Prefixal 'suffixes' in Skou

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Skou, a language of North-Central New Guinea, shows agreement on verbs by what appear to be monoconsonantal prefixes. A detailed analysis shows that the morphemes must be considered to be aligned to the right edge of the word, but are realized further left due to strict phonotactic constraints. Furthermore, the phonotactic constraint that dictates against the right-aligned morphemes appearing as suffixes, NoCODA, is the same one that is famously responsible for the infixation of left-aligned morphemes in Austronesian languages, showing that not only is right-edge aligned infixation perhaps not quite as rare as has been thought, but that it is governed by the same phonotactic constraints that determine left-aligned infixation. A historical motivation for this unusual alignment change is discussed, with a cautionary note on the use of under-analysed data in typological work.

Keywords: Skou; Papuan; New Guinea; Agreement; Alignment; Affix

1. Alignment and Affixation

The location of affixation in a word can generally be modelled simply by proposing different alignment conditions: prefixes are aligned to the left edge of the word, while suffixes align to the right. In more complicated cases the location of an affix may be dictated more by a set of constraints on the phonotactic possibilities of the syllable (or, more rarely, on feature clashes across syllables) (Buckley 1997; Yu 2003).

The well-known infixes of many Austronesian languages can be modelled as being essentially 'prefixal' in that their position is in general governed by ALIGN-LEFT (applying to the affix, with respect to the root), but that this constraint is outranked by NoCODA, forcing the affix away from the left edge of the word in the event of a

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consonant-initial lexeme. This is shown in (1) and (2), using data from Tukang Besi (Donohue 1999), a language that categorically does not permit codas.[2] In the case of a consonant-initial root aligning the affix strictly with the edge of the word will produce a sub-optimal form. The strictly left-aligned form *um.ta.u* completely satisfies the constraint on left-alignment, but results in the nasal of the affix appearing in a coda position. A candidate that deviates from strict left-alignment and does not result in a coda is selected in preference to this candidate; of the two candidates that do not violate NoCoda, the one that violates Align-Left to the least degree is selected. Even though *tu.ma.u* violates Align-Left, it is the optimal candidate for the realization of this particular morpheme. Note that the fact that *tu.ma.u*, and not *um.ta.u*, is selected is evidence that NoCoda outranks Align-Left, since if the ordering of the constraints were reversed the NoCoda violation of *umtau* would be irrelevant to the selection of this candidate. With a vowel-initial root, such as *aso* 'sell' in (2), the candidate which realizes *um* on the left edge, *u.ma.so*, is the optimal candidate, since it results in no violations of NoCoda, and no violations of Align-Left.

Prosodic constraints dominate alignment constraints: Tukang Besi <um>

(1)

<um> + *tau* 'place'	NoCoda	Align-Left
*ta.u-**um***	*!	*tau*
*ta-**u.m**-u*		*ta*!
⇒ *t-**u.m**-a.u*		*t*
***um**-ta.u*	*!	

(2)

<um> + *aso* 'sell'	NoCoda	Align-Left
*a.so-**um***	*!	*aso*
*a.s-**u.m**-o*		*a*!*s*
*a-**um**-so*	*!	*a*
⇒ ***u.m**-a.so*		

Note that while the rankings of the two constraints in (2) are not important for the correct selection of candidates, it is (as noted above) critically important for (1): if Align-Left was ranked more highly than NoCoda a different candidate would be ranked as the optimal one, *um.ta.u*.

In this paper I shall present an account of some inflectionally complicated predicates from the Skou language of New Guinea. While suffixation is by far the most common strategy for marking verbal agreement with subject in the languages of New Guinea, languages of the Skou family have been recognized as one of the few exceptions,

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2 I have not used the more frequently cited Tagalog data here since the *-um-* and *-in-* infixes in that language do NOT show any variation in surface alignment based on the prosodic shape of the root, since all roots are C-initial. The oft-cited *um-abot* 'reach for', purportedly showing the prefixal use of *-um-*, is in fact [ʔumabot], with a glottal stop that is, as Matsuda French (1988) and Schachter & Otanes (1972) make clear, as underlying as any consonant in the language (the root is /ʔabut/). An alternative analysis of Tagalog infixation as being driven by a requirement that syllables have onsets does not apply to Tukang Besi, which permits V-initial words and roots contrasting with C-initial ones (including ʔ-initial). See Donohue & Maclachlan (1999) for additional arguments against the viability of an analysis using a high-ranked NoCoda for Tagalog.

displaying regular prefixation (Cowan 1952, 1953; Galis 1955; Laycock 1975; Ross 1980; Voorhoeve 1971). We shall see that, while prefixation is the descriptively immediate characterization of the morphemes, we can also, and more insightfully, analyse the inflection as being governed by ALIGN-RIGHT, or minimally an inflection whose left alignment is less highly ranked than the left alignment of the head. Because the basic specification of the inflectional morphemes is more rightward (or, alternatively, less leftward) than the head, they can be thought of as being similar to displaced 'suffixes'.

2. Skou Phonology: Overview

Skou is the westernmost language of the Skou family of North-Central New Guinea (Cowan 1952, 1953; Donohue 2002, 2003a, b, c, 2006, 2008; Voorhoeve 1971; Laycock 1975). Skou has a fairly simple segmental phonology, with 13 consonants and 7 vowels, plus contrastive nasalization for most vowels. The segmental contrasts are shown in Table 1.

These elements are arranged in strictly (C)V syllables, not allowing complex onsets, codas, or complex nuclei. Slightly more than half of all roots are monosyllabic, the proportion is 80% amongst verb roots (based on a count of a 1300-item dictionary file). These factors will be relevant to the exposition and analysis that follows. Sequences of two vowels are extremely rare, but are always pronounced as two separate nuclei when they occur, and may carry separate pitch contours, as seen in *áì* 'father', clearly [a.i ˥˩], and not *[aj]. Less than 10% of all lexical items are longer than two syllables, and in almost all cases these are suspicious, an analysis involving historical compounding or reduplicating being likely. Historically complex onsets have been reduced, generally in favour of the second member of the cluster. This can be seen in the initial [kl] cluster of proto-Western-Skou *klǝdo being reflected as [l] in Skou [luto] 'eye'. In other cases we see some merger of the historical consonants, such as the initial ml cluster of *mlā being reflected as a simple p in the second syllable of Skou [(rā)pā] 'night' (Donohue 2002; rā 'sun', reflecting proto-Western-Skou *tā, is fused into this lexeme in modern Skou). The fact that the *p* of (rā)pā reflects the [labial] feature of the *m and the [non-nasal] feature of the *l, indicates that some level of merger of the relevant features is at work, a point that will be examined in more detail in section 3.

Examples of the historical loss of syllables can be seen in Table 2. Syllable loss is advanced in Skou, but is also found to a lesser extent in Dusur, a closely related language spoken approximately 50km to the east of Skou. Some of the proto-Western

Table 1 The Skou segmental system

p	t			k		i		ʉ	u		
b			ɟ~gʲ				ø			ĩ	õ
m	n					ɛ		ɔ	ɛ̃	œ̃	ɔ̃
f				h			a			ã	
	r	l j	w								

Skou forms, when compared to proto-Macro-Skou (where known), show that syllable reduction was a process that probably started before the modern Western Skou languages separated (the motivation for this syllable loss is unclear).

Suprasegmentally nasalization is contrastive on all vowels except ɨ, and there are five tone melodies whose domain is the word (only three patterns surface on monosyllables), complicated by an accent system that is contrastive only on words associated with a HL melody (Donohue 2003b). Examples are presented following IPA conventions, except for the use of *j* for [ɟ~ʝ~ɡʲ] and *y* for [j(~ʐ~dz~dzj)], and the use of only seven vowel symbols: /i e a o u ɨ ø/ (thus [œ̃] is shown as õ). Phonetic pitch (not underlying tone) is shown with diacritics: ′(high), ' (falling), and an unmarked low (see Donohue [2003b] for a description of the tonal phonology, and Donohue [forthcoming] for a discussion of the tonal orthography).

Most relevant to the discussion here are the conditions on syllable shape, all syllables adhering strictly to a (C)V template, and the historical trend towards monosyllabicity, as illustrated in Table 2.

3. Skou Agreement Morphology: Introduction and Overview

The agreement system of Skou is shown in its simplest form in (3), from Donohue (2003a). Note that in the (short, isolated) sentences shown there are usually three overt exponents of an argument: a free pronoun or NP, a proclitic attached to the verb, and (in five out of seven cases in the paradigm in (3)) an apparent prefix on the verb root itself. Here we shall concentrate on the prefixal material, shown in bold in (3), and ignore the invariate proclitics, which transparently represent a recent grammaticalization of the free pronouns (Donohue 2003a) (though, in the case of the third person markers, the proclitic is no longer itself pronominal).[3]

Table 2 Historical syllable reduction in Skou

proto Macro-Skou	proto Western-Skou	Skou		cf., Dusur:
*tey	*tlɛti	ri	'tree'	tɛti
*gʷɔ(-nu)?	*kʷɔnu	wū	'stone'	hβə̄
(*kadu?)	*adu	a	'cloud, sky'	a
*kɔni	*kɔni	kø̃	'tooth'	hə̄
(*tapri?)	*klūpa	lø	'ear'	hlə̄pa
*sjə̃mɔ̃djū	*hɲɔmɔ̃dū	hītū	'two'	jumɔ̃nō
	*k-lā	lā	'he hit.her'	hlā
*(k)ɛ̄du	*nɔ	no	'hand'	nɵ
*ra-psul	*pu	pu	'marsupial'	pu

3 The clitics are identical in form to the singular and plural pronouns, the only difference being that clitic pronouns other than the 1SG or 2SG, but not the free pronouns, may be realized with a schwa rather than *e*, and that the 'plural' clitics may be used with dual reference. There are no separate dual clitic pronouns, and the dual free pronouns show more distinctions than either the singular or plural pronouns, marking gender for all persons.

Vocalic inflectional paradigm: *e* 'ascend'

(3) | *Nì* | *nì = e* | | *Ne* | *ne = **n**-e* |
|---|---|---|---|---|
| 1SG | 1SG = ascend | | 1PL | 1PL = 1PL-ascend |
| *Mè* | *mè = **m**-e* | | *E* | *e = e* |
| 2SG | 2SG = 2SG-ascend | | 2PL | 2PL = ascend |
| *Ke* | *ke = **k**-e* | | *Te* | *te = **t**-e* |
| 3SG.NF | 3SG.NF = 3SG.NF-ascend | | 3PL | 3PL = 3PL-ascend |
| *Pe* | *pe = **p**-e* | | | |
| 3SG.F | 3SG.F = 3SG.F-ascend | | | |

'I/You/He/She/We/You lot/They ascended (/went east).'

It is trivial to extract a set of prefixes that attach to the verb root *e* 'ascend' resulting in this paradigm. The prefixes, which mark singular and non-singular number, as well as person and, in the 3SG, gender, are shown in Table 3.

The prefixes are used to mark agreement on phonologically suitable verbs in Skou, along with the agreement clitics also seen in (3). The prefixal agreement pattern applies with little variation (what there is must be lexically stipulated) to all vowel-initial roots.

Some further refinements are required when we examine a larger corpus of verbs. Many verbs inflect their 3PL form with *y*-, not *t*-. This conjugational distinction must be reconstructed to proto-Western Skou, being found in the closely related Nyao, Wutung, Dumo, Dusur and Leitre languages (see 'hit', compared to 'get', in Table 4: 'hit' takes a palatal 3PL inflection, while 'get' shows no 'prefixal' changes, since a 3PL *t*-combines with the *k*-initial stem to result in a zero parse for agreement).[4] Further, a small number of verbs such as *ã* 'eat' and *hū* 'drink', take *k*- in the 1SG, an irregularity that is also found in neighbouring languages with the same cognate lexemes. One verb, *ʒ̃ e* 'refuse, reject, not want', inflects for 1SG with *n*-. These allomorphs reflect the pre-proto-Western-Skou *ŋ- '1SG nominative agreement', still preserved in Leitre or Dusur 1SG forms, but in Skou either lost entirely (proto-Western-Skou *ŋane 'mother' appears as Skou *ánì* 'mother'), or else, rarely, decomposed into the separate features [nasal] (coronal by default, given the phonological system), or [velar] (stop by default) in the inflectional system for verbs, as just described (see also Donohue 2002). The velar allophone is also found in cognate verbs in other Western Skou

Table 3 Prefixal agreement on *e* 'ascend'

	SG	non-SG
1		*n*-
2	*m*-	
3NF	*k*-	*t*-
3F	*p*-	

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4 The ultimate source of the conjugational differences might be a different set of onsets (voiceless palatal stop and voiceless palatal fricative), and the unusual reconstruction of *hy clusters appears to provide some support for at least the latter segment. By Proto-Skou times, however, this putative contrast had been lost, and only the conjugational differences remained to be inherited by the daughter languages.

Table 4 Regular initial consonant alternations on different phonological verb classes

	Noninflecting	bilabial	alveolar	velar$_1$	velar$_2$	glottal$_1$	glottal$_2$
1SG	*pà*	*wé*	*lá*	*ké*	*ká*	*há*	*ha*
2SG	*pà*	***p**é*	***p**á*	***b**é*	***b**á*	***m**á*	***m**a*
3SG.NF	*pà*	*wé*	*lá*	*ké*	*ká*	***k**á*	***k**a*
3SG.F	*pà*	*wé*	***w**á*	***w**á*	***w**á*	***w**á*	***w**a*
1PL	*pà*	*wé*	***r**á*	*ké*	*ká*	***n**á*	***n**a*
2PL	*pà*	*wé*	*lá*	*ké*	*ká*	*há*	*ha*
3PL	*pà*	*wé*	***r**á*	*ké*	***j**á*	***t**á*	***y**a*
	'scratch'	'get.f'	'roast'	'get'	'hit'	'stand'	'walk'

languages that, like Skou, have lost *ŋ, such as Nyao k-æ̃ 'eat' (cf. Nyao *ana* 'mother'). There are many conditions on the realization of 'prefixal' agreement on C-initial roots, with the most common patterns being shown in Table 4. For most possible onsets (*p t b j m n f y*) no prefixal inflection is allowed (or at least, not realized), and the only exponent of agreement is the proclitic, which is obligatory with all verbal predicates. For *w l k h* and (for one verb, *re* 'go') *r* we see a merging of the features of the onset of the verb root with those of the agreement affix. I shall refer to these verb roots as 'inflecting', contrasting them to the verb in which no realization of prefixal inflection is found ('noninflecting'), while noting that all verbs do inflect by proclitic. (While eight possible syllable-types are noninflecting, and only five different syllable types [plus zero-onsets] are inflecting, over two-thirds of all monosyllabic verb roots do show prefixal behaviour, showing that the unmarked case does involve inflection. I shall briefly return to the analysis of proclitic agreement in section 7.1.) The inflecting verbs can be divided into phonological classes based on the initial consonant of the verb root, though we also find minority subsets within these classes, with the alveolar lateral paradigm being rich in lexicalized variants, usually involving the suppletion of the 3SG.f cell from the 3PL cell (see below for examples). Only the most common patterns have been shown in Table 4. The table shows the (trivial) example of a non-inflecting verb, *pà* 'scratch', and inflecting verbs with bilabial, alveolar, velar and glottal onsets. One verb, *re* 'go', begins with a trill. It inflects as follows: 1SG *re*, 2SG *me*, 3SG.NF *ti*, 3SG.F *te*, 1PL *ti*, 2PL *re*, 3PL *te*. Because there are no other trill-initial verbs, and the consequent impossibility of knowing whether *re* 'go' has regular or irregular inflection, it shall not be considered further.

The same general patterns can be seen here as were seen in (3), especially with the glottal paradigm. We can note the addition of evidence for two conjugations for 3PL, with a *y-* joining the *t-* seen earlier in Table 3 as an alternative for 3PL, evidenced only in some verbs that fall into the velar and glottal paradigms. While there is clearly a basic, regular set of paradigms, shown in Table 4, there are numerous irregularities in the verbal paradigms. Two verbs, *là̀* 'chop (feminine object)' and *lā* 'narrate' show *y-* conjugations in the alveolar paradigm: the 3PL forms for these verbs are *yà̀* and *jā*, respectively. Many verbs of the alveolar paradigm use the 3PL inflection for 3SG.F, such as *rú* 'she straightens' (< *lú*), and in many cases the 3PL and 1PL inflection results in a

t, not *r*, such as *tá* 'hit her', not **rá* (see also (13b)). There is also a very small number of lexically irregular vowel-initial verbs as well: *e* 'board, travel by means of' does not inflect by prefix, for instance, despite the phonological identity of this root with the root of 'ascend' (and the obvious historical relationship). Similarly, *ĩ* 'dig up' and *ø̃* 'jump' have no 'prefixal' alternations of the sort seen in (3), and *hɸ* 'go beachward', *hí* 'wash', *kí* 'scream' and *wá* 'plant' do not show any inflectional agreement, despite matching the overt phonological requirements for prefixation, by analogy with the forms in Table 4. I shall not deal with these cases of the extension of the domain of the morpheme, as this is a morpholexical issue, and not a morphophonological one. Following Ross' (1980) analysis of 'underlying' agreement markers in Dumo (= 'Vanimo'), a related Western Skou language, I assume that the forms shown in Table 5 lie behind the consonantal variation seen in Table 4. The most obvious difference between Table 5 and Table 3 is the fact that the easily identifiable consonants we saw in the vocalic paradigm are not always realized so transparently in Table 4, but show differing degrees of phonological assimilation with the onset of the verb root, ranging from the unchanged realizations common in the glottal paradigm to the complete non-realization that is prevalent in all cells but one in the bilabial paradigm. For comparison, we can note that the forms that Ross (1980: 94) posits for the closely-related language Dumo ('Vanimo') are: 1SG *Ø-*. 2SG *m-*, 3SG.M *h-*, 3SG.F *b-*, 1PL *n-*, 2PL *Ø-*, 3PL *d-*, clearly cognate with the forms for Skou in Table 5. The reconstructable proto Western Skou forms are: 1SG **ŋ-*, 2SG **m-*, 3SG.M **k-*, 3SG.F **gʷ-*, 1PL **n-*, 2PL **Ø-*, 3PL **d-/y-*. See Donohue (2002, 2003a) for comparative data on verbal inflection in the Western Skou languages.

Rather than assuming inflection is by prefixes that merge with an initial onset, if present, a better analysis posits that the five overtly inflecting cells in Table 5 are in fact encoded by sets of consonantal features of varying complexity, but not complete segments as such (see below for further discussion of the nature and representation of these subsegmental features). The 'absorption' of subsegmental inflectional features into the onset of the root is similar to the behaviour of agreement morphemes in languages such as Chaha (McCarthy 1983; Zoll 1994, 1997). There are important differences, particularly the fact that the Skou inflection can arguably be realized as a full segment, as seen in (3). It would be possible to analyse verbs of the vocalic paradigm as involving a syllable specified for a null onset, but with a 'place-holder'.

Table 5 'Underlying prefixes' in Skou

	SG	non-SG
1	(/ *k-*/*n-*)	*n-*
2	*m-*	
3NF	*k-*	*t-*/*y-*
3F	*p-*	

This place-holder is supplied with features only by the agreement morpheme. Under this analysis, the analogy with Chaha object inflection is even closer. Thus 2SG inflection on the verb 'hit' is realized with the features [bilabial] and [voiced] from the inflectional feature bundle, and [obstruent] from the consonant of the root. These features, and some details of their interaction with onsets specified by the roots, can be gauged from the summary results in Table 5, with the caution that underspecification applies to many of the cells, so that 3SG.F is simply specified as [bilabial] and [obstruent], for instance. For now, I shall use the overtly occurring forms shown in Table 5 as shorthand to refer to these subsegmental feature bundles, while acknowledging that they do not represent full segments. The ability of segmental features to merge in a single segment allows for the realization of inflection despite a language-wide prohibition on consonant clusters, evidenced by the lack of any such clusters in modern Skou, despite their attestations in closely related languages, and proto-Skou (see section 2 for brief examples, and the material in Donohue 2003a).

The inflecting onsets are those in which the Segment Structure Conditions (SSCs) are not violated by the subsegmental parsing of features associated with the marking of agreement. Other phonological features of the language that will become relevant include a general ban on codas, evidence for which can be seen in Table 2, a condition against nonlexical syllabic structure (which has also been applying in the language diachronically), and eventually a (lower-ranked, and occasionally violated) ban on complex or contiguous nuclei (*VV) as well.

> SSC   Only specified combinations of feature bundles may combine to
>   yield felicitous outputs.

I shall not describe these conditions in detail in this paper, but their general nature can be inferred from the material presented in Tables 4, 6 and 7. At their most complex these feature bundles resemble underspecified feature bundles for whole segments. In other cases they contain less information that would be required phonologically to specify the segment. Thus, for instance, while the 2SG agreement, '*m*', must be specified as having the features [labial], [nasal] and [voice], the 3SG.F agreement, '*p*', is specified only for the features [labial] and [obstruent].

Table 6 Features associated with the different inflectional categories

	feature(s)		feature(s)
2SG '*m*'	[labial] [nasal] [voice]	1PL '*n*'	[coronal] [nasal]
3SG.NF '*k*'	[obstruent] [velar]	3PL_t	[coronal] [obstruent]
3SG.F '*p*'	[labial] [obstruent]	3PL_y	[palatal]

Table 7 Features associated with the different inflecting verb onsets

	feature(s)		feature(s)
bilabial *w*	[continuant] [labial] [voice]	velar *k*	[obstruent] [velar]
alveolar *l*	[coronal] [voice]	glottal *h*	[continuant]

The features that are specified for the different agreement markers are shown in Table 6. 2PL, consistently realized with no affixation, is not shown, and the rare allomorphs of the 1SG agreement, *n* and *k*, function exactly as do the 1PL and 3SG.NF prefixes, respectively. Table 7 shows the features that are associated with the different onsets found with inflecting verbs. Notice that for both tables the more highly specified members show, predictably, the greatest 'persistence': for inflectional cells, this means that a more highly specified inflection is most likely to be overtly realized on verb, so that 2SG is the most frequently differentiated cell in Table 4, and the 3PL '*y*' inflection the least commonly observed. For consonants associated with verbs it means that a root onset with a lot of highly specified features is more likely to resist fusion with an inflection, such that the bilabial verbs show very little overt inflection, and the glottal verbs very much (and, of course, verbs with no consonant onset show the least disruption of the inflectional (sub)segments). In both cases principles of underspecification determine the other features associated with different consonants, based on the segments available in the rest of phonological system. (It will not have escaped notice that in both cases it is the bilabial consonants that are 'strongest' in the system; recall from Table 1 that bilabial is also the most highly utilized place of articulation in Skou, a feature shared with many other languages of the north coast of New Guinea.)

The features of the inflection interact with those of the onset of the verb on which they are realized in ways that are mainly predictable on general phonetic and phonological principles, with some of the exceptions being explained by the phonological history of the language (Donohue 2002). For example, examining the features in Tables 6 and 7, and the outcomes seen in Table 4. it is clear that a hierarchy of preservation of place features operates, such that [labial] dominates all other places, [palatal] dominates [velar] and [coronal], and these last two place features show a more complex interaction, such that [coronal] on the verb dominates an inflectional [velar], and [velar] dominates [coronal] specified in the inflection. The details of the system are outside the scope of the present paper, but it is worth noting that some OCP effects can be observed: if both the verb and the inflection are specified as [+voice], the merger will show the value [-voice] (shown in the 2SG inflections of labial and alveolar verbs). Similarly, the feature [obstruent] is not

realized if both the inflection and the verb are specified as [obstruent] (see the 3SG.F inflection of velar verbs), with the proviso that the combination [velar, continuant] is not part of the phonological system of the language (see the discussion following (8)). The feature [nasal] is lost in any interaction with an oral consonant, and [labial] tends towards a [+continuant] realization wherever possible. The fact that the 2SG features [labial, nasal, voice] interact with a *w* onset resulting in a *p* (see Table 4) may seem hard to justify unless we know that modern Skou *w* has its origins in proto-Western-Skou *g^w, and that this phoneme may optionally appear as [ŋg^w] following a nasal vowel in a low-pitched syllable (e.g. *tangwáue* 'bush turkey, mallee fowl': [tāwaʉ] ∼ [tāŋwaʉ] ∼ [tāŋg^{w}aʉ]), providing both synchronic and diachronic support for the feature [obstruent] present in the modern 2SG *p* inflection. The 'merger' of 3SG.NF [obstruent, back] with *l*, resulting in *r*, follows from the fact that the *r* is articulated further back than the *l* (the trill is post-alveolar, while the lateral is alveolar). Predictably, interaction with a non-oral *h* onset results in the least deviation from the values that would be expected following from general principles of underspecification. One important feature of the SSCs is that consonantal features such as those shown in (41) may only be realized in the onset of a syllable, and may not combine with nucleus positions in the syllable. This means that a candidate such as *hatà̃* to parse *hatà* with the 2SG features represented as *m*, specifically with the feature [nasal] realized only on the vowel, would not be acceptable (compare with the other candidates in (14)). This is despite the evidence that such mergers did occur in the history of the language (see 'stone' and 'tooth' in Table 2 for consonant > vowel, and 'hand' for the transferral of the feature [nasal] from the consonant to the vowel).

The main difference between these subsegmental feature bundles and those analysed for, for example, Chaha (McCarthy 1983; Zoll 1994; Rose 2006), is that in most cases the morphological features described here for Skou are parsed with feature *bundles*, and not a single phonological feature. This fact in turn licenses the ability of these feature bundles to be realized on an empty onset position, with no segmental host, and to be realized as entire segments, as seen in (3). The subsegmental nature of the inflectional marking means that the agreement inflections are not truly C-final affixes, but only simulate the appearance of monoconsonantal suffixes operating in a NoCoda-dominated phonological landscape.

In most cases the banned combinations would be segments that are not in the Skou phonological system (see Table 1). For instance, drawing from Tables 4 and 5, while 2SG *m*- combines with *ká* 'hit' to yield *bá*, combining the place and voicing values of *m* with the obstruent specification for *k*, the 1PL *n*- cannot so combine, since the combination [coronal, voiced, obstruent] would result in [d], which is not an attested phone or phoneme.

Having introduced the morphophonological facts of agreement and its subsegmental nature, I shall now address the question of the positioning of this affix, and what constraints will adequately model this.

4. Aligning the Affix: Monosyllabic Roots

To account for the different nature of the consonants for morphological purposes, because it is not clear what phonological features can be used to characterize either of these sets of consonants, and because closely related languages have different patterns of realization of agreement, I shall simply refer to the consonants that allow agreement as being 'inflecting', and those that do not as being 'non-inflecting'. In Skou affixal agreement may be realized on syllables with an 'inflecting' onset, *w l k h* (*r*) or Ø, and not on syllables with a 'disagreeable' onset, *p b m f t n y* or *j*, as exemplified in Table 4.[5]

With respect to vocalic roots such as *e* 'ascend' in (4) the most simple analysis could be quite trivial, involving a simple ALIGN-LEFT constraint, referring to the alignment of the agreement affix with respect to the root. (Instead of Align constraints we could equally well employ Edge constraints, with the same effect, and the same relative ranking in the tableaux. Broselow [2003] follows such an approach.)

ALIGN-LEFT Align an inflectional affix to the left edge of the root
MAX (AGR) Agreement marking in the input should be realized in the output

This is trivially shown in (4) (2SG has been chosen to illustrate agreement in most of the tableaux that follow since it is the inflection with the most productive realization, being consistently realized on all verbs that show inflection, as seen in Table 4.). The suffixal candidate *e-m* is ruled out on the basis of its one-segment violation of ALIGN-LEFT. An additional constraint, MAX (AGR), has been shown to disallow the candidate with the null parse, *e*.

(4)

e 'ascend' with 2SG agreement, alignment constraints

m + e 'ascend'	ALIGN-LEFT	MAX (AGR)
e-m	*e*!	
⇒ *m-e*		
e		*!

(5) shows the same candidates put through a tableau consisting of prosodic constraints against codas, as well as MAX (AGR) to rule out the null parse. Rather than using ALIGN-LEFT as a critical constraint, NOCODA is employed.

NOCODA codas may not be present in output forms

Given the same low ranking of MAX (AGR), the same candidate is selected, suggesting that, if an alignment constraint is operative in the positioning of this affix, it is not highly ranked. Note that either an ALIGN-LEFT or an ALIGN-RIGHT constraint

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5 The unnaturalness of the class of inflecting onsets is somewhat mitigated by appeal to a diachronic explanation. Modern Skou *w* < *k^w (Donohue 2002), which along with *k* and *h* represent all of the [+back] consonants. This leaves only *l* and one verb root with *r*, the non-nasal sonorants, to account for. We have thus a disjunctive class of ([+back] or [+sonorant, -nasal]).

would be compatible with the candidates selected in (5), provided they were ranked below NoCODA.

e 'ascend' with 2SG agreement, syllable structure constraints

(5)

$m + e$ 'ascend'	NoCODA	MAX (AGR)
e-m	*!	
m-e		
e		*!

⇒ (points to *m-e*)

A simple way to avoid violations of NoCODA would be for an epenthetic vowel to be added following the agreement marker. This is a pattern that is employed in other languages to avoid similar *CC violations, through the addition of paragogic vowels on historically final consonants. This is attested in the general region in, for example, Sneddon (1993) on Sulawesi languages, van der Veen (1915) on North Halmahera, and Ross (1988) on several Oceanic groups in eastern New Guinea. Sneddon (1993) notes proto-Austronesian *ŋajan > Talaud *aranna* 'name', *manuk > *manuʔa* 'fowl', with a regular paragogic *a*. 'Copy vowels' (identical to those of the preceding syllable) can be seen in examples from proto-North Halmahera (van der Veen 1915) *pokol > Tobelo *pokoro* 'stomach', *ŋauk > *ŋauku* 'ear', and in the Bali dialect of Bali-Vitu (Western Oceanic; Ross 1988), where (for instance) proto Oceanic *boRok > Bali *boroko* 'pig', *Rumaq > Bali *rumaka* 'house'. This epenthetic strategy is not used in Skou; I assume that DEP$_\sigma$ is relevant to the tableaux to rule out such candidates. As relevant to the data presented here, DEP$_\sigma$ is defined as follows:

> DEP$_\sigma$ avoid syllable structure that was not part of the lexical entry

This constraint is independently motivated in the phonological history of Skou: there are numerous cases of reduction of the syllable count of lexemes from proto-Skou to modern Skou, implying that the constraint DEP$_\sigma$ has become increasingly prominent over time (see section 2). I have shown the epenthetic possibility with a schwa, *e-mə* in (6), but this should be read simply as a non-lexical vowel, without being committed to its precise quality, since if the epenthetic vowel copied the features of the lexical vowel, resulting in [ɛmɛ], it would still fail to pass DEP$_\sigma$.

e 'ascend' with 2SG agreement, syllable structure constraints

(6)

$m + e$ 'ascend'	NoCODA	DEP$_\sigma$	MAX (AGR)
e-m	*!		
e-mə		*!	
m-e			
e			*!

⇒ (points to *m-e*)

Based on a vocalic-paradigm verb we can see no reason to include a (high-ranking) constraint against consonant clusters, or any other constraints, into the tableaux, and no evidence of any ranking between the constraints. When we examine verbal agreement on roots with onsets we can see the necessity of at least a partial constraint

ranking, in which Max (AGR) is ranked lower than the purely phonological constraints.

In (7) the tableau is similar to that in (6), but showing inflection on the verb *ká* 'hit'. Simply adding an *m* to the root will, in all but the most strictly right-aligned case, result in a consonant cluster, something that we have seen is not permitted in the language, sections 2 and 3. I assume that *CC plays a role in the language, and that violations of *CC are responsible for these particular candidates not being selected.

       *CC   avoid consonant clusters

The appearance of epenthetic vowels breaking up these clusters is ruled out by *DEP$_\sigma$, just as was the case for (6). I have also shown a number of candidates in which certain features of the inflection (namely, the features [labial], [voice] and/or [nasal]) have been combined with those of the [k] onset of the root, resulting in *má*, *pá* and *bá* as possible (phonetically plausible) candidates. In order to exclude these candidates I assume the presence of a phonologically-driven set of constraints that specify which combinations of segmental features may combine together, which (following Zoll 1994) I call SSCs (Segment Structure Conditions), as described in section 3. These constraints are essentially based on the phonological inventory of the language: the reason that *m* ([labial], [voice], [nasal]), when combined with *k* ([dorsal]) does not result in an *ŋ* is simply that there is no *ŋ* in the language (see the discussion associated with Tables 6 and 7, and footnote 4); the combination [dorsal], [voice], [nasal] is not a licit combination in Skou. Without examining these conditions in detail (the principles are outlined in section 3), they serve to eliminate the false candidates.

(7)   *ká* 'hit' with 2SG agreement, phonological constraints III

m + ká 'hit'	NOCODA	*CC	DEP$_\sigma$	SSC	MAX (AGR)
ká-m	*!				
k-m-á		*!			
m-ká		*!			
kámə, kəmá, məká			*!		
má, pá etc.				*!	
⇒ *bá*					
ká					*!

A verb with 3SG.nf agreement, shown as *k* in Table 5, results in a null parse of the agreement morpheme. This outcome is successfully predicted with these constraints. We also see that we have evidence for constraint ranking, at least partial: although MAX (AGR) is violated, the null parse is favoured over any other candidates involving violations of NOCODA, *CC, DEP$_\sigma$ or SSC. Clearly these four constraints, while not yet internally ordered, outrank MAX (AGR).

(8)

ká 'hit' with 3SG.NF agreement, phonological constraints

k + *ká* 'hit'	NOCODA	*CC	DEP$_\sigma$	SSC	MAX (AGR)
ká-k	*!				
k-k-á		*!			
k-ká		*!			
kákə, kəká, kəká			*!		
xá, há, bá etc.				*!	
⇒ *ká*					*

It might seem strange, or at least arbitrary, to offer *xá* as a possible candidate in (8), given the lack of a *x* in the phonological inventory of Skou. In fact Nyao, a related neighbouring language spoken immediately east of Skou, and which also lacks a lexical *x* in roots, has verbal paradigms in which the combination of inflectional *k* and *k* on the verb root yields [x]. This shows the precedent for non-lexical segmental structures in the western Skou languages. The nomination of *bá* as a possible candidate for the 3SG.NF form of 'hit', on the other hand, *is* strange and arbitrary. Dealing with a noninflecting verb that does not allow for the merger of the grammatical agreement marker with the onset of the syllable, we must also allow for the null parse. No additional constraints are required to model the successful selection of *pà* in (9).

(9)

pà 'scratch' with 2SG agreement

m + *pà* 'hit'	NOCODA	*CC	DEP$_\sigma$	SSC	MAX (AGR)
pà-m	*!				
p-m-à		*!			
m-pà		*!			
pàmə, pəmà, məpà			*!		
mà, wà, bà etc.				*!	
⇒ *pà*					*

The constraints used in (5)–(9) will all successfully predict the appearance and location of agreement, without needing to refer to any alignment constraints. But at the same time they are compatible with such a constraint: adding ALIGN-LEFT anywhere in any of tableaux (5)–(9) would not affect the selection of the correct candidate. In the following section I present data from disyllabic verb roots that shows that in fact ALIGN-LEFT is *not* compatible with candidate selection, and that in fact we must assume that ALIGN-RIGHT is relevant to candidate selection.

5. Disyllabic Roots

When we examine unanalysable disyllabic roots we find the value of the more complex model, however. Given a verb consisting of two syllables, there are logically four possible combinations of agreeable and disagreeable syllable types, as shown in (10).

Inflecting and noninflecting combinations of syllables in disyllabic predicates

(10) a.   σ   σ   b.   σ   σ

             inflecting   inflecting   inflecting   noninflecting

       c.   σ   σ   d.   σ   σ

          noninflecting inflecting   noninflecting noninflecting

Cases with two disagreeable syllables show no agreement, and present a trivial case. Verbs that meet this criterion include *bātʉ* 'break', *fátí* 'lay down (someone) to sleep', and *jípa* 'fly'. Since both syllables are noninflecting, agreement may not be realized on either syllable and the null parse is favoured. Note that the proclitic agreement is obligatory, regardless of the presence or absence of 'prefixal' agreement, and so ambiguities are resolved. The arrangement of each verb and its inflecting parts matches that used for 'ascend' in (2), with two columns, for singular and nonsingular number, and rows for first, second and third person, the last of which is also divided into non-feminine and feminine gender.

		Inflection of 'break:'			Inflection of 'fly':	
(11)	a.	nì = bātʉ	ne = bātʉ	b.	nì = jípa	ne = jípa
		mè = bātʉ	e = bātʉ		mè = jípa	e = jípa
		ke = bātʉ	te = bātʉ		ke = jípa	te = jípa
		pe = bātʉ			pe = jípa	

A tableau showing the application of the non-alignment constraints to *bātʉ* is trivial, and is shown in (12). Neither *b* nor *t* allows for feature combinations with inflection, and the only alternatives to subsegmental parsing involve the creation of consonant clusters, non-lexical syllables, or of codas, all of which are also banned outcomes. This results in a null parse being the optimal candidate.

(12)

bātʉ 'break' with 2SG agreement

m + bātʉ 'break'	NoCODA	*CC	DEP$_\sigma$	SSC	MAX (AGR)
bātʉ-**m**	*!				
bãt-**m**-ʉ	*!	*			
bã-**m**-tʉ	*!	*			
b-**m**-ãtʉ		*!			
m-bātʉ		*!			
bātʉmə, bātʉmʉ, bāmətʉ, bəmātʉ, məbātʉ			*!		
bãnʉ, **m**ãtʉ etc.				*!	
⇒ bātʉ					*

Cases of verbs with one inflecting syllable and one noninflecting syllable are equally easy to find, and examples of these are shown in (13) illustrating the patterns predicted in (10b) and (10c), respectively.

Inflection of 'run':   Inflection of 'teach':

(13) a. *nì = hatà*   *ne = **n**atà*   b. *nì = nalǚ*   *ne = **n**arǚ*

   *mè = **m**atà*   *e = hatà*   *mè = na**p**ǚ*   *e = nalǚ*

   *ke = **k**atà*   *te = **t**atà*   *ke = na**r**ǚ*   *te = na**r**ǚ*

   *pe = **w**atà*   *pe = na**r**ǚ*

The agreement appears regularly on the syllable that allows it by satisfying the SSCs for that syllable. With *hatà* 'run' the initial *h* is capable of hosting agreement, while the *t* of the second syllable is not, and agreement is realized on the initial syllable.

hatà 'run' with 2SG agreement

(14)

m + hatà 'run'	NoCoda	*CC	DEP$_\sigma$	SSC	MAX (AGR)
*hatà-**m***	*!				
*hat-**m**-à*	*!	*			
*ha-**m**-tà*	*!	*			
*h-**m**-atà*		*!			
***m**-hatà*		*!			
hatàmə, hatəmà, hamətà, həmatà, məhatà			*!		
hanà, halà, harà				*!	
⇒ *matà*					
watà				*!	
hatà					*!

With *nalǚ* 'teach' agreement is realized on the second syllable, which is *l*-initial. This happens because *n* does not allow for feature merger, and any other overt realization of agreement either results in consonant clusters, non-lexical syllables, or codas.

nalǚ 'teach' with 2SG agreement

(15)

m + nalǚ 'teach'	NoCoda	*CC	DEP$_\sigma$	SSC	MAX (AGR)
*nalǚ-**m***	*!				
*nal-**m**-ǚ*	*!	*			
*na-**m**-lǚ*	*!	*			
*n-**m**-alǚ*		*!			
***m**-nalǚ*		*!			
nalǚmə, naləmǚ, naməlǚ, nəmalǚ, mənalǚ			*!		
⇒ *napǚ*					
namǚ				*!	
malǚ				*!	
nalǚ					*!

While not requiring it, this tableau is fully compatible with an Align constraint, provided it is ranked below the other constraints (that is, NoCoda/*CC/SSC/ DEP$_\sigma$ » ALIGN). There is, then, not a strong claim that ALIGN-LEFT plays a role in the grammar of affixation in Skou, but it is not incompatible with the constraints

we have considered. Of course, neither do these data argue against ALIGN-RIGHT, as long as it is ranked sufficiently low, below MAX (AGR). Of course, the fact that in the tableaux in (14) and (15) the winning candidates violate none of the constraints listed means that we could add any constraint we wished, and as long as it was ranked lower than MAX (AGR) we would arrive at the optimal candidate. If there is an alignment constraint relevant to the positioning of the agreement inflection, it is a very low-ranked one, and essentially the constraints which are a necessary part of the phonotactic account of the language, and which are independently attested as historical trends in Skou, are enough to assure proper alignment of the agreement marker.

The crucial data that indicates the relevance of alignment constraints comes from an examination of disyllabic verbs in which both syllables are inflecting syllables. We find there are four logical permutations for the realization of agreement on predicates of this type, shown in (16).

Hypothetical possibilities for the realization of agreement on disyllabic roots with two inflecting syllables

(16)   a. σ_1 σ_2 b. σ_1 σ_2
            agreement   agreement   agreement   no agreement
        c. σ_1 σ_2 d. σ_1 σ_2
        no agreement   agreement   no agreement   no agreement

Of these possibilities, (16d) is not a pattern that we need to consider, since it is, in effect, the noninflecting pattern introduced in (10d), and illustrated in (13a-b).[6] The pattern described in (16a), in which agreement appears on both syllables, is commonly found. This probably reflects the diachronic coalescence of two verb roots, but must be analysed synchronically as a bipartite stem. The inflectional paradigms for *háhi* 'count' and *lo hí* 'hit with hand', illustrating this multiple-exponence pattern, are shown in (17).

		Inflection of 'count'			Inflection of 'hit with hand'	
(17)	a.	nì = *háhi*	ne = **nán**i	b.	ní = *lohí*	ne = **ron**í
		mè = **mam**i	e = *háhi*		mè = **pom**í	e = *lohí*
		ke = **ká**ki	te = **yáy**i		ke = *lo**k**í*	te = **roj**í
		pe = **wáw**i			pe = **wow**í	

Modelling these predicates simply requires that we consider each syllable separately for the parsing of agreement, and gets us no further in our search for an underlying

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6 Some verbs are phonologically suited for inflection, in that their onsets are either null (the vocalic paradigm) or else *w l k* or *h*, and yet do not show inflection. Disyllabic members of this class are not common, but do exist: *lého* 'be surprised, be amazed' is one such example of a verb with two syllables, both of which are in the 'inflecting' category (based on phonological constraints—that is, Segmental Structure Constraints), but which do not inflect for lexical reasons. These verbs will not be discussed further, being governed by stipulative, irregular conditions they are outside the regular rules and models of the grammar described here.

alignment preference for the 'prefixes'. I take this to be an instance of lexicalization in progress; agreement is realized twice, because the two verbs are treated as independent, as if they were part of a serial verb construction. Effectively, the domain for agreement is a single syllable in each case, resulting in multiple exponence.

Searching through the patterns predicted in (16b) and (16c), however, is significant. While the pattern shown in (16c), with agreement on the second syllable, is attested, the pattern in (16b), in which agreement is only realized on the first syllable, is never attested.

We can see a real example of this with the verb *kalē* 'look for', shown in (18). Agreement is realized in the onset of the second syllable, but not on the first syllable. This is not a result that we would have predicted if we assumed an ALIGN-LEFT constraint and applied the domain of inflection to the whole word. If ALIGN-LEFT did apply to determine the positioning of the agreement marking, we would predict a pattern such as that shown in (19) (assuming that the verb is a member of the *y*-conjugation). This is not attested with any verb in the language.

Inflection of *Kalè* 'look for':

(18)   nì = kalè   ne = ka**r**è
       mè = ka**p**è   e = kalè
       ke = kalè   te = ka**r**è
       pe = ka**w**è

Hypothetical, but unattested, inflection of *kalè* 'look for' with left-dominant affixation:

(19)   nì = kalè   *ne = kalè
       *mè = **b**alè   e = kalè
       ke = kalè   *te = **j**alè (?)
       *pe = **w**alè

It might be argued that the inflecting pattern seen in (18), with inflection on the second syllable, is due to a preference for inflection on the *l*-initial syllable rather than the *k*-initial one. This would argue that segmental differences, rather than alignment constraints, determine the pattern in (18) rather than (19). In (20), however, we see the verb *loké* 'snatch', which also shows inflection on the second syllable, not the first, despite the order of the different onsets being reversed from that seen in *kalè* 'look for' in (18). This shows that any attempt to determine the location of agreement in disyllabic verbs on the basis of an appeal to segment identity doomed to failure.

Inflection of *loké* 'snatch'

(20)   nì = loké   ne = loké
       mè = lo**b**é   e = loké
       ke = loké   te = loké
       pe = lo**w**é

A tableau using the constraints that have so far proved to be successfully applied to *kalè* is shown in (21). While this tableau does successfully predict the form *kapè*, it also makes the false prediction that *balè*, from (19), should be successful, since neither *kapè* nor *balè* show any violations. It is worth noting in passing that a form such as **bapè** would not violate any of the constraints shown in (21). This is not an acceptable form, giving further evidence that the forms with multiple exponence by 'prefix', such as *háhi* in (18), are lexically irregular, being specified as involving more structure than is absolutely necessary for the realization of the morphemes in the input (the doubly inflecting predicates probably involve historical compounds).

(21)

kalè 'look for' with 2SG agreement

m + kalè 'look for'	NOCODA	*CC	DEPσ	SSC	MAX (AGR)
*kalè-**m***	*!				
*kal-**m**-è*	*!	*			
*ka-**m**-lè*	*!	*			
*k-**m**-alè*		*!			
***m**-kalè*		*!			
kalèmə, kaləmè, kaməlè, kəmalè, məkalè			*!		
⇒ *kap**è***					
*kam**è***				*!	
*⇒ *bal**è***					
*wal**è***				*!	
kalèng					*!

The only way to resolve this false prediction is to rerank (highly) another constraint that is more strongly violated by **balè** than by *kapè*. If we assume that inflection is basically suffixal—that is, the constraint ALIGN-RIGHT is relevant to the candidate selection—then we can successfully predict *kapè* and not *balè. This constraint is dominated by the syllable structure constraints NOCODA, *CC and DEPσ as well as the SSCs and MAX (AGR), leading to infixal behaviour in the case of *kalè*. The candidate that involves prefixation (and merger), *balè*, is ruled out by virtue of its displaying inflection further from the right edge of the word than is the case with the successful candidate, *kapè*. A partial tableau showing the application of this constraint to the two successful candidates of (21) is given as (22).

(22)

kalè 'look for' with 2SG agreement and ALIGN-RIGHT

m + kalè 'look for'	NOCODA	MAX (AGR)	ALIGN-RIGHT
⇒ *kap**è***			*è*
balè*			a!lè
kalè		*!	

(23) shows how assuming that ALIGN-LEFT, and not ALIGN-RIGHT, is dominant will result in the wrong predictions about the successful candidate.

*kal*ȅ 'look for' with 2SG agreement and ALIGN-LEFT

(23)

*m + kal*ȅ 'look for'	NoCODA	MAX (AGR)	ALIGN-LEFT
*kap*ȅ̀			*ka*!
balȅ̀			
*kal*ȅ̀		*!	

*⇒ (points to **bal**ȅ̀ row)

Under this 'suffixal' analysis the paradigm for 'ascend' first seen in (3) involves the use of the *suffixes -m, -k, -p, -n* and *-t* attached to the stem *e*. The suffixation of these consonants immediately following the nucleus of the syllable would result in syllables of the shape VC, a phonotactic form that is banned by the high-ranking NoCODA. Because a null parse is dispreferred by MAX (AGR), the suffix is aligned one segment further left than would be expected from the strict application of ALIGN-RIGHT. This is modelled in (24), showing only a subset of candidates and constraints.

e 'ascend' with 2SG agreement (compare with (4) and (5))

(24)

m + e 'ascend'	NoCODA	MAX (AGR)	ALIGN-RIGHT
*e-**m***	*!		
***m**-e*			*e*
e		*!	

⇒ (points to ***m**-e* row)

Similar reasoning applies to the other instances of apparently prefixal agreement: in all cases a low-ranked ALIGN-RIGHT constraint operates, but is invariably violated by NoCODA. The suffixal agreement is thus never realized suffixally, and indeed is frequently found prefixally. The fact that it appears infixally, and not prefixally, on disyllabic roots for which either syllable is a potential host means that we must regard the agreement morpheme as being essentially a right-aligned element. The tableaux in (14) and (15) can now be understood as allowing winning candidates that *do* violate a constraint, ALIGN-RIGHT, by more than some of the other candidates. In (14) *matà* shows the maximal degree of violation of this constraint, but is still selected as the optimal candidate since it satisfies the more highly-ranked constraints that proscribe codas, clusters, and features combinations with *t*. In (15) the marking of agreement on *nap*ǔ shows one violation of ALIGN-RIGHT, which is not true of **nal*ǔ*m*, with the coda-producing 2SG *m* on the right edge.

Is this an unmotivated analysis, or one that would allow us to treat *all* affixation as right-aligned, regardless of its position in the word? In the following section I will show that neither of these propositions are true.

6. A Contrast: True Prefixation in the Area

One is an unrelated language spoken contiguously with the eastern edge of the Macro-Skou family area, and it shows true prefixation. An example of a

verbal paradigm in One is given in (25), showing inflection on *ia* 'lie down, sleep'.[7]

Verbal paradigm in One

(25)
I	*ia*	*Fimpla f-ia*		*Mine*	*m-ia*
1SG	lie.down	1DU.IN 1DU-lie.down		1PL	1PL=1PL-lie.down
Yine	*w-ia*			*Pine*	*p-ia*
2SG	2/3SG-lie.down			2PL	2PL-lie.down
Wo	*w-ia*			*Nine*	*n-ia*
3SG	2/3SG-lie.down			3PL	3PL-lie.down

'I/You/He/She/We/You lot/They lay down.'

Unlike Skou, One allows codas, as can be seen in (26). All consonants except *s* and *k* (which is a very rare phoneme) may occur as codas (*r* is the allophone of *t* following a non-nasal sonorant).

(26)
	V_CV	V_#
p:	*tapla* 'mouth of river'	*mayrop* 'cover'
f:	*tafla* 'cold'	–
m:	*imfla* 'husband'	*pinkim* 'inside skin of betel nut'
t:	*sarwa* 'rack'	*fir ye* 'have scabies'
n:	*intala* 'root'	*unkun* 'mosquito'
l:	*ulpi* 'ginger'	*upol* 'casuarina tree'
y:	*naympla* 'forehead'	*mantay* 'coconut'
w:	*sawmu* 'tree kangaroo'	*sisaw* 'arrow with three prongs'
ɥ:	*plaɥla* 'fence'	*aɥ* 'sago'

Perhaps even more tellingly, there are morphological processes that result in codas. Both the applicative and the locative, now largely lexicalized, involve an *-n* (Crowther 2001).

	Plain verb	Applicative verb with *-Vn*
(27)	*wiri* 'speak, say'	*wir(i)-on* 'speak to, tell'
	Productive *-ne*	Lexicalised as *-en*
(28)	*floka-ne* 'swamp'	*moren* 'in the house, at home'
	(<*'water' + *-ne*)	*moru* 'house' + *-ne* (+ metathesis))

(modern One 'water' is *fola*, following further application of the regular change *k (> *ʔ (> Ø)), and metathesis of Vl/lV, an erratic but common process in One. The case marker *ne* is more productively found marking instruments in modern One: *sisaw ne* 'with the three-pronged arrow')

Given the lack of a high-ranked NoCODA constraint we would expect a verb such as *ia* 'lie down, sleep' to inflect as *iam with a 1PL subject, if the agreement was aligned to the right; even if a word-final alignment was banned for some reason, the

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7 Orthographically, vowel sequences are written with a glide between the two vowel symbols, thus /ia/ appearing as <iya> (Sikale *et al.* 2002). This practice has not been followed here, in order to avoid obscuring the phonotactic patterns being discussed. In terms of the map in figure 1, One lies approximately as far north as Manem, and approximately the width of the map again (50km) to the east of the edge of the map.

minimal step to the left would produce **ima*, also ungrammatical. The form *mia* is the one expected if we assume that the agreement morpheme is aligned to the left. The fact that a consonant-initial root, such as *tiolo* 'put, place' always appears as *tiolo*, and not as **timolo* or **tiolom*, (or, with increasingly lower likelihood, **tiolmo*, **tiomlo*, **mtiolo*, or **tmiolo*), shows that Max (Agr) is ranked lower than Align-Left in One, that there are high-ranking constraints on the form of initial clusters, and that there is an absolute ban on subsegmental feature merger. (The only clusters allowed in lexical roots are *pl* and *fl*. One grammatical enclitic, *nto* 'perhaps, maybe', evidences an intial *nt*, and one verb (*te* 'come around a contour level') shows irregular inflection involving otherwise illicit initial clusters (*mte*, *pte* and *nte* in the plural, and *fte* for 1DU), but otherwise the phonological constraints are quite strict.) We cannot assume that agreement in One is anything other than prefixal, arranged through a relatively high-ranked Align-Left constraint. The behaviour of true left-aligned prefixation can be seen to be quite different to that of the affixation in Skou.

7. Typological and Historical Support for the Suffixal Analysis of Agreement in Skou

The previous sections argued that, in effect, the monoconsonantal agreement affixation in Skou is basically 'suffixal', and not 'prefixal', despite always appearing in an onset, not in a coda. Is this a plausible analysis of real data, given what we know of the profile of the rest of the language?

The short answer is 'yes'. The 'prefixes' of Skou are a typological anomaly in the language, which in all other respects shows the characteristics of a suffixing language. Skou shows behaviour consistent with a suffixing language, and inconsistent with a prefixing language, in many respects. Firstly, all other bound morphology is suffixal:

- it has a suffixal applicative morpheme
- it has suffixal possessive marking on nouns.

Examples of both of these features are shown in (29) and (30).

applicative by suffix
(29) *Te=ing a*   *te=y-a-**na***   *pá*.
      3PL=the   3PL=3PL-walk-APPL   house
      'They walked to the house.'

possession by suffix
(30) *pá-tè=te*
      house-3PL.GEN=3PL.DAT
      'their house'

The reason that the applicative, genitive and dative suffixes are allowed to be realized suffixally, not prefixally, is simply that they include vowels, which project a

syllabic structure and so avoid Dep$_\sigma$. The fact that these affixes have a CV shape means that they do not cause any violations of NoCoda. Other structural features that are strongly correlated with a suffixing typology in a language include a host of head-final word order facts:

- SOV (or, more rarely, OSV) basic order in the clause;
- post-N adposition marking (i.e. postpositions, not prepositions);
- right-aligned reduplication.

That these are features associated with OV languages can easily be checked. Combining the values for OV vs. VO languages with the dominant position for inflectional morphology in the WALS database (Haspelmath *et al.* 2005) reveals that 76% of OV languages are dominantly suffixing, and only 17% show significant amounts of prefixal inflection. VO languages, in contrast, are dominantly suffixing 34% of the time, and show significant amounts of prefixation in 45% of cases (as well as a greater proportion of languages lacking much inflectional morphology: 22%, compared to 7% for OV languages). All of these features are found in Skou. Examples are shown in (31)–(34), illustrating the word order in main clauses, the postpositional case, and the right-aligned reduplication.

	Subject	Object	Verb
(31)	*Nì*	*pá=fʉ a*	*nì=lʉ.*
	1SG	house=that	1SG=build
	'I built that house.'		

N-postposition case marking

(32)	*Nì*	*tāhápā=**pa***	*nì=re*	*pá-tè=te.*
	1SG	motorbike=INSTR	1SG=go	house-3PL.GEN=3PL.DAT
	'I went to their house by motorbike.'			

Right-edge reduplication on verbs and nouns

(33)	a.	*te=rapʉ*	b. *te=rapʉ-**pʉ***	c. * *te=ra-rapʉ*
		3PL=descend	3PL=descend-RED	3PL=RED-descend
		'they descend'	'they will descend'	

(34)	a.	… *ne=bàro-ro,*	b. * … *ne=bá-bàro,*
		1PL=widow-RED	1PL=RED-widow
		'and us widows, …'	

In short, the overall typological profile of Skou is more compatible with suffixation than with prefixation. Only the recently grammaticalized clitics are counter to this, being proclitic rather than enclitic. I return to these morphemes in 7.1, but shall first consider another instance of agreement that is best thought of as being underlyingly suffixal, though, like the 'prefixes', it is realized in the modern language as a subsegmental feature parse.

In addition to the 'prefixal' agreement affixes, some verbs show agreement by vowel ablaut; this can occur in addition to any other agreement marking. Examples can be seen in (35a-c). Here the verb roots have the vowels ø, ʉ and *e*,

respectively, but in the 3SG.f and 3PL we see ablaut applying to these vowels (shown in bold).

		Inflection of 'shave':			Inflection of 'see':			Inflection of 'give':	
(35)	a.	*nì=lɸ*	*ne=rɸ*	b.	*nì=fʉ*	*ne=fʉ*	c.	*nì=lẽ*	*ne=rẽ*
		mè=pɸ	*e=lɸ*		*mè=fʉ*	*e=fʉ*		*mè=pẽ*	*e=lẽ*
		ke=lɸ	*te=**rí***		*ke=fʉ*	*te=f**ì***		*ke=lẽ*	*te=r̃**ĩ***
		*pe=r**ʉ́***			*pe=fʉ*			*pe=r**ũ̃***	

Generalizing across these paradigms as representatives of the system, it is easy to come up with the following principles:

- 3SG.F is associated with (more) back, round vowels;
- 3PL is associated with front, high vowels, unrounded.

These patterns can be thought of as being underlyingly a right-aligned agreement morpheme. Support for this position is easy to find: a comparison with related languages reveals -*u* '3SG.F.P' and -*i* '3PL.P' in verbal paradigms (these forms are attested in Barupu and Sumo, from the Piore River branch of Macro-Skou, but other examples are easy to find; see Donohue 2003). The difference in realization is due to the fact that, unlike these more easterly languages, the morphemes in Skou do not support a separate syllable structure. This is consistent with the constraint against non-lexical syllabic structures that has developed in Skou.

Given the constraint against complex nuclei (*VV), and the unsuitability of resyllabifying the vocalic suffix as a glide (NoCoDA), the only option available is for the vowels to merge features, just like the 'prefixal' case. In (36) we see that Sumo allows for a suffixal vowel showing 3SG.f agreement to appear following a vowel-final verb root, since the -*u* possesses its own syllabic structure. (The disyllabic prefix in Sumo might appear to contradict what I have been claiming about word structure in the Macro-Skou languages as essentially head-final and suffixing, but this prefix is the relic of a suffix attached to an auxiliary element, which has since fused onto the verb stem: *C-a-na yara-u (the realis *auxiliary/prefix is not cognate across languages: Sumo *b*, Ramo *r*, Barupu *k*). This development is common to all Piore River languages (Donohue 2003c). In (36a), on the other hand, the same (or very similar) morpheme for 3SG.f does not possess any syllabic structure, either through an application of a *VV constraint or from a stipulation in the lexicon that agreement affixes do not project syllabic structure. Whatever the source is of the lack of syllabic structure, the vocalic affix must be realized in the syllable that is specified by the verb root. It is not possible for two vowels to be present in a single nucleus, as in (36b), and so feature merger is the only possible solution. In the case of the merger of ʉ and u it appears that the vowel of the verb root is lost completely, but examples such as 'shave' in (34a) show that the original vowel in the root does affect the quality of the final merger.

P agreement in Sumo:

(36) σ   σ   σ   σ   σ

b- a.n a- t∫ a.r a -u
R-1SG-see-3SG.F
'I saw her.'

Ablaut agreement in Skou:

(37) a. σ   σ   σ   σ   b. * pe=ka-u, * pe=ka-w

  * p e= p a -u   →   p e=   p -u
   3SG.F=3SG.F.carry-3SG.F   3SG.F= 3SG.F.carry.3SG.F
   'She carried it.'

(The verb root for 'carry' is *á*, and the *p* is the 3SG.F member of the 'prefixal' agreement paradigm described throughout this article (see, e.g., Tables 3 and 5. With 3SG.NF agreement the verb will surface as *ke=k-á*, showing the *k* typical of 3SG.NF verbs, and without any ablaut.)

We have seen that suffixation is the rule in Skou morphology. The question remains as to why the ancestors of modern Skou language speakers innovated the change that resulted in the 'prefixal' C-$_{SUBJ}$ appearance that we find today. The answer lies in the historical movement of the linguistic ancestor of the Skou language (and its linguistic relatives) from a more interior area to the coast, and into contact with the multiplicity of language types with which it now has contact (Donohue & Crowther 2005).

While prefixal monoconsonantal agreement is very rare, cross-linguistically, this marking pattern is very common in a belt of languages that run both east and west of the modern Skou area. Monoconsonantal prefixal agreement is found in the Torricelli languages, such as One; in a number of (far) Western Oceanic languages of the Austronesian family, including Tobati, a language whose speakers have close marriage relations with Skou; in the inland languages Molof and Elseng, as well as the Border Stock languages; and, much further west, in the isolate Burmeso on the middle Mamberamo river, and in the West Papuan languages of the Bird's Head at the west edge of mainland New Guinea. Past this point monoconsonantal agreement prefixes are also found in the Austronesian and non-Austronesian languages of southern Maluku and Nusa Tenggara, and then, after a gap in central and western Indonesia, in the Aslian languages of Malaysia and southern Thailand. I suggest that, on arrival in this typological hotbed for monoconsonantal prefix agreement, Skou adapted its own superficial typology to match the dominant pattern in the new region, most particularly the pattern found in the Border Stock languages. This is shown in Figure 1, representing an area approximately 100km wide in North-Central New Guinea. The linguistic ancestors of the modern Western Skou peoples arrived at the coast somewhere near the mouth of the Tami river, which marks the modern border between Skou and Wutung lands. From there the linguistic settlement of the coastal

villages proceeded west to east. Before this time, however, the earlier Skou peoples had migrated from the upper Pual valley, itself merely a stop along the greater migration north over the Bewani mountains, and ultimately from areas still further to the south (Donohue & Crowther 2000). When we examine the form and position of nominative agreement markers in these languages, we find a strong correlation between coastal (or near-coastal) languages with prefixal agreement, and interior languages with suffixal agreement; the map shows the approximate areas of the two different agreement types. For all languages in the map, however, agreement is shown by a single consonant. This is shown in the figure, with the approximate modern locations of the languages shown, and the reconstructed Skou and proto-Skou migration path(s) shown with arrowed lines.

C_{NOM}- prefix		-C_{NOM} suffix	
Austronesian, Oceanic	Ormu	Sentani	Sentani
	Tobati		Nafri
TNG, Nimboran	Kemtuik		
TNG, Border, Taikat	Awyi	(isolate)	Kaure
	Taikat	(isolate)	Molof
TNG, Border, Waris	Mnanggi	(isolate)	Usku
	Manem	TNG, Border, Waris	Dera
	Bewani		Senggi
	Mbo	Kwomtari	Fas
	Ningera		
(isolate)	Elseng		

The fact that a trend towards open syllables was already present in the language(s) meant that, rather than imposing a new strain on the grammar, this external force added to an existing trend, and reinforced it. The emulation of prefixation also provided an 'escape route' for the right-aligned morphology, which was no longer able to be realized in its suffixal position. The modern Skou languages appear to be prefixal, in keeping with the areal typology, but they achieve this as a result of the reorganization of the rankings that govern the realization of the 'suffixes'. This accords well with Yu's (2003:198) suggestion that 'edge-oriented infixes originate from earlier prefixes or suffixes'. Here we have a typologically and historically plausible case for what is realized infixally to be treated as a (generally) covert 'suffix', originally overtly and synchronically.

This should serve as a more-than apocryphal tale for typologists and linguistic surveying: an apparently anomalous pattern in a language, and apparent evidence for areal diffusion of a grammatical feature, might in fact represent a 'disguise'. The 'prefixes' in Skou are a structural disguise, rather than representing a datum about the language. They do represent clear evidence of influence from the languages native to the Bewani ranges, languages of the Kwomtari and Torricelli families, but they do not represent diffusion of a 'monoconsonantal prefix' setting. Rather, they represent
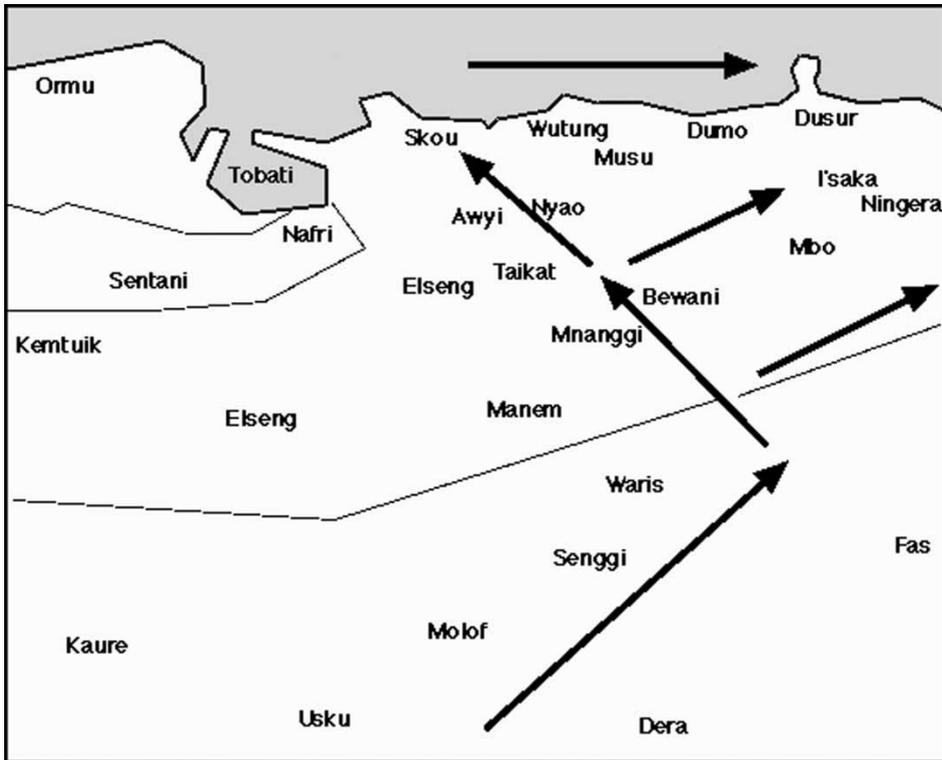
Figure 1 Pre-Skou and modern Skou locations

a more complex linguistic response to a changed social milieu, utilizing, and reinforcing, existing trends in language change.

7.1. An Aside: Proclitic Agreement

The one part of the language that is dominated by ALIGN-LEFT is the system of proclitic agreement. This was first seen in (3), where I noted that the proclitics appeared to be recent grammaticalizations. The motivation for that grammaticalization lies in the interaction of affixal agreement with C-initial roots, such as those seen in Table 4.

Examining the major verb classes in Skou we find that the number of zero-parses achieved with C-initial roots, as a result of incompatible SSCs, is high: 69% of the agreement cells across the 'p', w, l, k and h verb classes show no change due to affixal agreement; even looking at those verbs which are phonologically suitable for affixation, fully 40% of cells do not show any overt agreement except by proclitic. This led to the functional load played by 'prefixal' agreement being very low. In response to this, a second cycle of agreement cliticization appeared, one that has not taken place in the eastern relatives of Skou that allow a greater proportion of

differentiated verb forms, due to the presence of consonant clusters (see Donohue 2003a). In modern Skou these proclitics are obligatory with all verbs, yielding a 100% differentiated paradigm, regardless of the phonological shape of the verb root.

Unlike the prefixes, these clitics *are* governed by ALIGN-LEFT, which for them is an inviolable constraint (they also have a slightly different domain, a fact that only emerges when we examine serial verb constructions, as discussed in Donohue 2008). In (18) we saw the inflection of 'look for' with various subjects, and in all cases the proclitic is at the left edge. From (18) we can extract the 2SG cells, as in (38a). Note the ungrammaticality of (38b), despite the affixal agreement appearing 'infixally'.

(38)   a.   *mè = ka-**p**-è̀*
           2SG = look.for <2SG>
           'You looked for (something)'

       b.   **ka* = mè = **p**-è̀*
           look.for <2SG><2SG>

As recent grammaticalizations from free forms, these clitics contain vowels (just like the true suffixes such as *-na* in (29)), and so are specified as bearing their own syllabic structure, so violate no DEP$_\sigma$ constraints.

(39)

ká 'hit' with 3SG.NF agreement (proclitic)

ke= + *ká* 'hit'	ALIGN-LEFT	MAX (AGR)
*ká=**ke***	*k!á*	
*k-**ke**-á*	*k!*	
⇒ ***ke**=ká*		
ká		*!*

Note that most of the phonological constraints, NOCODA, *CC and the SSCs, are irrelevant in the determination of the position of the clitic, though they are not excluded from the analysis.

It is not accidental that this more 'prefixal' aspect of the morphology of Skou is the most obviously recent grammaticalization (proclitic agreement of this sort is only found in Skou, and not in any other members of the Western Skou group. Puare, of the Serra Hills group, also has proclitic (as well as 'prefixal') agreement, but under very different conditions to those in Skou, and not formed with morphemes cognate with the Skou clitics, thus clearly representing a separate development.). As mentioned earlier, the clitics are in all cases identical to the free pronouns, the first and second person clitics are fully pronominal, they show no phonological influence from or to the stems to which they attach (other than tone spreading), they are found with nouns as well as verbs (in different functions), and they are unique to Skou itself, not being found in any related languages. The proclitics, in short, show evidence of being a development in Skou, the most exocentric of the Skou languages, that has taken place since the arrival and settlement in the prefixing area. The phonological typology of the language, specifically the highly-ranked *CC constraint,

has ensured that the proclitics are fully syllabic, and so ironically do not approximate the monoconsonantal model which is probably their inspiration.

8. Productive Infixation: Not an Exclusively Left-Edge Phenomenon

The discussion of infixation in the literature has involved morphemes that are essentially aligned to the left of the word, but which for prosodic reasons appear (slightly) away from the left edge of their domain. (The only exceptions cited in Yu (2003) involve reduplication, and not lexical infixes, certainly not a full inflectional paradigm with right-aligned behaviour. By contrast, left-edge aligned infixation is widely reported.) Buckley (1997) gives an example of a right-aligned affix in Kashaya that appears aligned away from the right edge of its domain due to constraints against phonological features in contiguous segments, an OCP violation.

We have seen that the best analysis of inflectional agreement in Skou, and some of its relatives, involves right-aligned morphemes which appear with alignment constraints that are universally violated because of the higher-ranked constraints against codas. This is an example of the same sort of prosodic conditioning that is found with the essentially left-aligned infixal *-um-* in Austronesian languages, shown with Tukang Besi data in (1) and (2), but in Skou we see NoCODA producing infixation that is aligned with the right edge of the word. The same prosodic, syllable-structure oriented constraints produce the infixation in Skou at the right edge as are found in Austronesian languages, and the same morpheme shapes (those ending in a vowel, and thus immune to restriction by NoCODA) are immune to infixation. In (40) we can see that in both Tukang Besi and Skou a CV suffix is located on the edge, the right edge in a verb-final and suffixing language such as Skou, and the left edge in prefixing Tukang Besi (in contrast to Skou, Tukang Besi presents the opposite profile in terms of word order typology, including being predictably dominantly prefixing). In both cases a non-V-final affix, the affixes described in this article for Skou and the *<um>* morpheme with a VC shape in Tukang Besi, is located one segment away from the appropriate edge. (Tagalog examples analogous to these, often cited, include *-um-* in *t<**um**>akbo* 'run', and *ma-* in ***ma**-tulog* 'sleep'. Tagalog *<um>* and *ma-* are (almost certainly) cognate with the Tukang Besi morphemes *<um>* and *mo-*.)

			Tukang Besi	Skou
(40)	Affixes:	C-final	*um-* + *gonti* = *g**u**.**m**on.ti* '… who is chopping'	*-m* + *kalề* = *ka.p**ề*** '2SG.look for'
		V-final	*mo-* + *gonti* = ***mo**.gon.ti* 'is chopped'	*-na* + *hatà* = *ha.tà.**na*** 'run towards'

Additional phonotactic constraints against consonant clusters in Skou, combined with a set of segmental structure constraints that determine the possibility of rescuing overt agreement through its subsegmental parsing (as outlined in section 3), lead to

the feature merger between the agreement affix and the coda in the verb root that characterizes the agreement system.

9. Conclusion: The Appearance of Affixation

The Skou data presents us with a case of an inflectional affix that does not appear where its alignment principles say it should be. Despite ALIGN-RIGHT dominating the morphological landscape for Skou (section 7), the rise in prominence of NoCODA has meant that the monoconsonantal affixes cannot appear as suffixes. In order to avoid complex clusters, earlier tokens of which have been eliminated from the language (Table 2), the displaced segments are not retained in full, but rather reduced to particular subsegmental features that combine with the specified features of the onset of the syllable on which they appear (section 3, and Tables 4, 6 and 7). Since not all onsets may host agreement, the feature bundle is displaced leftwards until it encounters an appropriate syllable (see (13)). We see, thus, the interaction of an alignment constraint that is ranked lower than at least two phonotactic constraints that prevent the morpheme from being realized on the right.

   Note that, since the overwhelming majority of verb roots consist of only a single syllable, the constraint calling for right alignment is generally obscured, and the appearance of prefixation dominates. The fact that in these circumstances this apparent prefixation can be modelled without appealing to either left- or right-alignment matches work on, for instance, Udi cliticization (e.g. Harris 2000) in which a number of factors govern the location of clitics, and the form that they take (whether apparently clitic or affix). The fact that on disyllabic stems of suitable phonological shape the apparent prefixes appear aligned as far to the right as possible means that we must acknowledge that ALIGN-RIGHT is a relevant constraint, and that the account that simply appeals to phonotactic factors such as NoCODA and *CC is not sufficient. We have seen that *CC is inviolable in modern Skou, despite there being evidence of clusters in the past. The resolution of these clusters historically is similar (but not completely equal to) to the observed synchronic resolution of feature merger when a verb is inflected, and the inflectional affix combines with a root consonant. While feature merger of the sort described here for Skou (and related languages, as detailed in Donohue 2003a) is not a process that is frequently discussed, the combination of two segments into one is not unusual, and the fact that not all combinations are equally predictable might imply that an underspecification account, with subsegmental features combining, can be profitably explored for, for example, Indonesian prefixation or systems of verbal 'conjugation' in other languages.

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