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CLITIC SEQUENCES IN NUNGGUBUYU AND PF
CONVERGENCE*

ABSTRACT. Although X^0 movement places clitics within sentences, ordering within clitic clusters must be readjusted at PF to conform to nonsyntactic ordering requirements. This paper addresses exactly how the conflicting demands of syntactic ordering and purely morphological ordering are mediated, with data from Nunggubuyu (Australia, documented by Heath (1980, 1982, 1984)). Two mechanisms are proposed. First, a pre-Spell-Out deletion of features by means of Impoverishment rules (Bonet 1991, 1995) bleeds the insertion of certain clitics. Impoverishment rules also feed and bleed one another, giving rise to complex surface patterns. Second, clitics which survive Impoverishment must move in Morphology from their abstract (syntactic) position to conform with surface ordering restrictions. Heath formalized these movements as Affix Hopping transformations, but this paper shows that Hopping is always local, and can thus be modelled as an instance of Morphological Merger (Marantz 1988). Where clitic sequences cannot be properly reordered by local movements, clitic deletion applies as a Last Resort to allow PF convergence. The proposed locality restriction explains a battery of seemingly unrelated clitic deletions in a principled way.

Perlmutter (1971) drew attention to surface constraints in the ordering of Romance clitic sequences, first posing the question of how output constraints on clitic orderings are imposed in a generative grammar. Since that time two lines of thought have emerged. According to one view, clitic sequences are base-generated in the lexicon, and their ordering is a non-syntactic, morphological peculiarity imposed either by lexical subcategorization (Inkelas 1993) or templates (Simpson and Withgott 1986). Other accounts similarly propose that clitic clusters merge together abstractly at PF and are then arrayed post-syntactically onto a spell-out template (Bonet 1991, 1995). The alternative view, espoused in many syntactic treatments such as Kayne (1989 et seq.), Haverkort (1993) or Uriagereka (1995) contends that the answer is to be found in the syntactic component: clitic order reflects directly some aspect of derivational history, such as the order that clitics head-adjoin to their host functional

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projection. The syntactic view has met with a certain degree of success, but as Uriagereka (1995) admits, some additional mechanism of PF reordering appears inescapable. While some reordering is driven by prosodic considerations, as argued by Halpern (1995), Bonet (1991) concluded in a detailed study of Catalan clitic ordering that there remains a residue of pure idiosyncrasy to clitic ordering. The same conclusion was drawn by Cummins and Roberge (1994) in a survey of clitic ordering in Romance. A natural question to pose at this juncture is whether some combination of syntactic conditions and PF-well-formedness constraints together give rise to complex ordering phenomena, and more important still, how such conflicting conditions are mediated.

In this article I address this question directly through an analysis of clitic sequences in Nunggubuyu, a language of Northern Territory, Australia, meticulously documented by Heath (1980, 1982, 1984). With 22 different categories of pronominal arguments, Nunggubuyu exemplifies complexities of clitic ordering and neutralization easily more complex than that of Romance languages such as Catalan, but in principle no different. Drawing on many of Heath's original insights, I show that clitic ordering must conform both to syntactic conditions as well as to specific morphological conditions on ordering. Abstract clitic morphemes are positioned syntactically, but the phonological actualizations of these morphemes must move in the mapping from their Spell-Out positions to their ultimate surface positions to conform to PF ordering restrictions. These movements were formalized by Heath (1984) as Affix Hopping transformations much as in Chomsky (1957). The primary advance over Heath's original analysis that I propose here is to show that Hopping obeys important conditions of *locality*, specifically, the conditions of MORPHOLOGICAL MERGER as proposed in Marantz (1988). Where clitics cannot move locally to a position licensed at PF, the derivation crashes. To permit a convergent derivation in the sense of Chomsky (1995), Last Resort clitic deletion must apply. The locality condition adduced plays a role in a battery of seemingly unrelated clitic deletion phenomena, and accounts for the absence of semantically expected clitics in roughly 40% of the logically possible argument combinations in Nunggubuyu. Alternative descriptions of the same set of facts yields a heterogeneous set of rules of little interest. Instead, the strict locality of reordering provides evidence that the mapping from Spell-Out to PF is constrained by universal principles of some interest. These principles reside in a post-syntactic component of Autonomous Morphology such as envisioned in the theory of DISTRIBUTED MORPHOLOGY (Halle and Marantz 1993, 1994), the essential premises of which are adopted here.

Not all cases of clitic disappearance can be explained by the locality restriction on clitic movement. Instead, some clitic sequences are unrealizable owing to rather specific rules of neutralization or clitic antipathy. Syntax appears to have no role in explaining these neutralizations, which I take to be part of the periphery with respect to syntax proper. On Heath's original analysis some of these neutralizations were accomplished by rules deleting clitics, but the present account differs in situating these neutralizations at the featural, pre-Spell-Out level. Following Bonet (1991, 1995) I propose that such neutralizations are accomplished by IMPOVERISHMENT rules, strictly morphological rules deleting certain values before the phonological realization of functional projections. Although these rules are largely particular to Nunggubuyu, they nevertheless interact in an intricate way, giving rise to a complex pattern of surface distribution.

The paper is organized as follows. Section 1 provides an introduction to the argument categories of Nunggubuyu and the clitic morphemes that express these categories. In section 2 language-particular Impoverishment rules and their interaction are discussed. Section 3 introduces three puzzling additional neutralizations, and explains these through the interaction of syntactic and purely morphological conditions on well-formedness; specifically, the locality conditions on Morphological Merger require these neutralizations for a convergent derivation to occur. Section 4 reviews lexicalist or base-generation alternatives and argues against these. Finally, Appendix I provides tables showing the complete inventory of verbal clitic sequences; Appendix II provides such minor rules as are necessary to complete the coverage of all the clitic sequences in the language, and Appendix III includes a brief description of the phonology relevant to deriving the surface forms of clitic clusters from the underlying forms as discussed in the body of the paper.

Textual examples from Heath (1980) are cited after the symbol § by text number, section and line number. For simplicity, glosses of textual fragments are given as whole sentences, omitting additional context where not necessary.

1. ARGUMENT CATEGORIES AND CLITIC INVENTORY

Before proceeding further, some preliminary remarks about the categories of the Nunggubuyu pronominal system and the inventory of clitics will be necessary. Part of the interest of Nunggubuyu derives from its extraordinarily baroque system of argument classes.

1.1. *Gender Categories*

Nunggubuyu has a system of 8 noun classes (Heath 1984, pp. 159 ff.), which I propose to express by means of the features in (1):¹

| (1) | Noun class categories | | | Heath's term |
|-----|-----------------------|---------|----------|--------------------|
| | [gender] | [human] | [neuter] | |
| a. | m | + | – | masculine |
| b. | m | – | – | NA |
| c. | f | + | – | feminine |
| d. | f | – | – | N ^g ARA |
| e. | p | + | – | plural |
| f. | p | – | – | WARA |
| g. | A | – | + | ANA |
| h. | M | – | + | MANA |

There are five distinct genders which I will denote with the attributes [m, f, p, A, M]. For concreteness, I take these to be the co-efficients (values) of a multi-valued feature [gender]. In addition, there is a contrast for [human] for genders [m f p]; the [A M] genders are specifically [+neuter]. I abbreviate the [–human] categories with the label [*], hence Heath's NA = m*.

Two further remarks need to be made in connection with the gender categories. First, the 'p' gender is called 'plural' by Heath, but inasmuch as 'p' patterns as a gender I will avoid this term here. Although [p gender] can denote groups of objects and can serve to encode number semantically, it

¹ The names of the nonhuman noun classes are derived from the 'continuous' (as opposed to 'punctual') noun class prefixes for each. Nouns have class prefixes in a variety of syntactic contexts not relevant to the present discussion (see Heath 1984, pp. 163 ff.). The features proposed in (1) identify certain natural classes among the noun classes. The [+human] noun classes refer to human beings or through 'personification' to nonhuman referents; the [–human] noun classes refer to nonhuman referents or through 'impersonalization' to human referents (Heath 1984, p. 178). The [–neuter] classes consist of either [m gender], [f gender] or [p gender]; each of these genders is subdivided into [+human] and [–human] classes. The markers for a given gender are usually homophonous, hence a [f gender +human] (i.e., 'feminine') argument and a [f gender –human] (i.e., N^gara) argument are typically expressed in the same way morphologically. This syncretism establishes the existence of the gender features grouping both [+human] and [–human] subtypes. The [+neuter] classes form a natural class defined by such formal properties as: they have no [+human] correspondents, they can never combine with [+aug] (see section 1.2), and when both subject and object are [+neuter], there is an obligatory absence of verbal agreement clitics.

does not always do so. For example, such semantically singular entities as *landhurg* ‘dog, dingo’, *miliwarwar* ‘bat’, *mala* ‘navel’, among others, are of the non-human [p gender] WARA (Heath 1984, p. 185).² Second, the [A gender] class syncretizes two historically distinct classes, called ‘ANA_{WU}’ and ‘ANA_∅’ by Heath. The ANA_∅ class is never marked overtly as the object of a transitive verb, but otherwise behaves like the ANA_{WU} class for the purposes of verbal agreement marking.³

1.2. *Person and Number Categories*

Person categories include the standard four: 1st person, 1st inclusive, and 2nd person and 3rd person; these person category labels will be abbreviated 1, 12, 2 and 3 respectively.

Although [p gender] is sometimes interpreted semantically as a number, there is a separate encoding of number by an additional feature. As pointed out originally by Conklin (1968), many languages admit a contrast between what will be called here AUGMENTED [+aug] and RESTRICTED [–aug] categories, where an augmented category has at least one more referent than the corresponding restricted category if there is one. In the case of 1st person inclusives, the augmented category is minimally tripl, referring to three persons or more, otherwise [+aug] implies minimally two (dual). I will use AUG to denote [+aug] category and RST (for ‘restricted’) to denote a [–aug] category:⁴

² An anonymous reviewer suggests an alternative according to which [p gender –human] is analyzed as a noun class feature while [p gender +human] is analyzed as a number feature whose exponence is accidentally homophonous with the noun class feature. On purely structural grounds there is little to recommend such a view. For example, the [p gender +human] class is marked by means of noun class prefixes in a manner analogous to all other noun class prefixes. Moreover, the relation between noun class membership and semantic number is indirect. As Heath states,

Although these NC [noun class] prefixes show some number-marking, in full nominal words it is also necessary to consider number marking affixes (and suppletion or reduplication where appropriate). In particular, Dual is marked by a suffix /w₂a:/ for humans and nonhumans alike, while humans also have special Sg and Pl markers. Since NC_{infl} [inflectional noun class – RN] prefixes are frequently omitted . . . these other number-markers are more reliable than the partial number-marking in the NC prefixes (Heath 1984, p. 160).

³ I am indebted to an anonymous reviewer for drawing my attention to this distinction. See footnote 26 for further discussion.

⁴ A number of other authors have recognized the existence of such a feature, including Matthews (1972) for Huave and McKay (1978) for Rembarrnga. For arguments that [aug] must exist in addition to [singular], see Noyer (1992, 1997).

- | | | |
|-----|--------|------------------------------------|
| (2) | 1 RST | 1st person singular |
| | 1 AUG | 1st person exclusive dual or more |
| | 12 RST | 1st person inclusive dual |
| | 12 AUG | 1st person inclusive trial or more |

The labels in (2) are to be understood as abbreviations for collections of features, i.e., 12 AUG abbreviates [1 2 +aug].

A peculiar consequence of the double encoding of semantic number (by morphosyntactic number and [p gender]) is that augmented arguments which are not plural end up by implication denoting duals and trials. For example, the 3 AUG m category, being neither RST (i.e., the minimal 'singular' category), nor plural, is interpreted semantically as dual:

- | | | |
|-----|---------|-------------------------------|
| (3) | 3 RST m | 3rd person masculine singular |
| | 3 AUG m | 3rd person masculine dual |
| | 3 AUG p | 3rd person masculine plural |

1.3. *Category Inventory*

Given these person, number and gender distinctions there exist a total of 22 pronominal categories.⁵ The full set and their abbreviations used here is listed in (4):

- | | | |
|-----|----------|---|
| (4) | 1 RST | 1st person singular |
| | 1 AUG m | 1st person exclusive masculine dual |
| | 1 AUG f | 1st person exclusive feminine dual |
| | 1 AUG p | 1st person exclusive plural |
| | 12 RST | 1st person dual (I and thou) |
| | 12 AUG m | 1st person inclusive trial masculine |
| | 12 AUG f | 1st person inclusive trial feminine |
| | 12 AUG p | 1st person inclusive plural |
| | 2 RST | 2nd person singular |
| | 2 AUG m | 2nd person dual masculine |
| | 2 AUG f | 2nd person dual feminine |
| | 2 AUG p | 2nd person plural |
| | 3 RST m | 3rd person masculine singular |
| | 3 RST m* | 3rd person masculine singular nonhuman: |
| | | NA gender |

⁵ Only [+human] categories can have person values 1, 12, or 2. Similarly, [p gender] implies [+aug], and [+neuter] categories are never [+aug]. These restrictions are imposed by Impoverishments of no interest here.

| | |
|----------|---|
| 3 RST f | 3rd person feminine singular |
| 3 RST f* | 3rd person feminine singular nonhuman: N ^g ARA gender |
| 3 RST A | 3rd person ANA gender |
| 3 RST M | 3rd person MANA gender |
| 3 AUG m | 3rd person masculine dual |
| 3 AUG f | 3rd person feminine dual |
| 3 AUG p | 3rd person plural |
| 3 AUG p* | 3rd person WARA gender |

A category label such as ‘3 AUG p’ should be interpreted as abbreviating a set of features [+augmented, p gender].

The interpretation of the number of referents in each category has been discussed above in connection with the feature [aug]; the interpretation of gender requires some further comment. An [m gender] category has a reference set containing at least one male human; an [f gender] category has a reference set containing at least one female human and no male human (Heath 1984, pp. 241–42). Hence, for example, the 1 AUG m category refers to two individuals, one the speaker, the other neither the speaker nor the addressee, and one of these individuals must be a male human. Hence, possible glosses might be ‘I (male speaker) and her’, ‘I (female speaker) and him’, or ‘I (male) speaker and him’, or (conceivably) ‘I (male) speaker and it’, but not ‘I (female) speaker and her’, for which 1 AUG f would be used.

1.4. *Morphological Expression of Category on Verbs*

Both subject and object of a transitive clause are marked morphologically by means of prefixed clitics on the verb. Within a theory that distinguishes ontologically between clitics and affixes, phonological criteria would classify these ‘clitics’ as prefixes, but here the clitic/affix distinction is assumed to be a phonological rather than a morphosyntactic property. Accordingly, the term ‘clitic’ will be used throughout the paper to refer to these verbal markers.

In addition, the clitic clusters come in two series, called ‘A’ and ‘B’ by Heath, which correlate with tense, aspect, mood, and polarity (affirmative vs. negative clauses).⁶ The B series typically contains a clitic *wan*, situated directly to the right of the leftmost clitic marking person, but the B property

⁶ The B series occurs in the negative past and negative present, the past potential, and the non-negative future; the A series occurs elsewhere (Heath 1984, p. 339).

is in some cases fused with the person clitic in a portmanteau. (See section 3.2 for further discussion.)

The inventory of underlyingly distinct clitic morphemes will vary depending on the rules of phonology and the degree to which these are sensitive to morphological information. In this paper, I assume the underlying forms given in Heath (1984) with some minor modifications;⁷ a brief account of the relevant phonology is provided in Appendix III. The list in (5) shows the 12 clitic morphemes that I will assume here. Some morphemes have only a single underlying allomorph, while others show variation depending on their context, which will be discussed below.⁸ Owing to phonological rules, the surface instantiations of the underlying representation (UR) of a clitic will often be quite varied and numerous, in some cases resulting in surface neutralizations due solely to phonological factors.⁹

⁷ The modifications of the underlying forms given in Heath (1984) are noted as they arise. Heath's analysis, along with the present one, assumes a certain degree of abstraction inasmuch as most clitic clusters are derived through the application of various phonological rules, many of which, however, are entirely regular in the language. Proponents of a more surface-oriented approach to morphophonology may feel uneasy accepting the proposed morphological parses of the clitic clusters. Heath himself expresses some skepticism about abstract phonology and some sympathy for a more surface-oriented approach, but nevertheless concludes, "... I think a forced choice between abstract and surface analyses does not adequately reflect the probable 'psychological' reality of both to Nunggubuyu speakers" (Heath 1984, p. 149). Indeed, the tremendous systematicity which the grammar of the clitic clusters obeys, as well as the simplifications proposed in this paper in section 3, will, I hope, serve to offset such anxieties.

⁸ Aside from these, there exist additional portmanteau forms which occur only in certain combinations of 1st and 2nd person arguments. See Table 6 for a full listing (proposed unanalyzable portmanteaux are glossed there with a *). The 1 subject with 2 RST object A form *ɲunu* is probably best treated as exceptional (i.e., as listed) since it departs in two ways from its expected behavior. First, the *a* of the 1 RST clitic *ɲa* unexpectedly becomes [u] before the 2.RST clitic *nu*, hence *ɲa-nu* → [ɲunu] (Heath 1984, p. 83 proposes a special rule for this); second, the 2.RST clitic lacks the final [n] which occurs in other instances of this clitic.

⁹ An anonymous reviewer has called attention to certain sets of forms which are in surface representation homophonous, including the following:

| (i) | subject | object | clitic sequence |
|------|---------|---------|-----------------------------|
| a. | 1 AUG p | 3 AUG p | nV:-wa-ra → [nara] |
| b. | 12 | 3 AUG p | na-wa-ra → [nara] |
| c. | 2 AUG p | 3 AUG p | nV-wV-wa-ra → [nara] |
| (ii) | | | |
| a. | 3 RST f | 1 AUG p | nV-N-ɲi → [naɲi] |
| b. | 3 RST f | 12 | na-N-ɲi → [naɲi] |
| c. | 3 RST f | 2 AUG p | nV-N-ɲi → [naɲi] |

-
- (iii)
- | | | | |
|----|---------|---------|-------------------------|
| a. | 3 RST m | 1 AUG p | nV-N-ni → [nani] |
| b. | 3 RST m | 12 | na-N-ni → [nani] |
| c. | 3 RST m | 2 AUG p | nV-N-ni → [nani] |

Given the underlying forms proposed here – which are essentially those of Heath (1984) – the surface identity in (i–iii) appears to be ‘accidental’, that is, not resulting from a systematic collapse of the categories involved at the featural level prior to spell-out. To justify this treatment, I briefly review here the alternatives available to this ‘accidental’ merger.

Within the theory of grammar espoused here (see (9)), surface level homophony could arise in four ways: (a) by featural neutralization prior to spell-out, making two syntactically distinct categories identical in morphology, so that their spell-outs are necessarily identical; (b) through systematic homophony in spell-out, i.e., where two morphologically distinct categories receive identical spell-outs; (c) through accidental homophony in spell-out, i.e., where two morphologically distinct categories are spelled with rules which happen to introduce phonologically identical exponents; or (d) through phonological neutralization via phonological rules, which, ideally, are independently established outside of the context of this particular neutralization. The question then arises which of these four possibilities is most appropriate for the data in (i–iii) above. Several pieces of evidence suggest that (a), namely systematic neutralization prior to spell-out, is unwarranted.

First, the forms in (i), for example, remain distinct in the B series forms, for example:

- (iv)
- | | subject | object | clitic sequence |
|----|---------|---------|---------------------------------|
| a. | 1 AUG p | 3 AUG p | nV:-wan-wa → [na:mba] |
| b. | 12 | 3 AUG p | na-wan-wa → [namba] |
| c. | 2 AUG p | 3 AUG p | nVn-wV-wa-ra → [nambara] |

Thus, if there were to be a systematic neutralization of the categories in (i–iii) at the featural level, this neutralization would have to be somehow limited to the A series, a rather peculiar restriction inasmuch as the B series is the more marked one (occurring as it does in syntactically specialized contexts). Reference to the A series to the exclusion of the B series would therefore be unexpected.

Second, there is evidence for underlying phonological distinctness of the component morphemes in the sequences in (i–iii). On the one hand, the underlying distinction between *nV*: ‘1 AUG p (subject)’ and *na* ‘12’, manifest in the B forms in (i), is neutralized in the A forms by an independently needed rule that shortens vowels before [p gender] *ra* (see Appendix III). This rule operates even in situations where the result does not produce homophony with another form, as in 12 AUG p subject with 3 RTS M object, *ŋV:-ri-ma* → [ŋirima]. Hence the collapse of 1 AUG p subject with 3 AUG p object *nV:-wa-ra* → [nara] and 12 subject with 3 AUG p object *na-wa-ra* → [nara] is best understood as type (d), that is, merely phonological. The distinction between 12 *na* and 2 *nV*, on the other hand, can be established by comparing 12 RST subject with 3 RST m object *na-nu* → [nanu] vs. 2 AUG p subject with 3 RST m object *nV-wV-nu* → [nu:nu]. The underlying form of 12 has a specified /a/, so *na-nu* resists vowel harmony; the underlying form of 2 has an underspecified V, and so *nV-wV-nu* does undergo vowel harmony, surfacing as [nu:nu]. Before [p gender] *ra* the distinction between *nV* and *na* is not evident because when *nV* harmonizes with

| | | | |
|--|-----------------|--------------------------|------------------------------|
| (5) Nunggubuyu Verbal Clitic Inventory | | | |
| | features | UR | surface instantiations |
| a. | 12.AUGA | ŋV: | ŋi:, ŋu:, ŋa:, ŋi, ŋa, ŋ |
| b. | 12 | na | na, n |
| c. | 1.AUG (subject) | nV: | ni:, nu:, na:, ni, nu, na, n |
| | 1.AUG (object) | nV | na |
| d. | 1 | ŋa | ŋa, ŋ |
| e. | 2 (A) | nV | na, ni, nu, n |
| | 2.B | nVn ¹⁰ | nim, num, nam |

ra the result is [na], such that the underlying distinction between *nV* and *na* is lost. Thus the collapse of 12 subject with 3 AUG p object *na-wa-ra* → [nara] and 2 AUG p subject with 3 AUG p object *nV-wV-wa-ra* → [nara] is also purely phonological, established by independent distinctions elsewhere in the system. Similarly, given that inverse *N* blocks the leftward copying of vowel features to an underspecified vowel (see Appendix III), the distinction between underlying *nV* and *na* is also neutralized phonologically in 3 RST f subject with 12 object *na-N-ŋi* → [naŋi], 3 RST f subject with 2 AUG p object *nV-N-ŋi* → [naŋi]. Finally, the distinction between *nV* '2' and *nV* '1.AUG (object allomorph)' is, admittedly, the least well-supported distinction; there is no immediate explanation for the fact that '1.AUG' when in object function should have a shortened (*nV*) allomorph, so that it in fact has the same spell-out as '2' *nV* in this context. The question to consider then, is whether this final syncretism is of type (a), (b) or (c). On Heath's analysis the equivalence of the forms amounts to syncretism of type (c) and this view has been adopted here. Alternative (a) would amount to obliterating the distinction between 1st person exclusive and 2nd person in terms of feature specifications prior to spell-out. Since these categories do not form a natural class to the exclusion of 1st inclusive, such a maneuver would be complex. Alternative (b) would amount to assuming that while 12 is systematically spelled as *ŋV:*, when in object function 1 AUG and 2 AUG would be collected as the natural class of remaining 'person' categories (i.e., 1st or 2nd person categories) and would be spelled always as *nV*. This result would be difficult to distinguish from the 'accidental homophony' analysis (c) offered in the text.

¹⁰ A special portmanteau *nVn* for 2 B forms does not figure in Heath's original analysis. There are two arguments for such a portmanteau. First, vowel harmony does not operate normally in 2 B forms without a portmanteau: the expected *nV-wan* '2-B' sequence should uniformly yield a surface form with [a]-vocalism, but actual 2 B forms are harmonic (see the last 3 cell rows of Tables 7 and 10). For example, 2 AUG f subject intransitive *nV-wan-wu-ŋi* '2-B-AUG-f' ought to surface as *[nambiŋi] but instead has the harmonic form [nimbiŋi]; this should be contrasted with the non-harmonizing (and non-portmanteau) 1 AUG f intransitive *ŋV:-wan-ŋi* '1.AUG-B-f' → [ŋa:ŋi], where the [a]-vocalism survives. Second, there is an idiosyncratic suppression of the [p gender] clitic *ri* in all 1st and 2nd person forms which have the B clitic *wan* (see rule D in Appendix II, and for examples, the cells marked with D in Tables 7 and 10 in Appendix I). The 2 AUG p subject forms are a systematic exception to this generalization. For example, the 1 AUG p subject with 3 RST f object B form is *nV:-wan-ŋu* '1.AUG-B-f' → [na:ŋu], without the expected [p gender] clitic

| | | | |
|----|--|------------|-------------------------------|
| f. | 2.RST (A) | nun | nun, nuŋ, nim, nu, ni |
| | 2.RST (subject, B) ¹¹ | ba | ba, b |
| | 2.RST (object, B) | a | a |
| g. | AUG (intransitive subject) | wu | wu, wi, bu, bi, i, u |
| | AUG (object) | wa | wa, ba, a |
| | AUG (transitive subject, rightmost clitic) | wi | bi |
| | AUG (transitive subject, elsewhere) | wV | wu, wi, bu, bi, w, b, i, u, ∅ |
| h. | m (human non-inverse object) | nu | nu |
| | m (elsewhere, i.e., nonhuman; or inverse object; or subject) | ni | ni |
| i. | f (non-inverse object after ri) | ŋa | ŋa |
| | f (non-inverse object) | ŋu | ŋu |
| | f (elsewhere) | ŋi | ŋi, ŋu |
| j. | p (intransitive subject) | ru | ru |
| | p (object) | ra | ra |
| | p (transitive subject) | ri | ri |
| l. | A | uqu | wu, gu |
| m. | M | ma | ma |

A variety of factors influence the selection of underlying clitic allomorphs, the most common being whether the clitic expresses a property of a subject or of an object, is in a transitive or intransitive clause, or is in

for the subject, whereas the corresponding 2 AUG form does have the plural clitic: *nVn-wi-ri-ŋa* ‘2.B-AUG-p-f → [nimbirŋa]. The set of cases in which the B clitic suppresses the [p gender] clitic do not comprise a natural class on the analysis in which the 2 B forms do not contain a 2.B portmanteau – the rule would apply in 1st person forms or in 2nd person RST forms. However, if 2 B is a portmanteau *nVn*, as proposed here, then suppression of the [p gender] clitic occurs in all 1st and 2nd person forms with the B clitic *wan*. Where the B clitic and 2 are fused as *nVn*, suppression of the [p gender] clitic does not occur, as desired.

¹¹ The clitic *ba* also occurs (instead of expected *nun*) in A forms where the object is 3 AUG, hence 2 RST subject with 3 AUG object gives *ba-wa-ra* ‘2.RST-AUG-p’ → [bara], instead of expected **nun-wa-ra*.

an A-series or B-series clause. Some further conditioning factors include whether the object is INVERSE, a situation which arises when an object clitic precedes a subject clitic in the string (see section 3.1 and 3.3; note also that such clitics are suffixed by the inverse marker *N*), and whether the argument is human or non-human in the case of [m gender].¹² An important pattern to note within the above system of allomorphy is that for the AUG, p, f and m clitics vowel quality differences express grammatical function.

(6) Underlying vowel quality/grammatical function correlations

| grammatical function | AUG | p | f | m |
|-----------------------------|---------|----|---------|----|
| transitive subject | wV ~ wi | ri | ŋi | ni |
| intransitive subject | wu | ru | | |
| inverse object | wa | ra | ŋu ~ ŋa | nu |
| human non-inverse object | | | | ni |
| nonhuman non-inverse object | | | | |

As shown in the table in (6), the underlying vowel of subject clitics (of the above types), if specified, is always [+high] and transitive subjects always have the /i/ vocalism (or an underspecified vowel).¹³ The /a/ vocalism is limited to object functions. While the pattern is not completely clean, the generalization appears to be that the phonological properties [+high] and [–back] cluster with subjecthood and agentivity while the absence of

¹² Note also the specific condition that [f gender] appears as *ŋa* when following [p gender] clitic *ri*.

¹³ The analysis of underlying vocalism for p and for AUG offered here differs minimally from that in Heath (1984). Specifically, Heath proposes in place of inverse object *ra* an underspecified *rV*, which, however, always surfaces as [ra] owing to a rule which provides [a] vocalism before the inverse marker *N*. Given the analysis of vowel harmony assumed here (see Appendix III), the use of underspecified vowels in this instance is unnecessary. Second, Heath proposes underspecified *wV* for all non-final instances of AUG; but again, given the analysis of vowel harmony proposed here, fully specified *wu* for intransitive subject AUG and *wa* for object AUG is feasible and allows for a slight regularization both in underlying forms and in the correlation between allomorphy and underlying vowel quality. In addition, it should be noted that although AUG in transitive subject function is *wV* when non-final in the clitic cluster, the surface instantiations of *wV* always contain a high vowel if they contain any vowel at all. The (only) reason *wV* is required, rather than *wi* (on analogy with [p gender] *ri*), is that when *wV* precedes *wa* the resulting vowel is [a], as in 3 AUG p subject with 3 AUG p object *wV-wa-ra* 'AUG-AUG-p' → [wara]. Normally, a derived sequence *i + a* yields [i:], so a putative *wi-wa* sequence would produce incorrect [wi:] in this case and in analogous sequences.

these properties – where contrastive allomorphs exist¹⁴ – denotes object function.

1.5. *Inventory of Clitic Sequences*

The 22 categories of argument might in principle give rise to 484 distinct clitic sequences for transitive clauses and 22 for intransitives in each of the two series. Of the transitives, 112 combinations in each series are semantically reflexive (e.g., ‘I acting on me’) and are marked by special reflexive forms which will not be discussed here. This leaves, however, 372 potential argument combinations for transitive clauses in each series. The actual number of distinct (phonological underlying) forms varies depending on the analysis, but certainly numbers no more than 19 intransitive forms and 126 transitive forms in each series. It should be evident then that considerable neutralization occurs in the expression of argument properties in the agreement prefixes; the task of this paper is to provide as simple and principled an account of these neutralizations as possible.

The full set of clitic sequences in Nunggubuyu is presented in Appendix I.¹⁵ There, Tables 1–5 give the A series forms and present most of the information relevant to the following discussion. Table 6 provides forms for argument combinations where both subject and object are 1st or 2nd person in both the A series and the B series: most such forms are not subject to synchronic analysis and many are the same for both the A series and the B series. Tables 7–12 show the B series forms, which present certain additional complications.

The reader should not attempt to assimilate this information all at once, but throughout the paper continual reference will be made to these tables so that the reader may be better oriented within the mass of data. For the time

¹⁴ Obviously for clitics which lack allomorphs with underlying differences in vowel height, the quality of the vowel is not informative. For example, the nonhuman [m gender] clitic is invariantly *ni*, so in this case the /i/ vocalism does not serve to express grammatical function. Similarly, clitics whose alternation is phonologically determined by vowel harmony may show /a/ vocalism in the appropriate phonological environment; for example, ‘1.AUG’ subject *nV*: surfaces as [na:] before object AUG *wa* (see the rightmost column in Table 2 in Appendix I).

¹⁵ Two exceptions should be noted here. First, as shown in (5), a nonhuman [m gender] argument is invariantly expressed (if realized) as *ni*, and never as the other allomorph of [m gender], namely *nu*. For all forms containing *nu* ‘m’ there exists an analogous form for nonhuman [m gender] obtained by substituting *ni* and making appropriate changes in vowel harmony (see Appendix III). For example, for 2 RST subject with 3 RST m (non-human) object, instead of *nun-nu* ‘2.RST-m’ → [nunu], one has instead *nun-ni* ‘2.RST-m*’ → [nini]. Second, when both arguments are nonhuman, there is an option of using a ∅-prefix rather than the appropriate full prefix form (and when both arguments are [+neuter] this option is always taken).

being the reader is advised to examine the general structure of these tables and the type of data which they present. Table rows represent subject arguments and columns represent object arguments; where intransitive forms are given, these are listed in a column labelled 'Intransitive'. The upper left corner of each box in the table gives the underlying form of the clitic sequence, with the clitics separated by hyphens; clitics expressing properties of the object argument (if any) are underlined to distinguish them from clitics representing properties of the subject argument. Below each clitic's underlying form is given its gloss (that is, the properties it expresses as shown in (5), but not its contextual subcategorization); hyphens within the gloss separate the glosses of each clitic and periods within the gloss separate the features of clitics expressing more than one feature. To the right of the underlying form the surface form is provided enclosed in brackets. The lower right corner of each box may contain special annotations such as *i*, *ii*, *A*, *DP* and so on; these refer to the morphological rules which affect the derivation of the form shown, and a key to these annotations is provided in Appendix II. Some of these rules are discussed in the main text of the paper while others are included in Appendix II merely for completeness so that the reader can verify that all clitic sequences are generable within the proposed grammar.

Some boxes in the tables show syncretisms of various types. For example, the rightmost column in Table 2 shows the neutralization of contrast between 3 AUG f, 3 AUG m, and 3 AUG p object arguments. Similarly, in the lefthand (3 RST f) column of Table 2, the three rows 1 AUG f, 1 AUG m, and 1 AUG p are merged. For convenience, I will refer to each subpart of the table which contains a glossed underlying form as a 'box' in the table, while each subpart of the fully-differentiated grid imposed by all the distinct rows and columns will be called a 'cell'. Each cell denotes a possible combination of arguments generated in the syntax, or more precisely, a set of argumental features whose realization on the verb as clitics the Morphology component must be responsible for. Because of certain neutralizations, some boxes consist of more than one cell. For example, the box containing *nV:-ri-ŋa* '1.AUG-p-f' → [niriŋa] in Table 2 contains 3 cells, that is, *nV:-ri-ŋa* → [niriŋa] is the underlying and surface form for a 3 RST f object with a 1 AUG f, or 1 AUG m or 1 AUG p subject. Note that some cells contain lower-right corner annotations even though the cells themselves are merged into a single box. What this means is that distinct morphological rules operate in each cell but the resulting underlying form is the same in each case. Finally, note that some boxes or sets of boxes are surrounded by bolded lines. These paradigm areas are discussed specifically in section 3.

1.6. *Clitic Disappearance*

Paralleling similar phenomena in Romance, Nunggubuyu effects the massive neutralization of 372 category combinations to (at most) 126 forms through what I will call here clitic DISAPPEARANCE (where an expected clitic does not surface) and clitic SUBSTITUTION (where an expected clitic is replaced by a different clitic with a different canonical ‘meaning’).

Heath (1984, p. 363) shows that in a sequence of clitics referring to subject and object of a transitive clause, one clitic morpheme seems to cause another to delete. Consider the contrast below (compare also the first two rows and columns of Table 5). In this and the following examples I provide first the clitic sequence in isolation followed by a supporting textual example. For ease in parsing the forms, clitics expressing properties of the object argument are shown with underlined glosses.¹⁶

(7)a. η i nu \rightarrow [η unu]

f m

she ... him

η u nu = bilhargan

f m *grab-PAST_I*

she grabbed him §5.7.1

b. (*ni) η u

(* m) \underline{f}

he ... her

η u = yami-jga-n

\underline{f} *do.that-CAUSE-PAST_I*

He told her §4.1.2

¹⁶ In this and in following examples, the underlying form of the clitic cluster is given with glosses for each clitic; to the right of the right arrow the surface form appears if it is different from the underlying form. In examples cited from text collections, only the surface form is shown. For visual clarity, clitics within clusters are not joined by hyphens to each other or to the following verbal stem; this should not, however, be taken to indicate that they are phonologically free-standing in any sense. Parentheses have their customary interpretation.

- c. *ni*
m
 he ... (intransitive)
- ni** = *yarbi-n*
m run-PAST₁
 He ran over §5.1.2

(7a) presents an unremarkable case where both a subject clitic *ŋi* [f gender] and an object clitic *nu* [m gender] appear. In contrast (7b) permits only the object clitic: the subject clitic *ni* [m gender] (shown occurring independently in (7c)) cannot occur in the presence of an [f gender] object.

1.7. Clitic Substitution

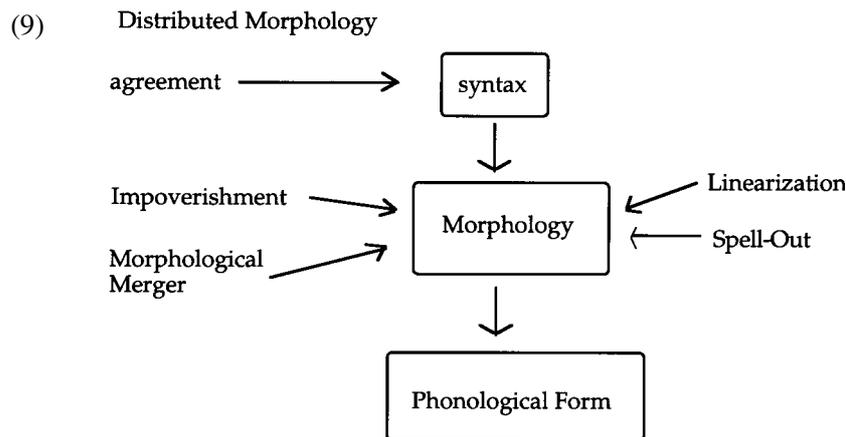
Nunggubuyu also exemplifies clitic substitution, analogous to the well-known phenomenon of spurious *se* in Romance (Harris 1994). In a phenomenon called ‘Dual/Trial Absorption’ by Heath (1984, p. 363) we find that [f gender] and [m gender] are in some instances replaced by [p gender].

- (8)a. *wV wa ra/*nu* → [*wara*]/* [*waanu*]
*AUG AUG p/*m* ‘They (pl) ... they two (masc)’
- b. *nu:-bi-ni*, *na-nuŋ-garagu-wa:*,
m-ANAPH-m m-uncircumcised-DUAL
- w a ra** *ŋura=guldah-ŋi*
AUG AUG p penis=cut-PAST₂ §2.1.2
 Those two young (uncircumcised) boys. They (men) circumcised them (boys).

In the above example, the [m gender] of the dual object (two males, explicitly marked dual by the suffix *-wa:* on the substantive ‘uncircumcised’) is replaced by [p gender] in the verbal clitic sequence *w-a-ra*. This is unexpected because normally [p gender] indicates a plural, non-dual category, that is, a referent with at least three individuals. Logically, one might expect there to be an [m gender] object clitic *nu* in the verb in (8b). However, in certain object arguments, [p gender] appears even with semantically dual referents (see forms containing *wa-ra* in the rightmost column in Table 2). The surface result is what appears to be a lack of

gender agreement between the verb and the object, since an [m gender] object co-occurs with a [p gender] object clitic.¹⁷

The goal of the present paper is to provide as principled an account as possible of both disappearance and substitution. These effects result from processes occurring in a post-syntactic Morphology component which is responsible for providing phonological form to the abstract categories manipulated by syntax. A simplified diagram of the Distributed Morphology model assumed here is shown below:



A variety of processes occur during Morphology, including the deletion of morphosyntactic features present in syntax (Impoverishment), the imposition of linear order on the constituents, the local dislocation of constituents via Morphological Merger, and the insertion of phonological expressions into terminal nodes (Spell-Out). For more detailed discussion of Distributed Morphology, see Halle and Marantz (1993, 1994) and Harley and Noyer (1999).

In this paper, we concentrate first on those cases of clitic disappearance or substitution which appear to be the result of Impoverishment rules, turning in section 3 to neutralizations arising from the interaction of syntax and PF well-formedness conditions.

¹⁷ It is important to realize that this lack of surface concord does not in fact produce any anomalies in the system of syntactic agreement. Specifically, in (8), both the object argument and the verbal clitic cluster have the same set of features in the syntax, namely [m gender +human –aug]. As shown in diagram (9), it is only after syntax and after agreement that these features are manipulated in Morphology such that the verbal clitic sequence is spelled out with [p gender] rather than the expected [m gender]. See section 2.2 for further discussion.

2. IMPOVERISHMENT RULES

An important source of neutralization arises from the loss of gender features in a variety of situations. Gender contrasts of both subject and object arguments are neutralized, although deletion of Subject Gender is less uniform in Nunggubuyu than deletion of Object Gender. For example, deletion of Object Gender occurs in Nunggubuyu whenever the object is [+aug] in number. This can be seen easily by examining the AUG object columns in Tables 2–6: the contrast between [m gender], [f gender] and [p gender] object arguments is neutralized and all AUG objects are expressed through the same clitic sequence.

Section 2.1 considers the learnability problem of neutralization and puts forth a possible way of approaching the problem. Section 2.2 discusses object gender neutralization first, followed by subject gender neutralization in section 2.3. Finally, section 2.4 illustrates the somewhat complex interaction of these rules in clauses where both the subject and the object have underlying gender features.

2.1. *Impoverishment and Complexity*

An important question to ask is why there should be gender neutralization at all, a problem which was first posed in Hale (1973). Hale noted that many languages with agreement with more than one argument show extensive neutralization of information in transitive clauses, *even where morphological means exist to express the relevant contrasts*. For example, Hale notes that while specifically dual forms exist for all three persons for intransitive agreement in Warlpiri (Pama-Nyungan, Australian), the dual is replaced by the plural in certain combinations when both subject and object are nonsingular. The two dialects of Warlpiri, Eastern and Western, differ in regard to how extensive this replacement is. In the Eastern dialect, “[i]f both the subject and object are nonsingular, only plural clitics are allowed” (Hale 1973, p. 330):

- (10) ngajarra-rlu ka-**rna-lu-nyarra** nyumpala nya-nyi
we.DUAL-ERG PRESENT-1-PL-2PL you.DUAL see-NONPAST
 We two see you two.

In Western Warlpiri, however, the facts are more complicated. Dual is replaced by plural obligatorily when both subject and object are dual, and

only one dual must be replaced. The dual which is replaced is that which is lowest on the hierarchy 1st person > 2nd person > 3rd person:

- (11) nyumpala-rlu ka-nku-lu-jarrangku ngajarra nya-nyi
 YOU.DUAL-ERG PRESENT-2-PL-2DUAL US.DUAL see-NONPAST
 You two saw us two.

Simpson and Withgott (1986) discuss a phenomenon of dual neutralization similar to that seen in Eastern Warlpiri occurring in Warumungu, a related language. In order to render plural clitics compatible with a dual interpretation which they normally do not have, they suggest that in the neutralization context, the value [–dual] is ‘erased’, thus allowing the plural clitic to be ambiguous between [–singular –dual] (i.e., plural) and [–singular +dual] (i.e., dual). Moreover, they suggest that the value [+dual] could be ‘blocked’ from a feature matrix containing [–singular].¹⁸ Although Simpson and Withgott do not offer a complete theory of such operations, it is clear that formally the grammar will require two operations: a constraint against a certain feature combination, and a rule which maps that feature combination to another (perhaps less specified combination). In this paper, Impoverishment rules serve these functions; in what follows I sketch a preliminary outline of a theory of Impoverishment.

One way to construe these neutralizations in Warlpiri and in other multiple-argument agreement systems is that the category produced by X⁰ adjunction of the subject and the object has become too informationally ‘rich’ or ‘complex’. Such a notion of informational complexity presumes a particular hierarchy of markedness relations, where more certain properties are ‘more marked’ or ‘rich’ than others.¹⁹ For example, it is fairly uncontroversial to construe [dual] as a marked feature relative to [+singular] or [–singular]. Evidently, the combination of two such [dual] features in Warlpiri surpasses a language-specific limit on informational richness:

- (12) *[[dual][dual]]

Violation of the constraint in (12) triggers a repair in which [dual] is deleted, leaving only the property [–singular] (i.e., ‘plural’; further factors

¹⁸ In addition, since the loss of [–dual] in these contexts violates the No Lookahead or Adjacency Constraint (Siegel 1977) – this being their major concern in examining this phenomenon – Simpson and Withgott (1986, p. 163) suggest that instead, the lexical entry for the ‘we plural + they plural’ clitic combination would have to be “semantically unpredictable” and that “four separate interpretations must be listed” unless further modifications in the standard lexicalist model are made. See section 4 for further discussion.

¹⁹ A full theory of such markedness relations cannot possibly be introduced or defended here, but the remarks in the text should clarify how this notion underlies the concept of Impoverishment as employed below.

obviously determine which [dual] is deleted). On the model of grammar illustrated in (9), the deletion of [dual] entails that a dual-marking clitic cannot be spelled out and instead any combination of features violating (12) will be spelled with a plural clitic (which lacks any specification for [dual]).

What counts as ‘too rich’ must depend on language-particular (or even dialect-particular) thresholds for complexity, since languages with multiple-argument agreement vary in the degree of neutralization they exhibit. In the case just discussed, Western Warlpiri is not only subject to (13) but also to a further requirement that [dual] in one argument cannot co-exist with [–singular] in another:

- (13) *[[dual] [–singular]]

Constraints such as (12) and (13) present a puzzle for learnability theory. Since the child is presented only with positive evidence and has the morphological means to express non-neutralized forms, what is to prevent the child from acquiring an adult grammar with non-neutralized (i.e., overregularized) forms? In other words, how could such neutralizations be learned? One reasonable hypothesis is that a low complexity threshold for categories is the default state for the learner and that positive evidence must be provided that a neutralization *does not* occur.²⁰ In the absence of such evidence, neutralization is automatic; formally we can model this by having overly complex categories subject to Impoverishment rules which delete features. Preliminary investigations of Impoverishment suggest that the choice of which feature to delete when these thresholds are surpassed appears to obey a HIERARCHY OF FEATURES:²¹

- (14) Hierarchy of Features
 person > number > gender

When a category becomes too complex and surpasses a language-specific threshold, the lower features are deleted in preference to higher features. The result is that person and number are typically preserved at the expense of gender; while loss of number contrasts typically precedes loss of person contrasts. If these conjectures are correct, in Nunggubuyu a complexity threshold is surpassed when the object argument contains both [+aug]

²⁰ Noyer (1992, 1997) explores this hypothesis in detail with data from a variety of languages.

²¹ Hierarchies of features of this sort are, of course, not new to the present paper, but have figured in various proposals and in various ways in the analysis of morphosyntax, beginning at least with Silverstein (1976).

and specified gender. Impoverishment applies automatically to repair this offense, deleting gender rather than [+aug] (number).

While this approach to Impoverishment is attractive for learnability reasons, here, for the sake of explicitness, I will model Impoverishments as rules deleting specific features in specified contexts, rather than as automatic processes triggered by complexity thresholds having been surpassed. However, we will see in section 3.3 that the notion of automatic Impoverishment will play a crucial role in explaining a number of puzzling neutralizations discussed there.

2.2. Object Gender Impoverishment

As mentioned above, in objects with augmented number, gender contrasts are completely neutralized. For example, the sequence *na-N-uŋu* ‘1.AUG-N-A’ → [naŋgu] does triple duty for cases where a subject of [A gender] acts on any augmented 1st person exclusive argument:

- (15)a. nV N uŋu → [naŋgu]
 1 AUG N A ‘it [A gender] . . . us’
 Ambiguous as to object: exclusive masculine dual
 exclusive feminine dual
 exclusive plural

na ŋ gu =burdi-ŋ
1 AUG N A *push.ahead-PAST*
 It (rain) pushed us ahead (i.e., made us bend over). §163.23.5

Notice that in this case, no object gender clitic appears at all. Similar neutralizations of gender contrast occur in all augmented objects. As further illustration, observe that in the textual example (16), while the object is morphosyntactically and semantically feminine dual, the [f gender] object clitic *ŋu* does not appear:

- (16) nV N wan **wi** =ra-yi: → [nambambi-rayi:]
 2 AUG N B AUG *spear*
 They will spear you (two women). §17.12.3

No gender clitic appears at all in (16), and the form uttered in isolation conveys no information regarding the gender of the object argument.

A first approximation of these facts then is an Impoverishment rule deleting gender in [+aug] object categories:²²

- (17) Object Gender Impoverishment (OGI)
 $[\alpha \text{ gender}] \rightarrow \emptyset / [+aug \text{ ___ object}]$

As proposed by Bonet (1991, 1995), Noyer (1992, 1997), Harris (1994), and Halle and Marantz (1993, 1994), an Impoverishment rule such as (17) will delete a value for some morphosyntactic feature before the insertion (or, realization) of phonological form. The deletion of certain values bleeds the appearance of ‘expected’ morphemes, giving rise to across-the-board neutralizations. In the tables in Appendix I, boxes where Object Gender Impoverishment (OGI) occurs are annotated with ‘O’; these comprise 120 cells (48%) in both series.

Impoverishment has exactly the desired effect in this instance. Because OGI deletes any gender value, it predicts that object gender clitics will be systematically absent in these environments, since the insertion of these clitics will be bled across-the-board.

There is a set of exceptions to the generalization that no [+aug] object category ever exhibits a gender clitic. As discussed above in connection with clitic substitution, in certain circumstances, for example when the subject is of [p gender], a [p gender] object clitic *ra* appears irrespective of the actual gender of the object (for textual example, see (8) above):

- (18) $wV \text{ wa } \mathbf{ra} \rightarrow [wV\text{ara}] \rightarrow [wa:ra] \rightarrow [wara]$ ²³
AUG AUG p
 Ambiguous: ‘they (pl) ... them (pl)’ or ‘they (pl) ... them (masc dual)’

This lack of surface gender agreement, where a dual argument of [m gender] agrees as if of [p gender], can be explained by a redundancy rule which supplies [p gender] to any [+augmented] argument:

- (19) Default P
 $[+aug] \rightarrow [p \text{ gender}]$

²² A more general restriction bars the cooccurrence of [+neuter] genders with [+augmented], even in intransitive subjects, hence, there are no categories specifically denoting non-singular collections of specifically nonhuman entities. See also footnote 5.

²³ Note that independently established phonological rules delete the intervocalic /w/ in (18) as well as shorten the vowel before [p gender] *ra* (see Appendix III).

Assuming that default rules apply whenever possible, that is they are *persistent* in the sense of Myers (1991), OGI will feed Default P, since the deletion of [m gender] will trigger insertion of default [p gender]. The derivation in (20) illustrates how (18) comes about:

- (20) [subject p AUG [object m AUG]] ‘they (pl) ... them (masc dual)’
 [subject p AUG [object ∅ AUG]] OGI
 [subject p AUG [object p AUG]] Default P

I assume that syntactically (and semantically) the arguments are fully-specified as shown in the first line in (20). Since agreement operates in syntax (see (9)), or at least prior to Impoverishment, there is in fact complete agreement between the object argument (‘them (masc dual)’) and the features on the verbal clitics at the point in the derivation where agreement takes place. Impoverishment rules operating in Morphology, *after* agreement, alter the features which are spelled out as verbal clitics, giving the appearance of a lack of agreement. Specifically, in (20), OGI applies deleting [m gender] from the object argument’s feature matrix. Default P then automatically supplies [p gender] to this argument.²⁴

For independent reasons, subject [p gender] is also subsequently Impoverished (see section 2.3). Along with ordering restrictions to be discussed, the application of OGI and Default P yields the correct surface sequence:

- (21) wV wa ra → [wara]
 AUG AUG p ‘they (pl) ... they two (masc)’

Default P is independently needed in the grammar, since it expresses the generalization that the default gender for augmented arguments is [p gender]. As was discussed in section 1.2, [m gender] and [f gender] augmented arguments are special cases which induce dual or trial interpretations. Because [p gender] is the default gender for augmented arguments, an argument with [p gender] is interpreted as plural but not specifically

²⁴ Within a strict lexicalist approach, that is, one in which the clitic clusters are already formed in the Lexicon prior to syntactic insertion and prior to agreement, it is less clear how such an agreement pattern would be derived. Arrangements would have to be made so that there would be no agreement conflict between [p gender] and [m gender]. However, it is clear that [m gender] and [p gender] cannot typically co-occur, so such arrangements would require reference to much the same information as appears in the Impoverishment rules in the text.

dual or trial. In the tables in Appendix I, cells in which Default P operates are annotated ‘DP’; in the A series 22 cells are subject to Default P.²⁵

Default P seems to make incorrect predictions in the case of sequences like (22), however. If [p gender] is supplied by default for augmented objects, there is no explanation for why the [p gender] clitic does not always appear:

- (22)a. nV (*ra) N uꞤu → [na(*ra)Ꞥgu]
 I AUG (*p) NA ‘it (ANA) ... us (*pl)’
- b. wV wa (*ra) Ꞥi → [wa:(*ra)Ꞥi]
 AUG AUG (*p) f ‘they (f) ... them (*pl)’
wa a Ꞥi = Ꞥu-ni
 AUG AUG f ate
 They (two women) ate them (mud-whelk shells). §13.7.3

Examining the [3 AUG f, 3 AUG m, 3 AUG p] combined column (the rightmost one) in Table 2 or Table 5, observe that the [p gender] object clitic *ra* appears only if either (i) the subject is not augmented or (ii) the subject has [p gender]. Thus, independent reasons are required to prevent the default appearance of [p gender] in the remaining forms: such cases are annotated in Appendix I with ‘DP!’ (In general an exclamation point is used to denote the absence of an expected rule or clitic.) We return to these unexpected exceptions to Default P in detail in section 3.²⁶

²⁵ This number is increased to 36 if one counts cases of optional [p gender] deletion in 12 AUG objects of the A series (see Table 3, rightmost column); see section 3.4.1 for discussion. In the B series, Default P is normally blocked by a special rule (rule D of Appendix II) which deletes [p gender] in the context of the B clitic *wan*. Cases where Default P is blocked by rule D are notated (DP/D) in Appendix I. Hence the number of cells in the B series where Default P applies overtly is only 8.

²⁶ Additional phenomena which appear, at least initially, to be Object Impoverishments include first, cases in which the object argument is of the ANA_∅ subclass of [A gender], and second, cases in which both arguments are [+neuter].

As mentioned in section 2.2, when the object is of the ANA_∅ subclass it is not expressed by any verbal agreement clitic at all. Instead, the form that appears is identical to that of the corresponding *intransitive* prefix combination. In the majority of instances, the result is the same as if the spell-out of the object clitic were simply ∅, but when the subject is [p gender] the clitic sequence is *-wu-ru* – the intransitive subject prefix for 3 AUG p with the intransitive subject [p gender] allomorph *ru* – rather than expected *-wi-ri* with the

2.3. Subject Gender Impoverishment

In addition to the Impoverishment of gender in the object, gender is Impoverished in the subject in a variety of environments. A relatively unspectacular case is that gender distinctions are unavailable for nonaugmented 1st or 2nd person arguments (henceforth (specified) PERSON arguments).

- (23) Person-Gender Impoverishment (PGI)
 $[\alpha \text{ gender}] \rightarrow \emptyset / [\text{person}, -\text{aug} \text{ ___}]$

Without Person-Gender Impoverishment (PGI), there is no way to prevent the occurrence of such clitic sequences as:

- (24)a. ηa (*ni)
 1 m
 I (masculine speaker)
- b. nun (* $\eta j i$)
 2 *RST* f
 you (sg) (feminine addressee)

Because separate person and gender clitics provide in principle the means to express such forbidden categories, explanation must be given for why transitive subject $[p \text{ gender}]$ allomorph *ri*. (Compare the lefthand two columns of Table 1 in Appendix I in the $[p \text{ gender}]$ rows, and review Table 6 for the allomorphy of $[p \text{ gender}]$):

- (i) **wu ru** wangana ana-dha:mbulg
AUG p hold ANA \emptyset -feathered.stick
 They hold feathered stick(s). §9.8.4

The evidence from allomorphy, then, points toward a morphosyntactic process which ‘de-transitivizes’ a verb containing an ANA \emptyset object and not a (later) Impoverishment rule deleting feature values alone from the object. If verbs with ANA \emptyset gender objects simply never show object agreement to begin with, all spell-out rules, including crucially the allomorphy rules for $[p \text{ gender}]$, will behave as if the verb were intransitive, giving the desired pattern of distribution.

An important further complication to this pattern occurs in transitive clauses when both arguments are [+neuter]. In such cases, no agreement clitics appear at all (see the lower-right corner of Table 1 in Appendix I). Indeed, the absence of verbal agreement entirely is also an option whenever the subject and object are both [–human] (Heath 1984, pp. 356–357). For present purposes, I will assume that such cases of clitic absence also originate in the system of agreement (rather than via Impoverishment), and leave this matter open to further study.

such clitic sequences are not freely generable. By deleting gender values before Spell-Out, PGI renders such forms ungenerable. This neutralization is completely pervasive and affects not only the verbal agreement system but the pronominal categories as well. For this reason, in the paradigm tables in Appendix I there are no separate rows for 1 RST m vs. 1 RST f for example; both are combined into a single 1 RST row. The annotation ‘P’ is given along with the category label as a reminder that PGI has occurred.

A more complex set of subject gender Impoverishment cases includes those in which (non-neuter) object gender conditions the disappearance of subject gender. For example, where both subject and object have the same gender, subject gender is suppressed:

(25)a. (*ni) nu

(*m) m

he ... him

nu maraɪ = a-ɲ

m hand = give-PAST_I

He handed it to him. §4.6.3

b. wV wa (*ri) ra → [wa(*ri)ra]

AUG AUG (*p) p ‘they ... them (pl)’

w a ra Vba-Vba-V

AUG AUG p wrapped

They wrapped them. §50.5.2

c. (*ɲi) ɲu

(*f) f

she ... her

ɲu dan = bagiwa-ɲ

f guts = hit-PAST_I

She hit her in the guts. §6.3.1

One might try to explain cases such as (25a) and (25c) as resulting from haplology, since owing to vowel harmony if both clitics were generated the surface result would be [nunu] and [ɲuɲu] (for details of vowel harmony, see Appendix III). However, surface haplology is a poor explanation because there are cases of subject gender disappearance involving what

would be phonologically distinct clitics on the surface, as in (25b) or the following cases:

(26)a. (*ni) ηu → [(*nu)ηu]
 (*m) f ‘he ... her’ (cf. (6b))

b. wV (*ri) nu → [wu(*ru)nu]
 AUG (*p) m ‘they ... him’
wu nu =yura-ŋi
 AUG m *transported*
 They transported him. §50.2.1

In (26) an [f gender] object Impoverishes an [m gender] subject and an [m gender] object Impoverishes a [p gender] subject.

These facts are captured by a set of subject gender Impoverishments.

- (27) Subject Gender Impoverishment (SGI)
- (i) [α gender_{subject}] → ∅/[[object α gender – neuter]]
 - (ii) [m gender_{subject}] → ∅/[[object f gender]]
 - (iii) [p gender_{subject}] → ∅/[[object m gender]]
- SGI (i, ii) ≈ Heath’s Gender Marker Deletion (Heath 1984, p. 371)
 SGI (iii) ≈ Heath’s Pl-Deletion (b) (Heath 1984, p. 369)

The analogue to these rules in Heath’s analysis are a set of rules deleting phonologically instantiated clitics, while OGI and (the effects of) Default P are handled through rules which change one category to another prior to Spell-Out.²⁷

²⁷ A full comparison of the two treatments is not offered here for reasons of space. The differences between Heath (1984) and the present account can be summarized in general terms as follows. (Thanks to an anonymous reviewer for calling these to my attention.) First, as mentioned in the text, in place of featural deletions prior to Spell-Out such as SGI, Heath invokes rules deleting specific clitics. But in addition, Heath also makes use of operations which convert one category to another; for example, object ‘2 M Du’ and ‘2 F Du’ are converted to ‘2 Pl’, which is later realized as a sequence of morphemes (Heath 1984, p. 383). In the present analysis such category changes are accomplished by a two-step deletion and insertion routine via OGI and Default P, so that these operations are equivalent in their formal type to the Impoverishments which are needed for Heath’s clitic-deleting rules. (Further subtle differences in the way in which the neutralizations are parcelled out among the rules exists, but the reader must consult Heath (1984) to assess these.) Third,

SGI (i) accounts for the cases of apparent haplology; SGI (ii) and SGI (iii) handle sequences such as those in (26). In the tables in Appendix I, cells which undergo these rules are annotated ‘i’, ‘ii’, and ‘iii’, respectively. SGI (i) operates in 13 cells in each series; SGI (ii) in 5 cells in each series and SGI (iii) in 4 cells in each series.

The following section shows that SGI (27) interacts with OGI (17) and Default P (19) to produce the complex distribution of gender clitics.

2.4. *Impoverishment Rule Interaction*

OGI, SGI and Default P fall into feeding and bleeding relations of some general interest. As detailed below, OGI precedes all rules of SGI, as predicted by the STRICT CYCLE (Mascaró 1976): since OGI refers only to values on the inner (object) constituent, it must apply first, whereas SGI must apply later inasmuch as it refers to features of both the subject and the object constituents. Default P is fed by both OGI and SGI, confirming the conjecture made earlier that it is a PERSISTENT RULE in the sense of Myers (1991), applying both in the formation of morphosyntactic categories and during a derivation.

First, OGI bleeds SGI (ii): because [m gender] or [f gender] in a [+aug] object is deleted by OGI, then SGI (ii) and (iii) will not apply:²⁸

$$(28) \quad \begin{array}{l} nV \quad wa \quad N \quad ni \quad (*\eta u) \quad \rightarrow \quad [na:ni(*\eta u)] \\ I \quad AUG \quad \underline{AUG} \quad N \quad m \quad (*f) \quad \quad \quad \text{'we (excl, m) . . . them (fem)'} \end{array}$$

In (28) OGI deletes [f gender] from the object, so [f gender] cannot then condition the deletion of [m gender] from the subject. When the object is singular, as in (25a) above, OGI does not apply and SGI does apply. The result is a peculiar surface contrast: whereas [f gender] deletes when the object is augmented (29a), [m gender] deletes when the object is not augmented (29b):

Heath (1984) makes use of Affix Hopping transformations to situate clitics, but does not elaborate a theory of such transformations. The present account elaborates extensively on this point, showing how constraints on these transformations can explain a heterogeneous set of clitic deletions for which Heath (1984) requires specific rules.

²⁸ No textual example is available for this and certain other combinations; however, they are presumed to be accurate based on the following remark: “[t]he paradigms here have been put together primarily by direct elicitation and observation of (unrecorded) speech. The forms have in almost all cases been rechecked and confirmed many times” (Heath 1984, p. 349).

- (29)a. [1 AUG m_{subject}] [AUG f_{object}]
 [1 AUG m_{subject}] [AUG ∅_{object}]
 [1 AUG m_{subject}] [AUG ∅_{object}]
 na wa N ni
 I AUG AUG N m
 we (masc dual) ... them (fem dual)

- b. [m_{subject}] [f_{object}]
 n/a OGI
 [∅_{subject}] [f_{object}] SGI (ii)
 ŋu Phonology
 f
 he ... her

Similarly, OGI and Default P feed SGI (i). In Appendix I, table boxes in which this occurs are annotated ‘O, DP, i’ and occur in the rightmost column of boxes in Tables 2, 5, 8, and 10. When [m gender] or [f gender] is replaced by [p gender] by OGI and Default P, the resultant [p gender] object specification can condition the deletion of a [p gender] subject by SGI (i):

- (30) wV wa (*ri) ra → [wa(*ri)ra]
 AUG AUG (*p) p ‘they (pl) ... them (m, f dual)’
 w a ra = ra-ni
 AUG AUG p speared
 They (plural) speared them (two women). §17.13.2

In (31), a ‘non-agreeing’ [p gender], also exemplified above in (8), conditions the deletion of subject [p gender]:

- (31) [AUG p_{subject}] [AUG m/f_{object}]
 [AUG p_{subject}] [AUG ∅_{object}] OGI
 [AUG p_{subject}] [AUG p_{object}] Default P
 [AUG ∅_{subject}] [AUG p_{object}] SGI (i)
 wV-wa-ra → [wara] Phonology
 they (pl) ... they (masc/fem dual)

Evidence for the fact that the surviving [p gender] clitic *ra* in (30) is indeed the object clitic comes from its vocalism (see section 1.4). A [p gender] clitic in subject function would be *ri* and not *ra*.²⁹

The derivation in (31) is especially interesting since it shows that the value [p gender] supplied by Default P can trigger a later rule (SGI). One might imagine, alternatively, that the ‘p’ clitics are the default interpretation of gender, that is [\emptyset gender].³⁰ This cannot be correct, however, since (object) [p gender] must be on hand to trigger the deletion of subject [p gender] in (31).

Finally, SGI (i) and (ii) can feed Default P. These cases are shown in the leftmost (3 RST f object) column in Tables 2, 5, and 8, in cells annotated ‘i, DP’ or ‘ii, DP’. Where the object is [f gender], any subject gender in the augmented categories is replaced by [p gender], giving forms such as:

- (32) wV ri ŋa → [wiriŋa]
 AUG p f
 they (m dual, f dual, plural) ... her
- wi ri ŋa** = ya-ŋ
 AUG p f give-PAST_I
 They (plural) gave (him) to her. §5.17.5
- wi ri ŋa** = lhaŋarma-ŋ
 AUG p f reach-PAST_I
 They (masculine dual) reached her. §17.9.3

²⁹ An anonymous reviewer suggests that in certain argument combinations with [p gender] subjects and 3 AUG objects, such in (31), or as in *nV:-wa-ra* ‘1.AUG-AUG-p’ → [nara] (1 AUG p subject with 3 AUG p object), the clitic *ra* expresses the [p gender] property of the subject and not of the object, contra the analysis presented here and in Heath (1984). While potentially simplifying some aspects of the analysis of neutralization, this conjecture goes directly contrary to the system of correlations between vowel quality and allomorphy discussed in section 1.4. This would be the only instance in which a clitic with (underlying) vowel-quality alternation would have underlying or even surface [a] when referencing a subject argument; moreover, the same clitic *ra* occurs in sequences where the subject is unquestionably not [p gender], as in *ŋa-wa-ra* ‘1-AUG-p’ → [ŋara] (1 RST subject with 3 AUG p object).

³⁰ An analysis like this is presented for Romance spurious *se* in Harris (1994). On Harris’ analysis of Spanish, *se* is not intrinsically reflexive, but rather *s-* is the default realization for all arguments and *-e* the default nominal desinence. When Impoverishment deletes the value [dative] in the spurious *se* context, *se* remains the only possible clitic choice.

Here again an unexpected [p gender] is introduced: the clitic sequence above is used even when the subject has morphosyntactic [f gender] or [m gender]. The derivation below illustrates the sequence of events:

- (33) [m AUG_{subject}] [f object] output of syntactic agreement
 [∅ AUG_{subject}] [f object] SGI (ii)
 [p AUG_{subject}] [f object] Default P

The textual example in (34) shows first an intransitive verb with an explicitly [m gender] subject (a masculine subject argument), then a transitive verb with object [f gender] Impoverishing subject [m gender], leading to non-agreeing subject [p gender]:

- (34) **wi ni** yanga = ya-ŋgi:::, **wi ri ŋa** ya:rigi:-ni
 AUG m went AUG p f transported
 ↑ lack of agreement ↑

They (two men) went along, they took her... §14.10.1

2.5. Summary

In sum, a small set of language-specific rules for both Object and Subject Gender Impoverishment interact in complex fashion to give the system of clitic neutralization seen in Nunggubuyu. Of general importance is the fact that Impoverishment rules are crucially ordered, but only intrinsically so. OGI (Object Gender Impoverishment) must precede SGI (Subject Gender Impoverishment), but must do so assuming Impoverishments operate according to the Strict Cycle. Furthermore, I have argued that the replacement of [f gender] and [m gender] by [p gender] in the nonsingular is a by-product of a redundancy rule, Default P, which is fed by the prior Impoverishment of [m gender] and [p gender]. In this way, the current analysis avoids the use of feature-changing RULES OF REFERRAL (Zwicky 1985; Stump 1993) in favor of a two-step deletion-plus-insertion routine, where the insertion rule is independently needed to express the default value in a given context.³¹

³¹ For further arguments against feature-changing syncretism rules, see Lumsden (1992). Noyer (1998) provides further discussion on the role of markedness within Impoverishment with data from Nimboran.

3. FURTHER CASES OF CLITIC ABSENCE

The system of gender Impoverishments discussed in section 2 accounts for a complex surface distribution of clitics but leaves many cases of clitic absence unaccounted for; we turn now to these cases. In the tables in Appendix I, sectors of the tables relevant to this section are outlined in boldface (examples occur in Tables 2–5, 8, and 10–12). The annotations ‘f!, m!, p!, AUG!’ denote cases where the indicated clitic has ‘disappeared’: note that gender clitics of various types as well as number clitics are unexpectedly absent. Specifically, in each series, 12 argument combinations have a missing [f gender] clitic, 12 have a missing [m gender] clitic, 12 have a missing [p gender] clitic, and 21 have a missing AUG clitic. In addition, the annotation DP! indicates that Default P ought to have supplied a [p gender] feature in the relevant derivation, but the clitic corresponding to this feature is also absent. Default P fails to introduce a [p gender] clitic in 99 argument combinations in the A series and 48 argument combinations in the B series. On Heath’s account, a set of unrelated rules was required to delete these clitics, or the structural description of otherwise needed rules was complicated. This section, however, establishes that these apparently heterogeneous cases of clitic disappearance all arise naturally from a universal constraint on clitic movement in Morphology as proposed by Marantz (1988).

3.1. *Three Puzzles*

As mentioned in section 2, no rules given so far account for the failure of object [p gender] to appear in the presence of either neuter (35) or nonneuter (36) subject gender clitics. Specifically, we are concerned with the disappearance of the object *ra* [p gender] in forms such as:

(35) nV (*ra) N ũqu → [na(*ra)ŋgu]
 I AUG (*p) N A ‘it (ANA) ... us (*pl)’ (cf. (6))

(36) wa (*ra) N ŋji → [wa(*ra)ŋji]
 AUG (*p) N f ‘she (f) ... them (*pl)’

wa ŋji =lharga-ŋ

AUG f eat-PAST_I

She (mother python) ate them (boys). §1.2.6

Puzzle #1: Object [p gender] cannot co-occur with subject gender of any variety.

A second neutralization not captured by the rules in section 2 is that if the object is 1st or 2nd person, a subject has gender only if it is singular:³²

- (37)a. nV N wi (*ni) → [nambi(*ni)-]
 I AUG N AUG (*m) 'they (*masc) ... us (excl)'
na m bi Vga=r₁agu-ni
 I AUG N AUG looked.for.CONTINUOUS §166.6.3
 They (Indonesians from Macassar) (came) looking for us.

- b. nun N wi (*ra) → [nimbi(*ra)-]
 2 N AUG p 'they (*pl) ... you'
ni m bi magao-⟨V⟩
 2 N AUG told.CONTINUOUS
 They told you (lies). §69.16.4

Puzzle #2: If object not 3rd person, subject gender only in the singular.

Subject gender clitics are impossible in such circumstances. Finally, Heath (1984, p. 370) observes that the number clitic *wa* never appears with a 2nd person object ('NonSg Deletion'):³³

- (38) NonSg Deletion (Heath 1984, p. 370)
 Delete -NonSg- [i.e., *wa* – RN] as part of 2Pl object ... before Inverse morpheme.
- (39) na N wan (*wa) ni → [namba(*mba)ni]
 2 N B AUG m
 he ... you (nonsg) (B form)

Puzzle #3: *wa* [+aug] does not occur with 2nd person objects

One could attempt to capture these facts by appeal to specific rules of clitic deletion, as in Heath (1984). But despite the apparent arbitrariness

³² This generalization has an optional exception which is discussed in section 3.4.1.

³³ The omission of *wa* in this case does not lead to any ambiguity, however, since if the object were singular a special [–aug] 2nd person clitic would be used. But ambiguity avoidance is clearly inoperative elsewhere, so this cannot explain the absence of *wa* here. Rather, it is shown in section 3.3 that formal considerations underlie this phenomenon, although it is reasonable to suppose that functional considerations such as economy of expression may have potentiated the development of this formal system.

of these restrictions I now show that all three fall out simply, given certain restrictions on the manner in which clitic clusters are derived.

3.2. *Clitic Ordering*

I have so far remained silent on the issue of clitic order. It will turn out the rules for deriving clitic order provide explanation for the puzzling neutralizations just surveyed.

Basic constraints on clitic ordering can be inferred from the order clitics assume when there is only one argument (i.e., when the verb is intransitive). By examining the intransitive column in Table 1 in Appendix I, it is easily discerned that the intransitive clitic groups are aligned according to the following generalization (‘>>’ means ‘precedes’ in the string):

- (40) Alignment by Type
 Person >> Number >> Gender

When agreement is with two arguments rather than one (i.e., in transitive clauses), a further ordering generalization applies, namely that subject clitics precede object clitics:³⁴

- (41) Subject clitics precede object clitics
- a. $\eta j i \text{ nu} \rightarrow [\eta j u n u]$
f m
 she ... it (masc) = (cf. (7a))
- b. $nV \text{ wV } \eta j i \text{ nu} \rightarrow [n u : \eta j u n u]$
 2 *AUG f m* ‘you (nonsg, f) ... him (masc)’
nu u $\eta j u = \eta j i - V$
 2 *AUG m eat*
 (Don’t) you (two women) eat him! §17.9.6

³⁴ The assertion “subject clitics precede object clitics” is not meant to be a surface-true generalization in all instances, but rather a claim about a constraint operating during the derivation of clitic ordering. As shown in section 3.3 and following, by assuming an underlying order with subjects preceding objects, a number of cases of clitic disappearance result from locality restrictions on the re-ordering of clitics during Morphology.

- c. wV ŋi uqu → [wiŋiwu]
 AUG f A 'they (f) ... it (ANA)'
wi ŋi wu =na-ŋ
 AUG f A see-PAST₁
 They (two women) saw it (giant barracuda, ANA gender).
 §12.4.2

In a great many cases, most interesting to us here, the two constraints just mentioned are in conflict, and both cannot be satisfied simultaneously; on the surface, object clitics will precede subject clitics, contra (41). Such a situation will arise, for example, when a 3rd person subject argument, marked solely by a gender clitic, occurs with a 1st person object argument, marked by (minimally) a person clitic.

- (42) 'They ... me'
 a. *wV ... ŋa
 AUG I
 b. ŋa ... wi
 I AUG

"Subjects precede objects" dictates (42a), which in fact is not well-formed on the relevant interpretation. Instead, alignment by type (40) is more compelling, and (42b) is correct. Heath's summary is as follows:

(43) Main Ordering Rule

In a transitive combination involving PMs [pronominal markers – RN] of different hierarchical classes ... the high-ranking PM precedes the low-ranking PM. If the two PMs are in the same hierarchical class, if the result is not a portmanteau ... the subject PM precedes the object PM (Heath 1984, p. 367).

In addition, a special affix *N* (called 'Inverse' by Heath³⁵) appears whenever an object clitic precedes a subject clitic:

³⁵ The term INVERSE originates in earlier work on the morphosyntax of Algonquian languages (Bloomfield 1946) and was later extended to other contexts. Normally, an inverse construction contains a subject which is lower than the object on some fixed hierarchy defined by person or animacy properties, as will be the case where Nunggubuyu *N* is inserted.

- (44) $\eta a N wi \rightarrow [\etaambi-]$
I N AUG 'they ... me'
 $\eta a m bi$ -aG- ηu -juluba- η
I *N AUG BENEFACTIVE-hide.from-PAST*
 They hid (it) from me. §7.11.2

Finally, observe that when two gender clitics are present, alignment by type orders these strictly so that neuter clitics follow all others:

- (45) $ni N \eta u \rightarrow [ni\eta gu]$
m *N A* 'it (ANA) ... him'
 $ni \eta gu$ =buri- η
m *N A put-PAST_I* §43.7.4
 It (Stick Insect, a devil, ANA gender) put him (dog) (in a corner).

Adding to the ordering requirement shown in (45) the additional requirement that the B morpheme *wan* occurs to the right of a Person marker, if one is present, (40) can be revised to the following Inviolable Output Condition on Clitic Order (cf. Heath 1984, p. 366):

- (46) Inviolable Output Condition on Clitic Order
 Person \gg B \gg Number \gg Gender \gg Neuter

Without exception, all output clitic sequences conform to restriction (46). As a result, it may sometimes happen that clitics belonging to one argument will end up non-contiguous:

- (47) $nV: wan wV wa N ni \rightarrow [na:mbani]$
I.AUG B AUG AUG N m
 we (excl, nonsg, masc) ... them

Here the object number clitic *wa* is sandwiched between the person and gender clitics of the subject *nV*: and *ni*. Given such forms as (47) we must reject any analysis which tries to derive neutralizations from a requirement that all clitics belonging to a single argument be surface-contiguous, since this is not in fact true.

3.3. *Deriving clitic order*

Recall from (41) that one important generalization regarding clitic order is that subject clitics precede objects insofar as such order does not violate alignment by type (46). The positioning of clitics in the string in virtue of their syntactic function is plausibly a consequence of syntactic movement. Although details of Nunggubuyu morphosyntax are unclear, all that needs to be assumed in this connection is that syntax outputs the gross structure below:³⁶

(48) [subject clitic features [object clitic features ...

Within each constituent, the phonological realizations of the clitic features – the phonological clitics – are ordered initially according to type; in the case of intransitive subject clitic sequences no further remarks are necessary. Using [p, n, g, c] to denote person, number, non-neuter gender, and neuter gender ('class') respectively, the expected syntactic output for a transitive verb is (^ denotes linearized adjacency):

(49) [p ^ n ^ g ^ c ^ [p ^ n ^ g ^ c]]

We have seen however that alignment by type (46) is the more urgent requirement. This surface order requirement then necessitates a shuffling of the clitics as arrayed in (49) in such a manner as to permit conformity with type alignment. Specifically, certain clitics must move to a new string position to achieve a well-formed output. We may construe this broadly as a kind of REPAIR. To derive these effects, Heath (1984) postulated a number of Affix Hopping transformations.

The issue of whether such Affix Hopping rules were constrained in any way did not arise in the context of Heath's original account. It turns out however that there is an important restriction of locality for clitic movement. To account for this, I adopt here the theory of Morphological Merger (Marantz 1988). The restrictions adduced by Marantz are precisely those needed, allowing a straightforward explanation of the clitic disappearance puzzles discussed in section 3.1.

³⁶ I assume that the positioning of object agreement closer to the verbal root than subject agreement is a default property of UG; should this assumption prove false the ordering must be stipulated.

According to the theory of Merger, a constituent [x] may trade its relationship of adjacency with a constituent [y] for the relationship of adjunction to the head of [y].³⁷

$$(50)a. \quad [x \wedge [y \wedge w]] \rightarrow [t_i \wedge [[y \wedge x_i] \wedge w]]$$

$$b. \quad x \wedge y \wedge w \quad \rightarrow \quad \begin{array}{c} y \wedge w \\ \diagdown \quad \diagup \\ y \quad x \end{array}$$

$$c. \quad x \wedge y \wedge w \quad \rightarrow \quad \begin{array}{c} y \wedge w \\ \diagdown \quad \diagup \\ x \quad y \end{array}$$

In the input in (50a), [x] is left-adjacent to the constituent [y w], and in addition, [y] is left-adjacent to [w]. The operation of Merger allows [x] to ‘cash in’ its relationship of adjacency to [y w] for a relation of adjunction to the head of [y w], and (50b) shows the result of this exchange of relations. (50b) also shows that [y]’s requirement of being left-adjacent to [w] is still maintained in the output (after Merger), because [y] has become internally complex. The dominating instance of [y] is still left-adjacent to [w], so there has been no change in this adjacency relation. However, the Merger in (50b) has also *added* an additional adjacency relation, that between [x] and [w].

It should also be noted that [x] need not right-adjoin to [y] in (50); a string-vacuous Merger is also formally possible, as shown in (50c), and in such a case, no new adjacency relation is added to the structure. The effects of such a Merger, however, would be more covert (manifesting themselves, perhaps, in a change in phonological domainhood making [x] ‘closer’ phonologically to [y] than it might otherwise be).

Another crucial aspect of Marantz’s proposal concerns what counts as the ‘head’ of a constituent. During syntax the head of a constituent is the structural head as commonly understood from X-bar theory, but during Morphology the head is simply the *peripheral element* within a constituent (see Marantz (1988) for details). On this definition, [y] will count as the structural head for the constituent [y z] with respect to any Merger operation at the left-periphery of [y z], while [z] will count as the head for any Merger at the right-periphery of [y z].

³⁷ It is not customary to mark the site vacated by a merged constituent with a trace. This notation is used here merely for illustration: an element moved in the mapping to PF does not form a chain in the standard technical sense of the term.

It is clear that this operation bears an important resemblance to Head Movement in syntax (Travis 1984; Baker 1988), but Merger differs from Head Movement in that [x] is permitted to move only if it has no other commitments of adjacency to maintain. Hence [x] may move to the right side of [y] in (50a), since its only commitment of adjacency is to its right (to [y]). On the other hand, [x] is locked into position in (51) since movement to the right side of [y] will destroy [x]'s commitment of right-adjacency to [z]:

$$(51) \quad [z \wedge x \wedge [y \ y]] \rightarrow *[z \wedge t_i \wedge [y \ y + x]]$$

These formal restrictions ensure that in the typical case, only a peripheral entity in a domain may move at this level.

A simple example of the Merger operation can be seen in the placement of the B-series clitic *wan* 'B', which is situated to the immediate right of a person clitic, if any, otherwise, initially in the clitic string (see Tables 7–12 in Appendix I). As a preliminary conjecture subject to further study, I will proceed here assuming that the B clitic actually instantiates a syntactic complementizer. As Heath (1986) notes, Nunggubuyu lacks independent complementizers in syntax. However, the clitic-cluster-internal B shows an agreement relation with tense and negation which is reminiscent of complementizer agreement in other languages such as Modern Irish (McCloskey and Hale 1984, p. 496 ff.) and Dutch (Zwart 1993). If B is a complementizer, its peninitial (i.e., second from the left edge) position results straightforwardly from Morphological Merger. If a complementizer exists syntactically within Nunggubuyu, a plausible location for it in the string would be to the left of the inflected verb, as shown in (52a). (52b) shows how the B clitic, located in the complementizer position, moves to second position in the clitic sequence by Morphological Merger:

$$(52)a. \quad [C \ [[clitic \ sequence][verb \ \dots]]]$$

$$b. \quad [B \wedge [person \wedge number \ \dots] \rightarrow [t_i \wedge person + B_i \wedge number \ \dots]]$$

In this way, the positioning of the B clitic resembles second-position clitic phenomena such as Wackernagel's Law (Klavans 1985), which have also been analyzed as involving Morphological Merger (Marantz 1988). However, unlike typical second-position clitics, the B clitic does not always move, since it stays *in situ* if the following clitic does not mark person (see all the forms in Tables 8 and 9). Its motivation for movement, when it does move, is to achieve conformity with the ordering restriction (46).

3.4. *Neutralization as a Last Resort*

Aside from Merger positioning the B clitic peninitially at the left-periphery of the clitic sequence, Merger also can move object clitics leftward from the right-periphery of the clitic sequence, where syntax initially positions them. This section shows how this hypothesis provides a principled explanation for the three puzzles of clitic disappearance discussed earlier. In all such cases, an offending clitic group can be derived only by movement which violates the strictures imposed on Merger. Clitic deletion is invoked as a last resort to permit a derivation to converge at a well-formed output.

First, consider some well-formed cases.

(53)a. [[niN_i + ɯɸu] t_i ... [niŋgu]
 m A
 it (ANA) ... him (cf. (45))

b. [[ɲaN_i + wi] t_i ... [ɲambi]
 ɲ AUG
 they ... me (cf. (44))

c. [[waN_i + ɯɸu] t_i ... [waŋgu]
 AUG A
 it (ANA) ... them

wa ŋ gu =na-ɲa:-V

AUG NA *burned*

It (fire) burned them. §16.22.2

A significant generalization emerges from these examples: they are all created (by hypothesis) through movement of a right-peripheral clitic to left-adjoin to the head of the constituent to its immediate left. All resemble (in mirror image) the schema in (50). Evidently, a clitic which undergoes Merger is suffixed by *N*, which is glossed here as Inverse.³⁸ In each such (well-formed) case, only a *single object clitic* has moved, and so only a single object clitic precedes a subject clitic.

To verify this, consider first the distribution of object vs. subject clitics in the tables in Appendix I. Recall that the object clitics are underlined

³⁸ Undoubtedly, this *N* derives historically from the accusative case suffix *-n reconstructed for (or present in) many Australian languages; its function in Nunggubuyu is to signalize that the preceding clitic is in object function despite being ordered before a clitic in subject function.

in underlying forms. With the exception of the 12 AUG object column in Table 3 (which we return to in section 3.4.1), note that in underlying forms there are no cases where two (underlined) object clitics appear in non-final position; rather the forms containing Inverse *N* have at most one object clitic.

Now consider what sequences of clitics would be ‘unrepairable’ by Merger. Such cases will involve a non-peripheral clitic which, to achieve the correct surface order, must move leftward in the string but is unable to do so. This situation will hold if, for example, object person must move to the left of subject gender, but the object has gender as well:

$$(54) \quad [_{\text{subj}} \dots g [_{\text{obj}} \wedge p \wedge g \dots \rightarrow * [p_i + g [\wedge t_i \wedge g \dots$$

In (54) p(erson) is locked into place owing to its two-sided adjacency commitments. Hence (54) cannot be repaired to conform to alignment by type (46); the expected clitic sequence is consequently ungenerable by the grammar.

This provides an explanation for the first puzzle: “Object [p gender] cannot co-occur with subject gender”. For example, the object [p gender] clitic *ra* does not appear in (55):

$$(55) \quad \text{wa } (*ra) \text{ N } \eta\text{ji} \rightarrow [\text{wa}(*ra)\eta\text{ji-}]$$

$\underline{\text{AUG}} \ (\underline{*p}) \ Nf$
 she ... them (*pl)

The reasoning is as follows. If the object is [p gender] it will necessarily also have a [+aug] number clitic; this clitic will have to move to the left of subject gender by type alignment (46), but it will be unable to, because it is locked into place:

$$(56) \quad [[\text{AUG}_i + f] \quad [[t_i] \text{ p}] \dots$$

$\uparrow \quad \quad \quad * \quad \quad \quad \downarrow$
 she ... them (*pl)

The number clitic ‘AUG’ cannot move, owing to its right-adjacency commitment to the object gender clitic ‘p’. Only by omitting [p gender] can object number escape to the left of subject gender. Unless [p gender] is deleted, the derivation will not converge at PF.

One may ask why [p gender] is deleted rather than [+aug] number. Note that deletion of number (AUG) would also permit the derivation in (56) to converge: [p gender] would be able to escape to the right of

[f gender] and AUG would not need to move because it would not be present in the first place. The fact that [p gender] deletes rather than [+aug] shows that LAST RESORT DELETION, like other Impoverishments, obeys a hierarchy of features, as discussed in section 2.1. This hierarchy demands that gender be deleted in preference to number, and number in preference to person. To verify that this generalization actually holds, consider for example the rightmost columns of boxes in Table 4 vs. Table 5 in Appendix I (relevant table sectors enclosed in boldface). In Table 4, wherever AUG! appears, showing that the object's AUG number clitic has deleted owing to Last Resort Deletion, then at the same time the object's gender clitic is absent as well. For example, in 3 RST f subject with 2 AUG object *nV-N-ŋi* '2-N-f', the only clitic of the object to surface is the person clitic. Both AUG number (*wa*) and any gender specification of the object (presumably *ra* for [p gender]) are absent. In Table 5, however, the AUG number (*wa*) of the object is preserved, but gender of the object is absent, as in 3 RST f subject with 3 AUG object *wa-N-ŋi* 'AUG-N-f'. In no cases do we find gender of the object preserved while number of the object is absent; by the same token, expression of person of the object (where otherwise possible) is never sacrificed.

The Impoverishment rules of section 2 interact with Last Resort Deletion in an intricate fashion. Compare the derivation of 'they (pl) ... they (masc dual)' versus 'they (masc dual) ... they (masc dual)':

| | | |
|-------------------------|---|---|
| (57) | [_{subj} p AUG [<u>m</u> AUG obj]] | [_{subj} m AUG [<u>m</u> AUG obj]] |
| OGI | [_{subj} p AUG [∅ AUG obj]] | [_{subj} m AUG [∅ AUG obj]] |
| Default P | [_{subj} p AUG [<u>p</u> AUG obj]] | [_{subj} m AUG [<u>p</u> AUG obj]] |
| SGI (i) | [_{subj} ∅ AUG [<u>p</u> AUG obj]] | inapplicable |
| Spell-Out | [wV _{AUG} ^ [<u>wa</u> _{AUG} ^ <u>ra</u> _p]] | [wV _{AUG} ^ ni _m ^ [<u>wa</u> _{AUG} ^ <u>ra</u> _p]] |
| Last Resort Deletion | inapplicable | [wV _{AUG} ^ ni _m ^ [<u>wa</u> _{AUG}]] |
| Merger | inapplicable | [wV _{AUG} ^ <u>wa</u> _{AUG} + N + ni _m]] |
| Phonology | wV-wa-ra ³⁹ | wV-wa-N-ni |
| | [wara] | [waani] |
| | they (pl) ... | they (masc dual) ... |
| | they (masc dual) | they (masc dual) |

³⁹ As explained in Appendix III, a general morphophonological rule not particular to this sequence shortens all vowels before *rV* [p gender] (Heath 1984, p. 87). Hence underlying *wVwara* surfaces as [wara] here, but underlying *wVwaNni* surfaces as [waani].

In the form on the left above, SGI (i) applies, deleting the value [p gender] of the subject in the environment of [p gender] of the object. However, SGI (i) does not apply to the form on the right and the [p gender] value of the object is realized as the clitic *ra* at Spell-Out. In the resulting sequence, the number clitic *wa* [AUG] to the left of *ra* is not correctly ordered, since it follows the gender clitic *ni* ‘m’, so *wa* must move leftward. But *wa* cannot move since it is not peripheral in the string (owing to the presence of *ra*). Consequently, Last Resort Deletion applies to *ra* [p gender], allowing *wa* [AUG] to escape leftward to its proper surface position.

The co-occurrence restriction on second person objects with number clitic *wa* now also falls out directly (puzzle #3). Formally, this case is similar to that of (54) except that here a person clitic ‘2’ is locked into place by a following augmented number clitic (*wa*):

- (57) $[[2_i + f] \quad [[t_i] \text{ AUG}] \dots]$
 $\quad \quad \quad \uparrow \quad \quad \quad * \quad \quad \quad \downarrow$
 $\quad \quad \quad \text{she} \dots \text{you} (*\text{nonsg})$

The mention of 2nd person in the generalization makes the generalization seem more arbitrary than in fact it is: precisely the same situation would arise in the 1st person as well, were it not for the fact that 1st person arguments have a portmanteau realization with [+aug] (either ηV : ‘12 AUG’ or nV ‘1 AUG’) so they never occur with separate *wa* [AUG]. Compare the following derivations:

| | | |
|---------------|--|--|
| (59) | $[\text{subj } f \text{ [obj } \underline{2} \text{ AUG } \underline{m}]]$ | $[\text{subj } f \text{ [12 AUG } \underline{m}]]$ |
| OGI | $[\text{subj } f \text{ [obj } \underline{2} \text{ AUG } \emptyset]]$ | $[\text{subj } f \text{ [12 AUG } \emptyset]]$ |
| Default P | $[\text{subj } f \text{ [obj } \underline{2} \text{ AUG } \underline{p}]]$ | $[\text{subj } f \text{ [12 AUG } \underline{p}]]$ |
| SGI | inapplicable | inapplicable |
| Spell-Out | $[\eta i_f \text{ [na}_2 \text{ wa}_{\text{AUG}} \text{ ra}_p]]$ | $[\eta i_f \text{ [\eta V:}_{12\text{AUG}} \text{ ra}_p]]$ |
| Last Resort | $[\eta i_f \text{ [na}_2]]$ | $[\eta i_f \text{ [\eta V:}_{12\text{AUG}}]]^{40}$ |
| Deletion | | |
| Morphological | $[\underline{\text{na}}_2 + \text{N} + \eta i_f]$ | $[\eta V:_{12\text{AUG}} + \text{N} + \eta i_f]$ |
| Merger | | |
| Phonology | na-N- ηi | ηV :-N- ηi |
| | [na ηi] | [η aa ηi] |
| | she ... | she ... |
| | you (masc dual) ⁴¹ | we (inclusive masc trial) |

In both cases the [m gender] of the object is replaced by [p gender] by the combined action of OGI and Default P. At Spell-Out both sequences require reordering, and Last Resort Deletion deletes the [p gender] object clitic *ra* in both cases. But because [AUG] and [12] are realized together as a portmanteau form ηV : in the form at right, there is no separate [AUG] *wa* clitic needing to be deleted. In the form at left however, *wa* must also be deleted so that *na* [2] can escape to the left of ηi [f gender].

The explanation of puzzle #2 is the most intricate but does not require any further assumptions. If the object is 1st or 2nd person, the subject has gender only if singular. The violating case is exemplified in (60):

- (60) $[[[12_i + \text{AUG}] t_i] + \text{m}] t_i \dots$
 $\uparrow \quad * \quad \text{---} \parallel \text{---} \downarrow$
 they (*masc) ... us (incl dual)

Here the problem is that the object person clitic (here [12]) must move to the left of the subject number clitic (here [AUG]). Difficulty arises whenever the subject has gender, since to achieve its desired leftmost string position, the object person clitic must skip over both the number and gender clitics of the subject. A one-step move of 12 all the way to the left of AUG is impossible, since such a move would be non-local: [m] is the right-peripheral clitic in the constituent to the left of [12], so [12] can adjoin only to [m]. As shown in (60), the first jump of a two-step move is possible, but the second movement is impossible, because the object clitic is no longer peripheral after the first move and thus has a right-adjacency commitment to [m] to maintain. Deletion of the subject's gender feature allows [12] to achieve its needed surface position with only one move, permitting convergence.

⁴⁰ Deletion of *ra* in this form is optional. See section 3.4.1 for details.

⁴¹ An anonymous reviewer objects that the left-hand gloss in (57) is misleading since the surface form [naʒi] is ambiguous between 'she ... you (masc dual)', 'she ... you (fem dual)' and 'she ... you (plural)'. While [naʒi] is indeed ambiguous its ambiguity originates from the fact that (at least) three distinct derivations can produce this same surface form. The gloss in (57) is for the form as the output of the derivation shown, and not for any other; therefore the gloss is correct for that derivation. In other words, syntax generates a complex category [_{subj} f [_{obj} $\underline{2}$ AUG m]] from which the meaning 'she ... you (masc dual)' is interpreted by semantics: semantics is not interpreted from phonological forms; Morphology performs certain computations on this complex category resulting in the spell-out [naʒi].

3.5. *Merger Interactions*

The following two sections discuss cases in which Merger applies more than once in a given derivation, showing how the operations detailed in the previous section explain certain additional ordering phenomena. Section 3.4.1 considers whether Merger occurs only if its immediate effect is to ‘improve’ the structure by resolving a violation of the output conditions on ordering (46). It is shown that in at least one instance, Merger can apply string-vacuously without a locally optimizing effect, but such derivations appear to be optional. Section 3.4.2 considers the interaction of Mergers both at the right-periphery (moving object clitics) and at the left-periphery (moving the complementizer B clitic). These are shown to operate cyclically, with the desired surface results.

3.5.1. *Optional Local Optimization*

In a structure of the following form,

$$(61) \quad [_{\text{subj}} \text{g} \wedge [_{\text{obj}} \text{p} \wedge \text{g} \dots$$

a question arises why the (right-hand) object gender cannot first merge with p(erson), creating a fused peripheral constituent [p + g] which would then be able to escape inward to the left of (subject) gender. The following derivation illustrates this possibility:

$$(62) \quad [g \wedge [\underline{p} \wedge \underline{g}]] \rightarrow [g \wedge [\underline{p+g_i} \wedge t_i]] \rightarrow [[\underline{p+g_i}]_j + g] \wedge t_j \wedge t_i.$$

The first step in (62), creating the complex constituent [p + g], is a string-vacuous Merger, a logical possibility discussed above, and produces a sequence no less in violation of the output ordering constraint (46) than is the input. (Clearly if the Merger were metathetic, creating [g + p], it would immediately create a new violation of (46), so I assume that this is completely impossible). The output of the second step is completely well-formed according to (46). Merger permits both steps, assuming that [p+g] does not bear an adjacency commitment to t_i , given that the trace plays no role at this level.

Surprisingly, such derivations appear to be marginally well-formed for certain clitic clusters, namely those containing [12 AUG p] object:

(63)a. ηV (ra) N ηi → [$\eta ra\eta i-$ ~ $\eta aa\eta i-$]

12 AUG (p) N f
she ... us (incl pl)

yagi **ηa** **ra** **ηi** =ni- \emptyset

not 12+ p f see

She (dugong) cannot see us [lit. will not see us]. §42.6.4

b. ηV : (ra) ni → [$\eta ra\eta i-$ ~ $\eta aa\eta i-$]

12 AUG (p) m
he ... us (incl pl)

ηa : **ni** =Vgajij=gala:di-wan- η

12 AUG m ruined

He ruined us (incl pl). §34.8.2

Observe that in (63) the [p gender] clitic *ra* is optional in sequences where the object is 1st inclusive. However, this is the only case where two object clitics are permitted to move to the left of a subject clitic.⁴²

From a formal point of view, the putative derivation in (62) differs from the other cases of Merger we have seen in that the first Merger is not locally motivated. The object gender clitic's Merger with person does not produce a string any more in conformity with type alignment (46) than does the input, since the first Merger is string-vacuous. A local optimization strategy for producing well-formed outputs would not be able to see ahead to the outcome of this first, locally unmotivated movement. Put differently, the gender clitic has no immediate motivation to merge with the person clitic: movement by the gender clitic is strictly altruistic in the sense that it prepares the way for the person clitic's escape to the left. Assuming that morphological Merger is (optionally) subject to the principle of GREED (Chomsky 1993), it follows that the first step in (62) is not possible.

⁴² Other person object gender clitics are not also optionally available here, e.g.:

- (i) ηa : (*nV) N ηi
12 AUG (*f) N m

owing to Person-Gender Impoverishment (section 2.2), which applies both to subject and object arguments.

3.5.2. *Cyclic Merger*

As discussed above, Merger can occur both at the left-periphery, inverting the B (complementizer) clitic with a following p(erson) clitic, and at the right-periphery, moving a single object clitic to the left of a subject clitic which it must precede according to the output conditions on clitic order (46). In some cases, these two Mergers will not interact, as in (47), repeated below as (64a):

- (64)a. $nV: \text{ wan wV wa N ni} \rightarrow [\text{na:mbani}]$
 $1.AUG \ B \ \underline{AUG} \ AUG \ N \ m$
 we (3excl, nonsg, masc) ... them
- b. $[\text{wan} \wedge [\text{nV:} \wedge \text{wV} \wedge \text{ni} \wedge \underline{\text{wa}}]]$
 $[\text{wan} \wedge [\text{nV:} \wedge \text{wV} \wedge \underline{\text{waN}}_i + \text{ni} [t_i]]]$ Merger at right-periphery
 $[t_j [\text{nV:} + \text{wan}_j \wedge \text{wV} \wedge \underline{\text{waN}}_i + \text{ni} [t_i]]]$ Merger at left-periphery
 $[\text{na:mbani}]$ Phonology

(64b) shows the derivation of (64a) via two Merger operations. The first moves *wa* ‘AUG’ to the left of *ni* ‘m’, and the second moves *wan* ‘B’ to the right of *nV*: ‘1.AUG’. Note that the Inverse marker *N* is shown as attached to the inverted clitic *wa* ‘AUG’ after Merger. I will assume that the segment /n/ is inserted by a readjustment rule concomitant with Merger. (Alternatively, a series of allomorphs ending in /n/ could be postulated as underlying forms with the proviso that only such allomorphs are capable of undergoing Merger.)

In other cases, the two Mergers do interact. This occurs when a person-marking object clitic is moved to the left of a subject clitic, and the B clitic then inverts with the object person clitic, as shown in all the examples in Tables 11 and 12. Example (16), repeated below, is such a case:

- (65)a. $nV \ N \ \text{wan wi} = \underline{\text{ra-yi}} \rightarrow [\text{nambambi-}\underline{\text{rayi}}:]$
 $2 \underline{AUG} \ N \ B \ \underline{AUG} \ \text{spear}$
 They will spear you (two women). §17.12.3
- b. i. $[\text{wan} \wedge [\text{wi} \wedge \underline{\text{nV}}]]]$
 ii. $[\text{wan} \wedge [\underline{\text{nVN}}_i + \text{wi} [t_i]]]$ Merger at right-periphery
 iii. $[t_j [\underline{\text{nVN}}_i + \text{wan}_j] + \text{wi} [t_i]]]$ Merger at left-periphery
 $[\text{nambambi}]$ Phonology

The derivation of (65a) given in (65b) shows that Merger at the right-periphery feeds Merger at the left-periphery: it is only after the first

Merger (65bii) that the B clitic *wan* is adjacent to, and hence capable of inverting with, the person clitic *nVN* ‘2’. This ordering is expected if Mergers operate cyclically, since the Merger at the right-periphery involves more embedded constituents. On cyclic application, the Merger at the left-periphery could not apply until after the Merger at the right periphery had.

This derivation also illustrates some further complexities. First, the fact that in (65biii) B inverts with *nVN*, that is, with the person clitic *nV* suffixed by inverse N, shows that the insertion of *N* does not create a complex constituent which Merger can interpolate an element into. This conforms with the assumption that *N* ‘inverse’ is supplied by a morphophonological readjustment rule, rather than functioning as a distinct morpheme (structural terminal element). Second, notice that B inverts with *just nVN*, and not with the complex constituent *nVN + wi*, as in the incorrect derivation below:

- (66) i. [*wan* ^ [*wi* ^ [*nV*]]]
 ii. [*wan* ^ [*nVN*_{*i*}+*wi* [*t_i*]] Merger at right-periphery
 iii. *[*t_j* [[*nVN*_{*i*}+*wi*]+*wan*_{*j*} [*t_i*]] Merger at left-periphery

After (65bii) (= (66ii)), *wan* has a left- adjacency relation both to the complex constituent *nVN + wi* and to the constituent consisting of *nVN* alone. But regardless of which of these adjacency relations is ‘cached in’ by Merger, *nVN* is the head (left-peripheral) terminal of either constituent. The result is that *wan* can invert only with *nVN* and not with *nVN + wi*, making (66iii) impossible.

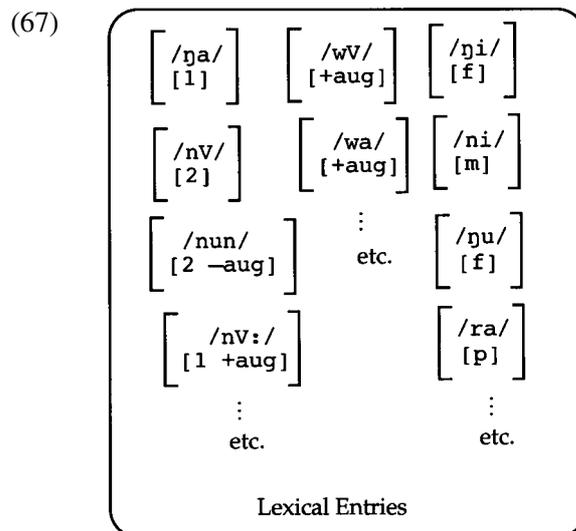
3.5.3. Summary

To summarize, the restriction that only peripheral clitics invert with their neighbor in the string by Morphological Merger explains directly a battery of seemingly arbitrary clitic co-occurrence restrictions and provides a mechanism for generating the surface order of clitics from a plausible underlying order constructed by syntax. Moreover, Merger appears to operate cyclically, as expected. Constraints on Merger are presumably part of Universal Grammar, and the ordering in (48) – with subjects preceding objects – is provided by principles of syntax. The arbitrariness of the system is thus reduced to the output ordering condition (46), which can be inferred by the learner directly from the surface forms.

4. LEXICALIST OR BASE-GENERATION TREATMENT

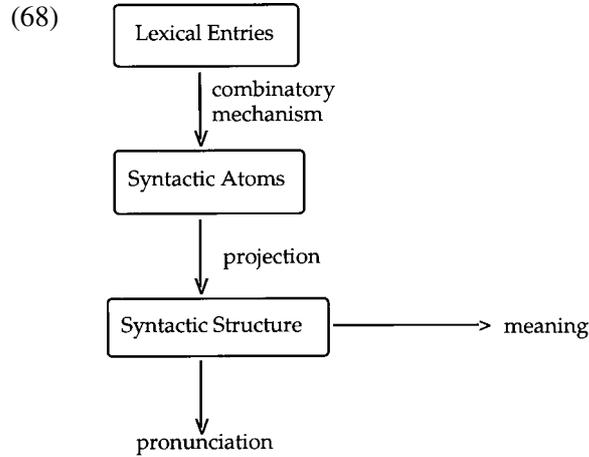
This final section considers some problems which the grammar of Nung-gubuyu clitics poses for Lexicalist morphology. By 'lexicalist' I mean any theory in which word formation occurs in the Lexicon as a consequence of the free combination of morphemes subject to restrictions imposed by selection, subcategorization, or, in some instances, global templates on morpheme order. This is essentially the model outlined by Lieber (1980) and its descendants (Williams 1981; Selkirk 1982; Di Sciullo and Williams 1987), assumed and elaborated by morphologists working within the framework of Lexical Phonology and Morphology such as Kiparsky (1982) and Inkelas (1993).

Within such an approach, the Lexicon of Nunggubuyu will contain a set of entries such as shown below, where each entry consists of a phonological form plus a set of morphosyntactic features which that form can provide to a complex form containing it via Percolation.



In addition, each such entry may contain selectional restrictions stating the other entries it may combine with. Binary-branching structures are freely generated containing these entries; each such complex structure has as its topmost node a complex symbol containing information provided by the daughter nodes. These complex structures then become the atomic units of syntax and only the information contained in the dominating complex

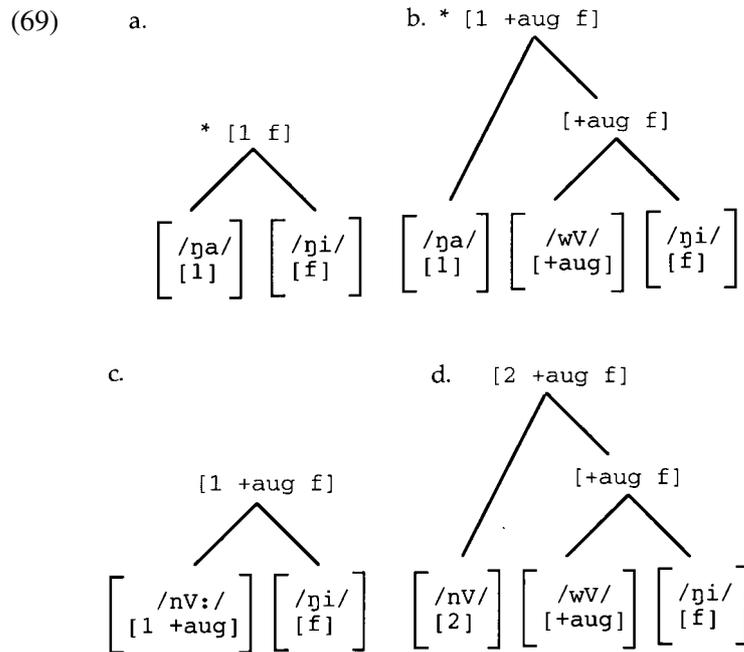
symbol is accessible to syntactic operations or to semantic interpretation (Lexical Integrity).



The inadequacies of such a model for clitic cluster phenomena have not gone unnoticed, even among those sympathetic to the Lexicalist view. Simpson and Withgott (1986), for example, suggest that clitic clusters are subject to special considerations (templatic ordering, the possibility of metathesis) and differ fundamentally from normal morphology in the Lexicon. The general difficulties faced by such a model of Morphology have also been reviewed elsewhere (Noyer 1992, 1997; Halle and Marantz 1994; Marantz 1997; Embick 1997). Thus, I will concentrate here on two issues which can be especially well-illustrated by the data from Nunggubuyu: OVERGENERATION and what I will for convenience call the MAPPING PROBLEM.

4.1. *Overgeneration*

Not all combinations of lexical entries yield acceptable outputs. Consider the intransitive prefix forms in (69):



While (69c) and (69d) are acceptable outputs, (69a) and (69b) are not. Two devices are available to prevent such ill-formed structures.

First, the lexical entries themselves may be elaborated in such a way as to prevent the combinatory mechanism from producing (69a, 69b) in the first place. Consider (69b). Clearly there is nothing wrong with the complex symbol $[1 \text{ +aug f}]$, since the same combination of features appears in well-formed (69c). Instead, the entry for ηa needs to be specified $[-\text{aug}]$, so that combination of ηa with $[+\text{aug}] wa$ can be banned by a restriction against the combination of previously specified feature values (Lieber 1989).

Second, the Lexicon may be subject to language-specific output filters which prevent certain combinations of features in the dominating complex symbol of a syntactic atom. In this regard, consider (69a). There is nothing in principle wrong with the combination of $[1]$ and $[f]$, as (69c) shows. Rather, the problem with (69a) is that gender cannot be specified for 1st or 2nd person arguments unless they are $[+\text{aug}]$. That is, Nunggubuyu does not allow a singular speaker or singular addressee to be specified for gender. This restriction was imposed by Person Gender Impoverishment in section 2.3. A theory without Impoverishment must capture the same facts some other way.

To encode the pervasive fact that gender cannot co-occur with 1st or 2nd person singular arguments through elaboration of the lexical entries

involved would fail to capture this generalization directly and render it an epiphenomenon. Instead, a more reasonable hypothesis is that the output of the Lexicon is subject to a set of filters which exclude certain potential feature combinations. For this case specifically, a filter of the following sort is active:

(70) *[person –aug α gender]

Structure (69a) – assuming that the entry *ŋa* has the features [1 –aug] – has the features [1 –aug f] and consequently violates the constraint in (70). The Lexicon cannot therefore produce (69a) and no well-formed syntactic structure could contain (69a).

The filter in (70) bears a striking resemblance to the complexity thresholds introduced in section 2.1. While they are identical in their formal statement (as a feature co-occurrence restriction), they play distinct roles in the two theories. Within Impoverishment theory, a filter such as (70) corresponds to an Impoverishment rule which deletes a feature value from the offending feature combination prior to that combination being spelled out as phonological material. The feature which is deleted is by hypothesis the lowest on a specified hierarchy of features. For example, if the features [1 –aug f] combine in syntax, as they are free to do, then the feature [f] is deleted before Spell-Out, rendering ill-formed *ŋa-ŋi* ‘1-f’ ungenerable. On the lexicalist approach as sketched here, on the other hand, the filter (70) has the function of excluding a potential output of the Lexicon from entering syntax.

While both approaches may appear to be covering the same ground in what seem to be very similar ways, important differences emerge between them. We turn to these in the following section.

4.2. *The Mapping Problem*

We have seen that output filters on the Lexicon are the functional analogue of some types of Impoverishment rules as proposed in this paper. However, Impoverishment rules do more than static filters in that they map a given feature set to another feature set whose phonological realization is chosen by the grammar as the ‘closest fit’ available. In the lexicalist model this MAPPING PROBLEM is commonly solved using one or both of two devices: (a) competition for paradigm cells (Wunderlich 1996, 1997), and (b) default rules which supply unmarked values to lexical outputs, making them unsuitable for certain syntactic situations, thus resolving Mapping ambiguities (Lieber 1989; Jensen 1990).

As was shown in sections 2–3, the pattern of neutralization in Nungubuyu is so complex that a great many instances of the Mapping Problem

arise. As I will show below, the required lexical default rules are by no means simple; that is, they cannot be reduced to simple statements such as “where no person is marked, assume 3rd person”. Rather, the default rules and output filters required for a descriptively adequate lexicalist treatment are at least, if not more, complex than the Impoverishment rules outlined in section 2. Space considerations make it impossible for a fully explicated alternative to be provided here, but a small example should suffice to make this point.

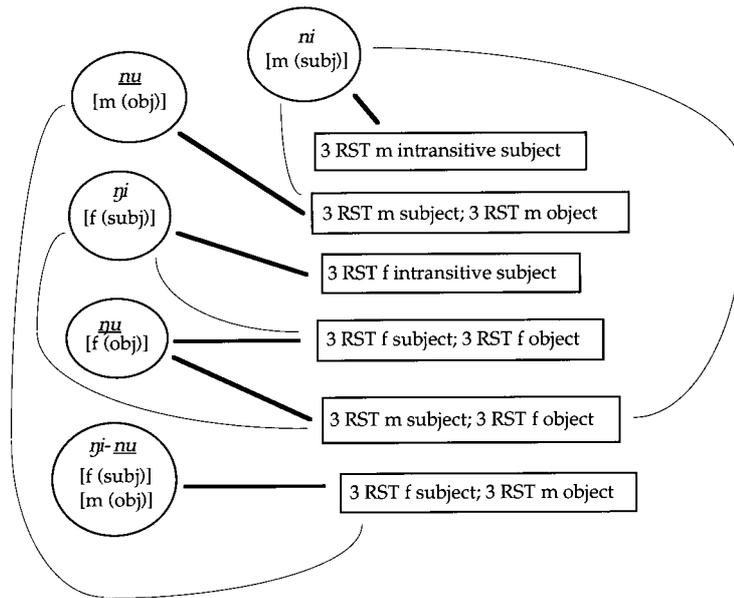
Consider the table in (71) below showing some A-series clause possibilities. For ease of parsing, the object-marking clitics are underlined.

(71)

| | INTRANSITIVE | OBJECT | |
|---------|----------------------|-----------------------------|---|
| SUBJECT | | 3 AUG f | 3 RST m |
| 3 RST f | η i <i>f</i> | η <u>u</u> <i>f</i> | η i- <u>nu</u> → [η unu] <i>f-m</i> |
| 3 RST m | ni <i>m</i> | | <u>nu</u> <i>m</i> |

As discussed in the previous section, output filters and/or subcategorization frames can prevent such ungrammatical sequences as **ni-nu* ‘m-m’; * η i- η u ‘f-f’ or **ni- η u* ‘f-m’. This aspect of Impoverishment is not at issue. Rather, the question is how the grammar maps the set of well-formed lexical outputs to the set of syntactic contexts. This problem is illustrated below, where lexical outputs are enclosed in circles and syntactic contexts are enclosed in squares:

(72)



The bolded straight lines connecting circles and boxes show the actual mappings of Nungguuyu; the curved lines show mappings which are conceivable, given the feature content of the lexical output under in question. For example, *nu*, as the marker of a masculine object, should be compatible with both the 3 RST m subject with 3 RST m object context as well as with the 3 RST f subject with 3 RST m object context. But in practice, *nu* can occur only in the former context; in the latter context *ŋi-nu-nu* ‘f-m’ must be chosen. On what grounds is *ŋi-nu* ‘f-m’ chosen over its ‘competitor’, *nu* ‘m’?

Advocates of Lexical Morphology, such as Jensen (1990) and Inkelas (1993) have made extensive use of a principle which prefers ‘more specific’ forms in such cases. This principle, stated informally in (73), is justified in Inkelas (1993) by appeal to the Elsewhere Principle of Kiparsky (1973, 1982).

(73) Where alternative markers exist, choose the ‘most specific’ form.

The problem with (73), however, is that it does not specify *what* the alternative markers (or, more properly, the outputs which they produce) are in competition for. The diagram in (72) shows how distinct lexical outputs are mapped to syntactic contexts, but in a Lexicalist grammar such as is depicted in (68), syntactic contexts are projected by freely combining the output

of the Lexicon. Consequently, the boxes in (72) should be understood as properties of sets of syntactic representations. If syntactic representations are built from the output of the Lexicon, then it is impossible for items of the Lexical output to be ‘in competition’ for syntactic situations which they themselves *subsequently* are responsible for creating.

More concretely, one may ask why a syntactic representation containing just the verbal prefix nu ‘m (object)’ cannot have the same interpretation as one identical except that it has both *ɲi-nu* ‘f-m’. Overt reference to the subject argument is not always necessary in other contexts (e.g., nu in its well-formed use does not index the subject argument directly), so this alone is not responsible for the effect. Moreover, pragmatic inference is of little utility since we have no evidence that discourse conditions can ever be manipulated so that nu ‘m (object)’ can mean what *ɲi-nu* ‘f-m’ means.

One escape from this problem is to reinterpret what the boxed elements in (72) mean: instead of properties of syntactic representations, these boxes could be construed as cells in a paradigm. Each such cell is then deemed to contain one and only one form. Although the notion of ‘paradigm’ plays an important role in traditional grammar, the Lexical Morphology model in (68) has no place for an autonomous paradigm in it. If such a paradigm were added to the model, generative grammar would require a specific device, call it the PARADIGM GENERATOR, for creating the cells for which Lexical outputs would be in competition. (Discussion of this issue is delayed until section 4.3, after the role of default rules is discussed.)

If a Paradigm Generator is not added to the grammar, the only device remaining for coping with the Mapping Problem is the use of default rules to render all but one Lexical output compatible with each context created by syntax.

A full exposition of the Lexical default rules necessary to produce the effects of Impoverishment is impossible here. However, rule (74) exemplifies an instance of the type of rule which would be required.

$$(74) \quad [\emptyset \text{ gender}_{\text{subj}}] \rightarrow [-\text{f gender}_{\text{subj}}]/[\text{subj} \text{ ____ } [\text{m gender}_{\text{obj}}]]$$

Rule (74) says, effectively, “if a lexical output is specified for having an [m gender] object and its subject is not specified for gender, then its subject is not [f gender]”.⁴³ Hence nu ‘m’ cannot be used in a context where *ɲi-nu* ‘f-m’ could be used, but can be used in the context of an [m gender]

⁴³ The rule cannot simply supply [m gender] to the subject, since [+aug] forms such as *wV-nu* can have either [m gender] or [p gender] subjects. The requirement that the object be specified [m gender] for the rule to apply is shown by forms such as *ɲu* ‘f’ for which either an [m gender] or an [f gender] subject may be interpreted.

subject. Although there is no one-to-one correspondence between Lexical default rules and Impoverishment rules, (74) covers some of the same facts in the Lexical theory which Subject Gender Impoverishment (i) and (iii) do in the Impoverishment analysis.

As it stands, (74) seems to overapply, since when the subject is a RST 1st or 2nd person argument, (74) excludes the possibility of an [f gender] subject there as well. For example, the lexical output *ŋa-nu* '1-m' will exit the Lexicon with the features [_{subj} 1 –aug [m_{obj}]]; rule (74) will convert this to [_{subj} 1 –aug –f [m_{obj}]], so that *ŋa-nu* will be incompatible with the interpretation in which the speaker is a female human (contrary to fact). However, we have previously established that gender features are generally incompatible with RST 1st or 2nd person arguments: in the Lexical analysis the output filter (70), repeated below, blocks (75) from applying in cases such as *ŋa-nu* '1-m'.

(75) *[person –aug αgender] (= (70))

In the Impoverishment analysis, the same result is obtained by first having Person-Gender Impoverishment delete specified gender in the contexts mentioned in (75), bleeding the application of Subject Gender Impoverishment, the analogue to rule (74).

It should now be obvious that the default rules and output filters required in an adequate Lexicalist grammar of Nunggubuyu will be equally (if not more) complicated in their statement and interaction as their analogues in the Impoverishment approach. My goal here is not to provide a complete alternative analysis, but rather to illustrate what would be required formally for that alternative to approach descriptive adequacy.

In sum, default rules supplying values to lexical outputs along with filters which rule out certain lexical outputs are the functional analogues of Impoverishment within a lexicalist theory. A preliminary comparison between the two approaches reveals that both require intricate, language-specific statements to accommodate the Nunggubuyu clitic phenomena. Moreover, in both analyses these statements of the grammar interact in subtle ways, which can be modelled by rule ordering or rule blocking.

At a sufficient remove, then, there seems to be a confluence between the two alternatives. On what grounds then is the analysis presented in sections 2–3 to be preferred? The following sections review arguments in favor of the realizational approach and against its Lexical competitors.

4.3. *Paradigm Spaces Redux*

The previous section has sketched how the use of output filters and language-specific lexical default rules allow a lexicalist morphology to approach a descriptively adequate solution to the Mapping Problem. Nevertheless, a further problem remains: why does the Lexicon not simply tolerate overlapping functions for the lexical outputs? In other words, what property of the model as a whole guarantees that the default rules and output filters conspire to ensure that one and only one output is available for each syntactico-semantic situation? Without a paradigm structure, this absence of functional overlap – especially in a case like Nunggubuyu where the Mapping Problem is so intricate – is completely unexplained. Admittedly an autonomous paradigm structure could, in principle, be added to the model as a kind of gateway between the Lexicon and syntax, as suggested by Wunderlich (1996, 1997), or explored in Williams (1994). But the Paradigm Generator needed to create this autonomous paradigm structure introduces an undesirable redundancy: the paradigm cells which the Paradigm Generator would produce are replicated by the set of syntactico-semantic situations which would arise during the course of a derivation. For example, a paradigm cell for a 3 AUG f subject and a 2 RST m object verbal clitic sequence corresponds to a syntactico-semantic situation which arises when a verb appears in a sentence containing arguments specified for these properties. To have the Paradigm Generator produce this cell and have the syntax produce the situation to which this cell corresponds is needlessly redundant.

Distributed Morphology, on the other hand, requires no Paradigm Generator aside from syntax itself. Syntax creates a set of situations, i.e., structural descriptions of expressions, by freely combining abstract features and structural elements. Morphology has the responsibility of providing pronunciations to these structural descriptions; inasmuch as derivations proceed deterministically, a unique output will be supplied for every morphosyntactic structure that enters Morphology.

In sum, Lexicalist Morphology implicitly requires a Paradigm Generator to explain why lexical outputs are not rampantly functionally overlapping. This requirement is especially evident in the case of Nunggubuyu, where the complex pattern of clitic absence makes a great many clitic sequences featurally compatible.

4.4. *Movement in Morphology*

A second deficiency of Lexicalist approaches is that, because clitic sequences are generated within a Lexicon insulated from and prior to syntactic operations, there is no way of (insightfully) capturing the facts

discussed in section 3, where syntactic and morphological operations jointly determine surface clitic ordering. To reiterate, I showed there that a significant subset of clitic deletions arises from the fact that at most one object clitic can precede a subject clitic in the string, although sequences of object clitics can appear sequence-finally with no problem. This generalization has a natural explanation within the model proposed here: syntax provides an underlying clitic order in which all subject clitics precede all object clitics, but this ordering must be repaired so as to conform to a language-specific requirement on surface ordering, which aligns the clitics according to the type of features they express rather than the syntactic function of the arguments they index. This repair is accomplished by Morphological Merger, which is constrained so that only peripheral elements in a structure are permitted to move. Neither Morphological Merger nor constraints on its application are specific to Nunggubuyu, but are, by hypothesis, general properties of Universal Grammar. The machinery involved is independently justified in explaining a variety of second-position phenomena and locality effects (Marantz 1988). Since only one clitic can move, and since, by hypothesis, object clitics always follow subject clitics underlyingly, the surface result follows automatically.

The standard Lexicalist approach does not provide the means to directly model this effect, since the ordering of affixes is established either by subcategorization frames, or through the use of templates. Admittedly, Simpson and Withgott (1986) take note of the possibility that classes of affixes within a template sometimes seem to undergo metathesis (p. 163 ff.), and support this view with data from Warlpiri and several related languages. Nevertheless, the requirements imposed are purely morphological and thus, in principle, bear no necessary relation to syntactic structures; neither are they situated within a general theory of movement, such as Morphological Merger as employed here.

5. CONCLUSION

Pronominal agreement clitics in Nunggubuyu fail to surface or are replaced by other clitics in a complex pattern reminiscent of better-known phenomena in Romance. Following the proposals of Bonet (1991, 1995), Noyer (1992, 1997), Harris (1994), and Halle and Marantz (1993, 1994), I argued that rules of Impoverishment delete underlying (morphosyntactic) values prior to phonological realization, somewhat in the manner of the original analysis of Heath (1984). Such rules were shown to be ordered by the Strict Cycle, with object Impoverishments applying before subject Impoverishments, giving crucial feeding and bleeding relations. In

addition, the replacement of [m gender] and [f gender] by [p gender] in certain environments is accomplished by a two-step process of Impoverishment plus insertion of default [p gender] by a persistent morphological redundancy rule. The analysis thus provides an example showing that feature-changing Rules of Referral in the sense of Zwicky (1985) may in fact be feature-deletions plus insertion of default values, as argued by Noyer (1998).

Certain other clitic neutralizations were shown to arise as a result of the need to meet surface ordering constraints. By hypothesis, syntax positions subject clitic information to the left of object clitic information but PF-ordering requirements require a realignment of the phonologically actualized clitics. These re-orderings, which Heath (1984) accounted for by means of Affix Hopping transformations, turn out to obey the constraints imposed by Morphological Merger (Marantz 1988), and were shown to operate cyclically. Only cluster-peripheral clitics may move to repair ill-formed orders. Where Merger cannot repair underlying orders to conform to surface requirements, the morphological derivation cannot converge at a well-formed surface output. Clitic deletion acts as a Last Resort repair strategy, and obeys the generalization that if the deletion of two different clitics can each lead to a convergent result, the clitic which is deleted is the one which expresses the lowest property on a hierarchy of features.

Finally, the extensive and complex use of Impoverishment in Nunggubuyu makes manifest certain important deficiencies of Lexicalist models of morphology.

First, even supposing that selectional restrictions and underspecification could restrict the Lexicon to generating all and only the well-formed clitic sequences of Nunggubuyu, the grammar must still contain some means for deciding which clitic sequence is the 'next best' one when an expected clitic sequence is ill-formed and several well-formed clitic sequences are compatible with the features which the ill-formed clitic sequence would have had. Although language-specific default rules and filters on the output of the Lexicon provide a possible analogue within Lexicalist morphology to the Impoverishment rules proposed here, such mechanisms rely implicitly on the notion of a paradigm space autonomous from syntax for which lexical output forms are in competition; a Paradigm Generator is required to produce this autonomous space of possibilities. The proposal here does not require such a Paradigm Generator, but instead uses an independently necessary device – namely syntax itself – to generate this space of possibilities.

Second, no analogue to, or general theory about, the mechanism of Morphological Merger exists within a standard Lexicalist model, so the

effects imputed to Merger in section 3 have no direct explanation. In Lexical Morphology, affixes do not normally ‘move’ in the Lexicon, and their ordering is stipulated, either by the combined effect of subcategorization frames, or globally by means of templates. In contrast, the Distributed Morphology alternative proposed here directly expresses the joint contributions of syntactic and morphological well-formedness in producing the complex pattern of data in Nunggubuyu. The burden of generating this extraordinarily baroque system of clitics is, as a result, properly distributed over several modules of grammar.

APPENDIX I: TABLES

TABLE I

Intransitive prefixes and transitives with 3rd person A and M objects

| | | Intransitive | OBJECT | |
|---|----------|-------------------------------|--|--|
| | | | 3 RST A | 3 RST M |
| S | 1 RST P | ŋa I | ŋa- <u>ɰu</u> → [ŋawu] I-A | ŋa- <u>ma</u> I-M |
| | 1 AUG f | nV:-ŋi → [ni:ŋi] I.AUG-f | nV:-ŋi- <u>ɰu</u> → [ni:ŋiwu] I.AUG-f-A | nV:-ŋi- <u>ma</u> → [ni:ŋima] I.AUG-f-M |
| U | 1 AUG m | nV:-ni → [ni:ni] I.AUG-m | nV:-ni- <u>ɰu</u> → [ni:niwu] I.AUG-m-A | nV:-ni- <u>ma</u> → [ni:nima] I.AUG-m-M |
| | 1 AUG p | nV:-ru → [nuru] I.AUG-p | nV:-ri → [niri] I.AUG-p | nV:-ri- <u>ma</u> → [nirima] I.AUG-p-M |
| B | 12 RST P | na I2 | na- <u>ɰu</u> → [nawu] I2-A | na- <u>ma</u> I2-M |
| | 12 AUG f | ŋV:ŋi → [ŋi:ŋi] I2.AUG-f | ŋV:ŋi- <u>ɰu</u> → [ŋi:ŋiwu] I2.AUG-f-A | ŋV:ŋi- <u>ma</u> → [ŋi:ŋima] I2.AUG-f-M |
| J | 12 AUG m | ŋV:-ni → [ŋi:ni] I2.AUG-m | ŋV:-ni- <u>ɰu</u> → [ŋi:niwu] I2.AUG-m-A | ŋV:-ni- <u>ma</u> → [ŋi:nima] I2.AUG-m-M |
| | 12 AUG p | ŋV:-ru → [ŋuru] I2.AUG-p | ŋV:-ri → [ŋiri] I2.AUG-p | ŋV:-ri- <u>ma</u> → [ŋirima] I2.AUG-p-M |
| E | 2 RST P | nun 2.RST | nun- <u>ɰu</u> → [nuggu] 2.RST-A | nun- <u>ma</u> → [numa] 2.RST-M |
| | 2 AUG f | nV-wu-ŋi → [ni:ŋi] 2.AUG-f | nV-wV-ŋi- <u>ɰu</u> → [ni:ŋiwu] 2.AUG-f-A | nV-wV-ŋi- <u>ma</u> → [ni:ŋima] 2.AUG-f-M |
| C | 2 AUG m | nV-wu-ni → [ni:ni] 2.AUG-m | nV-wV-ni- <u>ɰu</u> → [ni:niwu] 2.AUG-m-A | nV-wV-ni- <u>ma</u> → [ni:nima] 2.AUG-m-M |
| | 2 AUG p | nV-wu-ru → [nuru] 2.AUG-pl | nV-wV-ri → [niri] 2.AUG-p | nV-wV-ri- <u>ma</u> → [nirima] 2.AUG-p-M |
| T | 3 RST f | ŋi f | ŋi- <u>ɰu</u> → [ŋiwu] f-A | ŋi- <u>ma</u> f-M |
| | 3 RST m | ni m | ni- <u>ɰu</u> → [niwu] m-A | ni- <u>ma</u> m-M |
| | 3 AUG f | wu-ŋi → [wiŋi] AUG-f | wV-ŋi- <u>ɰu</u> → [wiŋiwu] AUG-f-A | wV-ŋi- <u>ma</u> → [wiŋima] AUG-f-M |
| | 3 AUG m | wu-ni → [wini] AUG-m | wV-ni- <u>ɰu</u> → [winiwu] AUG-m-A | wV-ni- <u>ma</u> → [winima] AUG-m-M |
| | 3 AUG p | wu-ru AUG-p | wV-ri → [wiri] AUG-p | wV-ri- <u>ma</u> → [wirima] AUG-p-M |
| | 3 RST A | ɰu → [wu] A | ∅ | |
| | 3 RST M | ma M | | |

B

TABLE II

1st and 2nd person subjects with 3rd person f, m and p objects

| | | OBJECT | | | | |
|---|-------------|--|---|--|---------|----------|
| | | 3 RST f | 3 RST m | 3 AUG f | 3 AUG m | 3 AUG p |
| S | 1 RST P | ḡa-ḡu <i>1-f</i> | ḡa- <u>nu</u> <i>1-m</i> | ḡa- <u>wa-ra</u> → [ḡara] <i>1-AUG-p</i> | | O, DP |
| | 1 AUG | | nV:-ḡi- <u>nu</u> → [nu:ḡunu] <i>1.AUG-f-m</i> | nV:- <u>wa</u> -N-ḡi → [na:ḡi] <i>1.AUG-AUG-N-f</i> | | O, DP! |
| U | 1 AUG m | | | nV:- <u>wa</u> -N-ni → [na:ni] <i>1.AUG-AUG-N-m</i> | | O, DP! |
| | 1 AUG p | nV:-ri-ḡa → [niriḡa] <i>1.AUG-p-f</i> | nV:- <u>nu</u> → [nu:nu] <i>1.AUG-m</i> | nV:- <u>wa-ra</u> → [nara] <i>1.AUG-AUG-p</i> | | O, DP, i |
| B | 12 RST P | na-ḡu <i>12-f</i> | na- <u>nu</u> <i>12-m</i> | na- <u>wa-ra</u> → [nara] <i>12-AUG-p</i> | | O, DP |
| | 12 AUG f | | ḡV:-ḡi- <u>nu</u> → [ḡu:ḡunu] <i>12.AUG-f-m</i> | ḡV:- <u>wa</u> -N-ḡi → [ḡa:ḡi] <i>12.AUG-AUG-N-f</i> | | O, DP! |
| C | 12 AUG m | | | ḡV:- <u>wa</u> -N-ni → [ḡa:ni] <i>12.AUG-AUG-N-m</i> | | O, DP! |
| | 12 AUG p | ḡV:-ri-ḡa → [ḡiriḡa] <i>12.AUG-p-f</i> | ḡV:- <u>nu</u> → [ḡu:nu] <i>12.AUG-m</i> | ḡV:- <u>wa-ra</u> → [ḡara] <i>12.AUG-AUG-pl</i> | | O, DP, i |
| E | 12 RST P | nun-ḡu → [nuḡu] <i>2.RST-f</i> | nun- <u>nu</u> → [nunnu] <i>2.RST-m</i> | ba- <u>wa-ra</u> [bara] <i>2.RST-AUG-p</i> | | O, DP |
| | 2 AUG f | | nV-wV-ḡi- <u>nu</u> → [nu:ḡunu] <i>2-AUG-f-m</i> | nV-wV- <u>wa</u> -N-ḡi → [na:ḡi] <i>2-AUG-AUG-N-f</i> | | O, DP! |
| T | 12 AUG m | | | nV-wV- <u>wa</u> -N-ni → [na:ni] <i>2-AUG-AUG-N-m</i> | | O, DP! |
| | 2 AUG p | nV-wV-ri-ḡa → [niriḡa] <i>2.AUG-p-f</i> | nV-wV- <u>nu</u> → [nu:nu] <i>2.AUG-m</i> | nV-wV- <u>wa-ra</u> → [nara] <i>2-AUG-AUG-p</i> | | O, DP, i |

TABLE III
3rd person subjects with 1st person objects

| | | OBJECT | | | |
|---------|--------------------|--------------------|-------------|------------|-------------------------------|
| | | 1 AUG f | 1 AUG m | 1 AUG p | 12 AUG p |
| S | 3 RST f | ŋV-N-tji → [ŋaŋji] | [naŋji] | | ŋV:-(ra)-N-tji → [ŋa(r)ŋaŋji] |
| | | I-N-f | I.AUG-N-f | O, DPI | I2.AUG-(p)-N-f O, DPI |
| U | 3 RST m | ŋa-N-ni → [ŋani] | [nani] | | ŋV:-(ra)-N-ni → [ŋa(r)ani] |
| | | I-N-m | I.AUG-N-m | O, DPI | I2.AUG-(p)-N-m O, DPI |
| J | 3 AUG f | | | O, fl, DPI | |
| | | fl | | | O, fl, DPI |
| E | 3 AUG m | ŋa-N-wi → [ŋambi] | [nambi] | | ŋV:-(ra)-N-wi → [ŋa(r)ambi] |
| | | I-N-AUG | I.AUG-N-AUG | O, ml, DPI | I2.AUG-(p)-N-AUG O, ml, DPI |
| C | | m! | | | |
| | | m! | | | |
| T | 3 AUG p | | | O, DPI, pl | |
| | | pl | | | O, DPI, pl |
| 3 RST A | ŋa-N-uqu → [ŋaŋgu] | ŋV-N-uqu → [naŋgu] | [naŋgu] | | ŋV:-(ra)-N-uqu → [ŋa(r)ŋaŋgu] |
| | I-N-A | I.AUG-N-A | O, DPI | | I2.AUG-(p)-N-A O, DPI |
| 3 RST M | ŋa-N-ma → [ŋama] | ŋV-N-ma → [nama] | [nama] | | ŋV:-(ra)-N-ma → [ŋa(r)ama] |
| | I-N-M | I.AUG-N-M | O, DPI | | I2.AUG-(p)-N-AUG O, DPI |

TABLE IV

3rd person subjects with 2nd person objects

| | | OBJECT | | | | |
|---|---------|---|----|--|---------|------------------|
| | | 2 RST | P | 2 AUG f | 2 AUG m | 2 AUG p |
| S | 3 RST f | <u>nun</u> -N- <u>ŋi</u> → [niŋi] 2.RST-N-f | | <u>nV</u> -N- <u>ŋi</u> → [naŋi] 2-N-f | | O, AUG!, DP! |
| | 3 RST m | <u>nun</u> -N- <u>ni</u> → [nini] 2.RST-N-m | | <u>nV</u> -N- <u>ni</u> → [nani] 2-N-m | | O, AUG!, DP! |
| J | 3 AUG f | | f! | | | O, AUG!, f!, DP! |
| E | 3 AUG m | <u>nun</u> -N- <u>wi</u> → [nimbi] 2.RST-N-AUG | m! | <u>nV</u> -N- <u>wi</u> → [nambi] 2-N-AUG | | O, AUG!, m!, DP! |
| | 3 AUG p | | p! | | | O, AUG!, DP!, p! |
| T | 3 RST A | <u>nun</u> -N- <u>ɰu</u> → [nuŋgu] 2.RST-N-A | | <u>nV</u> -N- <u>ɰu</u> → [naŋgu] 2-N-A | | O AUG!, DP! |
| | 3 RST M | <u>nun</u> -N- <u>ma</u> → [numa] 2.RST-N-M | | <u>nV</u> -N- <u>ma</u> → [nama] 2-N-M | | O, AUG!, DP! |

TABLE V

3rd person subjects with 3rd person f, m and p objects

| | | OBJECT | | | | |
|---|---------|--|--|---|---------|----------|
| | | 3 RST f | 3 RST m | 3 AUG f | 3 AUG m | 3 AUG p |
| S | 3 RST f | <u>ŋu</u> f | <u>ŋi-nu</u> → [ŋunu] f-m | <u>wa</u> -N- <u>ŋi</u> → [waŋi] AUG-N-f | | O, DP! |
| | 3 RST m | | <u>nu</u> m | <u>wa</u> -N- <u>ni</u> → [wani] AUG-N-m | | O, DP! |
| J | 3 AUG f | | <u>wV-ŋi-nu</u> → [wuŋunu] AUG-f-m | <u>wV-wa</u> -N- <u>ŋi</u> → [wa:ŋi] AUG-AUG-N-f | | O, DP! |
| E | 3 AUG m | | | <u>wV-wa</u> -N- <u>ni</u> → [wa:ni] AUG-AUG-N-m | | O, DP! |
| | 3 AUG p | <u>wV-ri-ŋa</u> → [wirija] AUG-p-f | <u>wV-nu</u> → [wunu] AUG-m | <u>wV-wa-ra</u> → [wara] AUG-AUG-p | | O, DP, i |
| T | 3 RST A | <u>ŋi</u> -N- <u>ɰu</u> → [ŋiŋgu] f-N-A | <u>ni</u> -N- <u>ɰu</u> → [niŋgu] m-N-A | <u>wa</u> -N- <u>ɰu</u> → [waŋgu] AUG-N-A | | O, DP! |
| | 3 RST M | <u>ŋi</u> -N- <u>ma</u> → [ŋima] f-N-M | <u>ni</u> -N- <u>ma</u> → [nima] m-N-M | <u>wa</u> -N- <u>ma</u> → [wama] AUG-N-M | | O, DP! |

TABLE VI
1st and 2nd person subjects with 1st and 2nd person objects (A and B forms)

| | | OBJECT | | | | | | | |
|---|---------|--------|---------|---------|---------|-------|---------|------------------|----------|
| | | 1 RST | 1 AUG f | 1 AUG m | 1 AUG p | 2 RST | 2 AUG f | 2 AUG m | 2 AUG p |
| S | 1 RST P | | | | | ijunu | | | |
| U | 1 AUG f | | | | | * | | ija-nV → [ijana] | |
| B | 1 AUG m | | | | | wa | | I-2 | C |
| J | 1 AUG p | | | | | * | | ijanamba | (B form) |
| E | 2 RST | | | | | | | * | (B form) |
| C | P | | | | | | | | |
| | | | | | | | | | |
| T | 2 AUG f | | | | | | | | |
| | 2 AUG m | | | | | | | | |
| | 2 AUG p | | | | | | | | |

NB. The A and B forms are identical in Table VI unless a special B form is noted.

TABLE VII
1st and 2nd person subjects: intransitives and 3rd person A and M objects (B forms)

| | | Intransitive | OBJECT | |
|---------|------------------------------------|--|---|--|
| | | | 3 RST A | 3 RST M |
| S | 1 RST P | ija-wan → [jan] I-B | ija-wan-t <u>u</u> → [jan <u>gu</u>] I-B-A | ija-wan-t <u>ma</u> → [jan <u>ma</u>] I-B-M |
| | 1 AUG f | nV:-wan-tji → [na:ɲi] I.AUG-B-f | nV:-wan-tji-t <u>u</u> → [na:ɲi <u>wu</u>] I.AUG-B-f-A | nV:-wan-tji-t <u>ma</u> → [na:ɲi <u>ma</u>] I.AUG-B-f-M |
| U | 1 AUG m | nV:-wan-ni → [na:ni] I.AUG-B-m | nV:-wan-ni-t <u>u</u> → [na:ni <u>wu</u>] I.AUG-B-m-A | nV:-wan-ni-t <u>ma</u> → [na:ni <u>ma</u>] I.AUG-B-m-M |
| | 1 AUG p | nV:-wan-wu → [na:mbu] I.AUG-B-AUG | nV:-wan-t <u>u</u> → [na:ɲ <u>gu</u>] I.AUG-B-A | nV:-wan-t <u>ma</u> → [na:ɲ <u>ma</u>] I.AUG-B-M |
| J | 12 RST P | na-wan → [nan] I2-B | na-wan-t <u>u</u> → [nan <u>gu</u>] I2-B-A | na-wan-t <u>ma</u> → [nan <u>ma</u>] I2-B-M |
| | 12 AUG f | ɲV:-wan-tji → [ja:ɲi] I2.AUG-B-f | ɲV:-wan-tji-t <u>u</u> → [ja:ɲi <u>wu</u>] I2.AUG-B-f-A | ɲV:-wan-tji-t <u>ma</u> → [ja:ɲi <u>ma</u>] I2.AUG-B-f-M |
| C | 12 AUG m | ɲV:-wan-ni → [ja:ni] I2.AUG-B-m | ɲV:-wan-ni-t <u>u</u> → [ja:ni <u>wu</u>] I2.AUG-B-m-A | ɲV:-wan-ni-t <u>ma</u> → [ja:ni <u>ma</u>] I2.AUG-B-m-M |
| | 12 AUG p | ɲV:-wan-wu → [ja:mbu] I2.AUG-B-AUG | ɲV:-wan-t <u>u</u> → [ja:ɲ <u>gu</u>] I2.AUG-B-A | ɲV:-wan-t <u>ma</u> → [ja:ɲ <u>ma</u>] I2.AUG-B-M |
| T | 2 RST P | ba 2.RST-B | ba-t <u>u</u> → [bawu] 2.RST-B-A | ba-t <u>ma</u> 2.RST-B-M |
| | 2 AUG f | nVn-wu-tji → [nimbiji] 2.B-AUG-f | nVn-wV-tji-t <u>u</u> → [nimbiji <u>wu</u>] 2.B-AUG-f-A | nVn-wV-tji-t <u>ma</u> → [nimbiji <u>ma</u>] 2.B-AUG-f-M |
| 2 AUG m | nVn-wu-ni → [nimbini] 2.B-AUG-m | nVn-wV-ni-t <u>u</u> → [nimbini <u>wu</u>] 2.B-AUG-m-A | nVn-wV-ni-t <u>ma</u> → [nimbini <u>ma</u>] 2.B-AUG-m-M | |
| | 2 AUG p | nVn-wu-ru → [numburu] 2.B-AUG-p | nVn-wV-ri → [nimbiri] 2.B-AUG-p | nVn-wV-ri-t <u>ma</u> → [nimbiri <u>ma</u>] 2.B-AUG-p-M |

TABLE VIII
1st and 2nd person subjects: intransitives and 3rd person A and M objects (B forms)

| | | OBJECT | | | |
|---|---------|--|--|---|----------|
| | | 3 RST f | 3 RST m | 3 AUG f | 3 AUG p |
| S | 3 RST f | wan-ŋu → [waju] <i>B-f</i> | wan-ŋi-nu → [waju] <i>B-f-m</i> | wan-wa-N-ŋi → [wambaŋi] <i>B-AUG-N-f</i> | 3 AUG p |
| | 3 RST m | | wan-nu → [wanu] <i>B-m</i> | wan-wa-N-ni → [wambani] <i>B-AUG-N-m</i> | O, DPi |
| U | 3 AUG f | | wan-wV-ŋi-nu → [wambuŋunu] <i>B-AUG-f-m</i> | wan-wV-wa-N-ŋi → [wamba:ŋi] <i>AUG-AUG-N-f</i> | O, DPi |
| | 3 AUG m | | | wan-wV-wa-N-ni → [wamba:ni] <i>B-AUG-AUG-N-m</i> | O, DPi |
| B | 3 AUG p | wan-wV-ŋi-ŋa → [wambiriŋa] <i>B-AUG-p-f</i> | wan-wV-nu → [wambuŋunu] <i>B-AUG-m</i> | wan-wV-wa-ra → [wambara] <i>B-AUG-AUG-p</i> | O, DP, i |
| | 3 RST A | wan-ŋi-N-ŋu → [wajingu] <i>B-f-N-A</i> | wan-ŋi-N-ŋu → [wajingu] <i>B-m-N-A</i> | wan-wa-N-ŋu → [wambaŋu] <i>B-AUG-N-A</i> | O, DPi |
| J | 3 RST M | wan-ŋi-N-ma → [wajima] <i>B-f-N-M</i> | wan-ŋi-N-ma → [wajima] <i>B-m-N-M</i> | wan-wa-N-ma → [wambama] <i>B-AUG-N-M</i> | O, DPi |
| | | | | | O, DPi |
| E | | | | | |
| | | | | | |
| C | | | | | |
| | | | | | |
| T | | | | | |
| | | | | | |

TABLE IX
3rd person subjects: intransitives and 3rd person A and M objects (B forms)

| | | Intransitive | OBJECT | |
|-----------|-------------------------|--------------------------------------|------------------|---------------------------------------|
| | | | 3 RST A | 3 RST M |
| 3 RST f | wan-tji → [waji] | wan-tji- <u>u</u> → [wajiwu] | <i>B-f-A</i> | wan-tji- <u>ma</u> → [wajima] |
| S | | | | <i>B-f-M</i> |
| U3 RST m | wan-ni → [wani] | wan-ni- <u>u</u> → [waniwu] | <i>B-m-A</i> | wan-ni- <u>ma</u> → [wanima] |
| B | | | | <i>B-m-M</i> |
| J 3 AUG f | wan-wu-tji → [wambitji] | wan-w V-tji- <u>u</u> → [wambitjiwu] | <i>B-AUG-f-A</i> | wan-w V-tji- <u>ma</u> → [wambitjima] |
| E | | | | <i>B-AUG-f-M</i> |
| C 3 AUG m | wan-wu-ni → [wambini] | wan-w V-ni- <u>u</u> → [wambiniwu] | <i>B-AUG-m-A</i> | wan-w V-ni- <u>ma</u> → [wambinima] |
| T | | | | <i>B-AUG-m-M</i> |
| 3 AUG p | wan-wu-ru → [wamburu] | wan-w V-ri- <u>u</u> → [wambiriri] | <i>B-AUG-p</i> | wan-w V-ri- <u>ma</u> → [wambirima] |
| | | | | <i>AB-AUG-p-M</i> |
| 3 RST A | wan-u → [wajgu] | | | ∅ |
| | | | | |
| 3 RST M | wan-ma → [wama] | | | |
| | | | | B |

TABLE XI
3rd person subjects with 1st person objects (B forms)

| | | OBJECT | | | | | | |
|---------|---------|---------------------------------------|---|---|--|---|--|--|
| I RST | | 1 AUG f | 1 AUG m | 1 AUG p | 12 RST | 12 AUG f | 12 AUG m | 12 AUG p |
| 3 RST f | 3 RST f | ɲV-N-wan-ɲi → [ɲambajɲi] I-N-B-f | ɲV-N-wan-ɲi → [nambajɲi] I.AUG-N-B-f | ɲV-N-wan-ɲi → [nambajɲi] O, DPI | ɲa-N-wan-ɲi → [nambajɲi] I2-N-B-f | ɲV-N-wan-ɲi → [ɲa:mbajɲi] I2.AUG-N-B-f | ɲa-N-wan-ɲi → [ɲa:mbajɲi] O, DPI | ɲV-N-wan-ɲi → [ɲa:mbajɲi] O, DPI |
| 3 RST m | 3 RST m | ɲV-N-wan-ni → [ɲambani] I-N-B-m | ɲV-N-wan-ni → [nambani] I.AUG-N-B-m | ɲV-N-wan-ni → [nambani] O, DPI | ɲa-N-wan-ni → [nambani] I2-N-B-m | ɲV-N-wan-ni → [ɲa:mbani] I2.AUG-N-B-m | ɲa-N-wan-ni → [ɲa:mbani] O, DPI | ɲV-N-wan-ni → [ɲa:mbani] O, DPI |
| 3 AUG f | 3 AUG f | ɲi | ɲi | O, (DP/D), ɲi | ɲi | O, (DP/D), ɲi | O, (DP/D), ɲi | O, (DP/D), ɲi |
| 3 AUG m | 3 AUG m | ɲi-N-wan-wi → [ɲambambi] I-N-B-AUG | ɲi-N-wan-wi → [nambambi] I.AUG-N-AUG | ɲi-N-wan-wi → [nambambi] O, (DP/D), m! | ɲa-N-wan-wi → [nambambi] I2-N-B-AUG | ɲi-N-wan-wi → [ɲa:mbambi] I2.AUG-N-B-AUG | ɲa-N-wan-wi → [ɲa:mbambi] O, (DP/D), m! | ɲi-N-wan-wi → [ɲa:mbambi] O, (DP/D), m! |
| 3 AUG p | 3 AUG p | pl | pl | O, (DP/D), pl | pl | O, (DP/D), pl | O, (DP/D), pl | O, (DP/D), pl |
| 3 RST A | 3 RST A | ɲi-N-wan-ɲu → [ɲambangu] I-N-B-A | ɲi-N-wan-ɲu → [nambangu] I.AUG-N-B-A | ɲi-N-wan-ɲu → [nambangu] O, DPI | ɲa-N-wan-ɲu → [nambangu] I2-N-B-A | ɲi-N-wan-ɲu → [ɲa:mbangu] I2.AUG-N-B-A | ɲa-N-wan-ɲu → [ɲa:mbangu] O, DPI | ɲi-N-wan-ɲu → [ɲa:mbangu] O, DPI |
| 3 RST M | 3 RST M | ɲi-N-wan-ma → [ɲambama] I-N-B-M | ɲi-N-wan-ma → [nambama] I.AUG-N-B-M | ɲi-N-wan-ma → [nambama] O, DPI | ɲa-N-wan-ma → [nambama] I2-N-B-M | ɲi-N-wan-ma → [ɲa:mbama] I2.AUG-N-B-M | ɲa-N-wan-ma → [ɲa:mbama] O, DPI | ɲi-N-wan-ma → [ɲa:mbama] O, DPI |

TABLE XII

3rd person subjects with 2nd person objects (B forms)

| | | OBJECT | | | |
|---|---------|---|---|---------|---------------------|
| | | 2 RST | 2 AUG f | 2 AUG m | 2 AUG p |
| S | 3 RST f | <u>a</u> -N-ŋi → [aŋi] 2.RST.B-N-f | <u>n</u> V-N-wan-ŋi → [nambaŋi] 2-N-B-f | | O, AUG!, (DP/D) |
| | 3 RST m | <u>a</u> -N-ni → [ani] 2.RST.B-N-m | <u>n</u> V-N-wan-ni → [nambani] 2-N-B-m | | O, AUG!, (DP/D) |
| J | 3 AUG f | | | fl | O, AUG!, (DP/D), fl |
| | 3 AUG m | <u>a</u> -N-wi → [ambi] 2.RST.B-N-AUG ml | <u>n</u> V-N-wan-wi → [nambambi] 2-N-B-AUG | | O, AUG!, (DP/D), ml |
| E | 3 AUG p | | | pl | O, AUG!, (DP/D), pl |
| | 3 RST A | <u>a</u> -N-uŋu → [aŋgu] 2.RST.B-N-A | <u>n</u> V-N-wan-uŋu → [nambaŋgu] 2-N-B-A | | O, AUG!, (DP/D) |
| C | 3 RST M | <u>a</u> -N-ma → [ama] 2.RST.B-N-M | <u>n</u> V-N-wan-ma → [nambama] 2-N-B-M | | O, AUG!, (DP/D) |

APPENDIX II. ADDITIONAL RULES AND KEY TO TABLE ANNOTATIONS

As shown in Table 6, most combinations of a 2nd person subject with 1st person object or 1st person subject with 2nd person object are expressed by portmanteaux glossed *; these account for 16 A-series argument combinations and 32 B-series argument combinations. The following additional rules, affecting 7.3% of all argument combinations and included here for completeness and clarification, are required to generate the full range of clitic sequences. The numbers in brackets after each rule's description indicate the number of argument combinations in which this rule figures actively in the A-series and B-series, respectively.

- A The [A gender] clitic *uŋu* deletes (or, perhaps, has the allomorph \emptyset) after the subject [p gender] clitic *ri*. [4, 2]
- B When both subject and object are both [A gender] or [M gender], then neither argument has any morphological marking (see also footnote 26). [4, 4]
- C The value [+aug] is deleted from a 1st person argument when the other argument is 2nd person. Hence, for example, both a 1 RST and a 1 AUG

subject with 2nd person object are expressed by the clitic *ŋa* ‘1’ and not by the clitic *nV*: ‘1.AUG’. [16, 0]

D The [p gender] clitic *ri* is deleted in the [person] categories (i.e., 1st and 2nd person) when preceded by the B clitic *wan*. Hence 1 AUG p subject with 3 RST M object yields *nV*:*-wan-ma* ‘1.AUG-B-M’ → [na:ma] instead of **nV*:*-wan-ri-ma* ‘1.AUG-B-p-M’. Note however that this rule applies only in forms containing the B clitic *wan*. As discussed in footnote 10, when there is a portmanteau of the B morpheme and a person morpheme, as in the 2.B form *nVn*, the rule does not apply and [p gender] *ri* does appear, as in the 2 AUG p subject with 3 RST M object form *nVn-wV-ri-ma* ‘2.B-AUG-p-M’ → [nimbirima]. [0, 6]

E In intransitive forms subject to the rule mentioned in D, the augmented clitic *wu* replaces the deleted [p gender] clitic. [0, 2]

Rules discussed in the body of the paper are annotated in the tables as follows:

O OGI = Object Gender Impoverishment (17)

[α gender] → ∅/[+aug ___ obj]

DP Default P (19)

[+aug] → [p gender]

P PGI = Person Gender Impoverishment (23)

[α gender] → ∅/[person -aug ___ obj]

i Subject Gender Impoverishment (i) (27i)

[α gender] → ∅/[___ [α gender -neuter obj]]

ii Subject Gender Impoverishment (ii) (27ii)

[m gender] → ∅/[___ [f gender obj]]

iii Subject Gender Impoverishment (iii) (27iii)

[p gender] → ∅/[___ [m gender obj]]

The following special annotations are used to denote the absence of clitics or the blocking of Default P as discussed in section 3.

f!, m!, p!, AUG! An expected [f gender], [m gender], [p gender] or [AUG] number clitic, respectively, is missing due to Last Resort neutralizations (section 3). (f! = [12, 12], m! = [12, 12], p! = [12, 12], AUG! = [21, 21])

DP! Some or all subject-object combinations of the box in question are potentially subject to Default P but constraints on Morphological Merger block the insertion of [p gender]. [99, 48]

(DP/iii), (DP/D) The subject-object combination(s) in question is potentially subject to Default P, but insertion of [p gender] is undone (or blocked) by Subject Gender Impoverishment (iii) or rule D, respectively. [3, 3]; [0, 64]

APPENDIX III. PHONOLOGY

The relevant phonological rules (in some cases abstracting away from complications not relevant to the phonology of the clitic clusters) are provided here so that interested readers can work out the derivations if they wish to; however, these details are not essential in understanding the main points of the paper. For a full exposition of the phonology of Nunggubuyu, one must consult Heath (1984, pp. 9–144).

As concerns notation, Heath's $n^s n^y$ are rendered here with standard IPA ηj . Digraphs *lh* and *dh* denote an interdental lateral and voiced stop respectively. A morpheme-initial vowel slot *V* indicates a vowel which has assimilated fully to a preceding vowel or has caused a preceding vowel to fully assimilate to it, replacing Heath's [$\bar{}$] (see Heath 1984, p. 100 for details); otherwise *V* represents a harmonizing vowel. In addition, *uŋ* denotes a surface segment [w] which alternates with [g] (= Heath's w_1); a *w* which alternates with [b] is simply *w* (= Heath's w_2).

Two types of phonological rules are relevant to the clitic clusters discussed in this paper: segmental rules and harmony rules. The first group includes the following. (1) Underlying *w* deletes intervocalically (the exact rule is a bit more complicated than this, see Heath 1984, pp. 50–52), (2) a derived vowel sequence *a + a* shortens to [a] (as in *ŋa-wan* '1-B' → [ŋan]); otherwise V_1V_2 coalesces as V_2V_2 (again, this is oversimplified but adequate for now, see Heath 1984, pp. 82–85). (3) A nasal assimilates in place of articulation to a following *w* or *uŋ*, which in turn harden to [b] and [g] respectively in this environment, hence *Nw* → [mb] and *Nuŋ* → [ŋg], where *N* here denotes any nasal. (4) A long vowel becomes short before the [p gender] clitic *ra* ~ *ri* ~ *ru*. (5) The first of two consecutive nasals deletes, e.g., *Nm* → [m], *Nn* → [n], and *Nŋ* → [ŋ] (6) An overlong vowel becomes long. Hence $V_1:-wV_2 \rightarrow V_2:$ (along with rules 1 and 2 above).

The vowel harmony rules can be divided into two types, general and morpheme-specific. The general rules are: (1) a fully harmonizing vowel, denoted underlyingly as *V*, takes on the place properties of a following vowel if any, otherwise it surfaces as a default [a]; and (2) a [+high] vowel agrees in [+back] with a following [+high] vowel, hence *i* becomes [u] if *u* follows, as in 1 AUG f subject with 3 RST m object *nV:-ŋi-nu* '1.AUG-f-m' → [nu:ŋunu], not *[ni:ŋinu]), and *u* becomes [i] if *i* follows, as in 2 AUG m intransitive subject *nV-wu-ni* '2-AUG-m' → [nu:ni] → [ni:ni], or 3 RST m subject with 2 RST object *nun-N-ni* '2.RST-N-m' → [nini], not *[nuni]. The morpheme-specific rules are: (3) the inverse morpheme *N* is an opacity to harmony rule (1), so that an underspecified vowel preceding *N* will surface with its default value [a], contra rule (1); (4) *uqu* 'A' is never

a trigger for round harmony (hence, for example, 3 RST f subject with 3 RST A object *ni-uqu* 'm-A' → [niwu], not *[nuwu]). The above analysis of vowel harmony differs in certain details from Heath's (cf. Heath 1984, pp. 82–83). One consequence worth noting is that the underlying form of the 2 clitic is treated here as simply *nV* with an underspecified vowel; Heath gives *na* (1984, p. 372) but notes that the underlying *a* is seen only in the form '1-2' *ŋa-na* (1 RST subject with 2 AUG object). If, as proposed here, [a] is the default value for harmonic vowels, than surface [ŋana] is derived straightforwardly from underlying *ŋa-nV*. Further consequences include a portmanteau *nVn* clitic postulated for 2nd person forms in the B series (see footnote 10), as well as a slight regularization on the underlying forms for [p gender] and AUG clitics (see footnote 13).

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