix and allomorph distribution changes. To derive this effect, it was proposed that one Impoverishment rule can bleed another, allowing the emergence of otherwise ungenerable forms (such as 50 and 52) in specific circumstances.

9 Syntagmatic Impoverishment and Position Class

Recall that Inkelas proposes to account for the neutralization of number in the Nimboran special environment by positional blocking. The affixes such as durative *tam* which induce the special environment block the appearance of the number affixes *k* and \emptyset by occupying the lexical level where the number affixes must attach. Specifically, the affixes in question have the following representations:

- (32) a. Durative [tam []B]D
 b. Dual or 2.-Sg [k []B]C
 c. Sg [∅ []B]C

All three affixes must attach to a base of level B. They are all in consequence disjunctive.

The Impoverishment analysis given in section 7 would appear to treat as accidental the fact that the affix realizing ‘durative’, for example, appears near or perhaps in the same position as the number affixes which it appears to block. This is in fact not so, as I now detail.

The Impoverishment analysis assumes that a durative morpheme triggers the special Impoverishment rules which bleed the insertion of *k*. It is not necessary on this view for *k* and durative *tam* to occupy the same position or lexical level. In fact, it is more natural to assume that they do not, since *k* realizes a number morpheme and durative *tam* does not.

The lexicalist analysis of Inkelas 1993 has recourse neither to Impoverishment nor to Referral. In consequence the only means by which affix disjunctions can be obtained is by making the two affixes in question occupy the same position or level. In this way, Inkelas’ account is in fact a translation of structuralist position class accounts into the levels of attachment formalism of Lexical Phonology and Morphology (Kiparsky 1982). Disjunctivity is in this model the only diagnostic for strict position class. But if Impoverishments can apply syntagmatically, that is, if a morpheme is able to delete part or all of the content of another morpheme, then disjunctivity and position need not be intrinsically connected.

Suppose morpheme A has content $[\square F]$ and B has content $[\square G]$. If only A appears when both might logically be expected, then on a position class analysis both must occupy the same level. But in a theory with Impoverishment, this need not be so. Instead, $[\square F]$ might trigger Impoverishment of $[\square G]$. But $[\square G]$ and $[\square F]$ do not have to occupy the same syntagmatic position; they may be in an appropriate local relation, sisterhood being unquestionably local enough:

$$(33) \quad [\square G] \rightarrow \emptyset / \begin{array}{c} \diagup \quad \diagdown \\ \text{---} \quad \text{---} \\ \quad \quad [\square F] \end{array}$$

In such cases the *illusion* of position class arises where in fact the disjunctivity is deletion under adjacency.

Precisely this situation obtains in Nimboran. Restricting attention to positions 0-3, Inkelas proposes the following distribution of affixes:

(34)	0	1	2	3
	root	PISubj [i]	DuSubj <i>k</i> SgSubj \emptyset Pl Obj <i>dar</i>	MObj <i>rar</i> Particles (vary)
			----- Durative <u><i>tam</i></u> -----	

Because the positions occupied by affixes — positions motivated solely on the grounds of disjunctivity — are not correlated in any obvious way with the content of the affixes which occupy the positions, Inkelas presents Nimboran as important evidence against the view that word formation is a syntactic process manipulating abstract morphemes. But given the possibility of syntagmatic Impoverishment, the motivation for these arbitrary position classes evaporates. Instead, it is possible to align the affixes according to their content as follows:

(35) Root ^ SubjNumber ^ Obj/Paricle ^ Durative . . .

Because their syntactic function is unlike, the subject number affixes and the object affixes need not and should not occupy the same position. Disjunctions between them must be accomplished by syntagmatic Impoverishment.

The disjunction of PObj *dar* and DuSubj *k* for example, need no longer be ascribed to competition for attachment at a certain level. Rather it is accomplished by the Special Impoverishment rules operating under sisterhood:

(36) [-pl] → \emptyset /

(37) [\square sg] → \emptyset /

(38)	ROOT - [-sg -pl] - [+pl] - [-masc]	Abstract morphology
	ROOT - [\square +pl] - [+pl] - [-masc]	Impoverishments
	ngedoi - i -dar -um	spell-out, ablaut
	draw[C]- PL - PL- NONMASC	

‘They (nonmasc) draw them (pl) here’ (Anceaux 1965: 218)

As shown in (38), if the targeted (subject agreement) morpheme happens to be dual, i.e., [-pl \square sg], the persistent universal redundancy rule supplies [+pl] to the Impoverished morpheme. This then triggers insertion of [i]

rather than of *k* when the object is plural. The appearance of [-masc] *um* in the plural under such circumstances shows that in all respects the appearance of *dar* ‘plural object’ is associated with the shift in affix distributions discussed earlier.

The remaining disjunctions can be captured by other syntagmatic Impoverishments. I conclude that Nimboran verbal morphology is not a counterexample to abstract (syntactic) word formation. More generally, I see no reason to retain the structuralist assumption that disjunction implies position class — or lexical level in present-day terms. The existence of syntagmatic Impoverishment opens up the possibility that a great many apparently arbitrary position class systems are amenable to a more principled account in terms of affix alignment by content, as predicted by theories incorporating the notion of abstract morpheme.

10 Redundancy Rules and Impoverishment

The persistent redundancy rule [-sg] → [+pl] introduced in the analysis of Nimboran complicates the idea that Impoverishment is limited to feature-deletion. Recall that duals were converted to plurals by allowing Impoverishment to delete [-pl], with the Redundancy Rule then inserting [+pl]. The net result is in fact a feature-changing operation:

$$(39) \quad [-sg \ -pl] \rightarrow [-sg] \rightarrow [-sg \ +pl]$$

It might therefore be objected that Impoverishment-plus-Insertion is in fact equally expressive as feature-changing Referral. But there is still an important distinction, namely, that the only values which may be inserted by persistent redundancy rules are in fact unmarked values. Hence Impoverishment-plus-Insertion will always move from a more marked to a less marked state. Referral is indifferent to markedness, and could equally convert plurals to duals or dual to plurals. Plurals could never be converted to duals by Impoverishment but could be by Referral.⁷ Moreover, the redundancy rule inserting the unmarked value is independently necessary to express markedness relations in the grammar. Acquisition of a Referral then requires only the observation of neutralization of contrast; principles of

⁷Calabrese (1994) explores a similar idea in a paper on the historical morphology of the Italian and Sardinian clitic systems. His proposal differs crucially from the one here in that it dispenses with many cases of underspecification in the representation of vocabulary items.

universal (or, perhaps, language-specific) markedness dictate what consequences such a neutralization will have.⁸

To summarize, while Bonet (1991) originally proposed that Impoverishment is in all cases a feature-deleting operation, subsequent work has also invoked feature-insertions, which give rise to a net effect of feature-changing in some circumstances (Noyer 1992, Calabrese 1994). However, if it is assumed that feature insertions occur only through the operation of persistent redundancy rules, the expectation is that marked values may change to unmarked, but never vice versa. An important prediction is that wherever discordant agreement arises, the target of agreement should always be a less marked category than the trigger (or antecedent) of agreement. I leave this question open to future research.

11 Some Outstanding Cases and Outlook

For reasons of space I am unable to discuss the great variety of neutralizations cited in the literature on Rules of Referral, particularly in Stump 1993. An examination of these shows that many, such as the Russian animate accusative, are amenable to reanalysis as neutralizations into less marked representation, although not obviously so. For the sake of completeness, I will list here some remaining cases which may provide evidence for markedness reversals in Impoverishment.

- (40) a. ablative → genitive (Vedic, Stump 1993:455-56)
- b. 3rd person → 1st person (Vedic, Stump 1993:465-66)
- c. 1st sg future → subjunctive (Latin, Carstairs 1987)

The question of whether the generalized syncretisms of natural language morphology conform to the restrictions I have outlined here is undoubtedly an empirical matter. I leave these remaining cases for future research. It is of course always possible to retreat to feature-changing rules, thereby expanding the space of possible grammars available to learners. If this is so, then the differences between Impoverishment as proposed here and Referral as proposed by Stump become less significant. But my hope remains that continued and careful examination of such cases will show that neutralizations are in fact universally feature-erasing operations, validating

⁸Noyer (1992:275 ff) discusses a similar case from Nunggubuyu (Heath 1984). In this language, duals and trials are normally marked for masculine or feminine gender, but when in object function, duals and trials neutralize with generic nonsingulars and are marked with a special so-called “plural” gender. Like the Nimboran case, this presents a case of moving to a less marked category, since the special plural gender is the default gender for nonsingular objects.

the original insight of Bonet (1991). An important consequence of this view may be that Impoverishment rules can be reformulated as choices among universal constraints on the output of syntax rather than as specific rules, a line of research begun in Noyer 1992, 1993 and Calabrese 1994.

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