

Clitics and crisp edges in Makassarese*

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Makassarese, a language of South Sulawesi, has three types of suffixes, distinguished by their syntactic and phonological behavior. We present an analysis of these differences in terms of constraints relating syntactic, morphological, and phonological structure.

We discuss in this paper a range of dependent elements from Makassarese, a language from South Sulawesi province, Indonesia. We classify these elements into three groups on the basis of their syntactic and phonological behavior: true suffixes, affixal clitics, and clitics. Two characteristics distinguish the suffixes from the clitics. First, true suffixes are included within the domain of stress, while clitics fall outside the stress domain. Second, in stems ending in non-permitted codas, a vowel and glottal stop are inserted before clitics but not before true suffixes. We will illustrate these two differences, and then discuss a third type of suffix, the determiner, which shows properties of both types.

1. True suffixes vs. clitics

We begin by contrasting the two types of suffixes with respect to stress. As illustrated in (1), stress in monomorphemic words is invariably penultimate, regardless of syllable structure. (The sole exception involves words containing epenthetic material, to which we return later.)

1. Stress: Monomorphemic Words

- | | | |
|----|------------|-----------------|
| a. | bintóeŋ | 'star' |
| b. | sará?ba? | 'kind of drink' |
| c. | sambíla | 'throw' |
| d. | karámeŋ | 'finger' |
| e. | kalumáŋŋaŋ | 'rich' |

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Words containing true suffixes take penultimate stress. (2) shows the stress shift resulting from the addition of the comparative suffix *-aŋ*:

2. Stress: True Suffix (Comparative)
 - a. *gássiŋgassiŋaŋ* 'strong / stronger'
 - b. *lómpo/lompóaŋ* 'big / bigger'

Other suffixes patterning with the comparative with respect to stress are the benefactive *-aŋ*, the transitivizer *-i*, the iterative *-i*, and the possessive suffixes.

In contrast to these suffixes, clitics fall outside the domain of stress. This is illustrated by the 1st person singular absolutive marker in (3):

3. Stress: Clitic (Absolutive 1sg.)
 - a. *gássiŋ/gássiŋa?* 'strong / I am strong'
 - b. *lómpo/lómpoa?* 'big / I am big'

All absolutive markers (1 sg. *-a?*, 1st plural *-ki*, 2nd *-ko*, and 3rd *-i*) as well as the emphatic markers *-mi/-ma* follow this pattern.

A second difference between true suffixes and clitics appears when suffixes are added to stems ending in the non-permitted coda consonants *r, l, or s*. As discussed in Aronoff, Arsyad, Basri, and Broselow (1987), the only consonants permitted in word-final position are glottal stop and velar nasal. Stems ending in *r, l, or s* appear with an epenthetic vowel (a copy of the preceding vowel) which permits the *r, l, or s* to be syllabified as an onset. A final glottal stop is inserted as well. Stems ending in *r, l, or s* are distinguished by their stress, which is antepenultimate, as shown in (4):

4. *r, l, s*-final stems
 - a. *ótere?* 'rope' (/oter/)
 - b. *bótoŋo?* 'bottle' (/botol/)
 - c. *rántasa?* 'dirty' (/rantas/)

If clitics attach to a prosodic word, we should expect the same pattern of vowel and glottal stop insertion before a clitic, but not before a true suffix. This prediction is confirmed, as the facts in (5) show:

5. *r, l, s*-final stems
 - a. with true suffix: *rántasa? / rantásaŋ* (rantas+aŋ) 'dirty / dirtier'
 - b. with clitic: *rántasa? / rántasaka?* (rantas+a?) 'dirty / I am dirty'

In (5a), the stem-final *s* syllabifies with the following suffix vowel, and the entire word forms the domain of stress. In (5b), *s* does not syllabify with the clitic vowel; instead, the stem undergoes the epenthesis of vowel and glottal stop seen elsewhere at word edges. Glottal stop is realized invariably as *k* before a vowel.

2. The problem: determiners

So far the true suffixes and clitics demonstrate fairly recognizable and consistent behavior. We now turn to the problem case, the definite determiner. The interest of this suffix lies in the fact that while it generally patterns with clitics, it shows suffix-like behavior in a particular phonological context.

The determiner attaches to a noun, adjective, or verb in a relative clause.

6. Determiner: Mixed Behavior

- a. C-final stem:
bálla? gássiŋ / bálla? gássiŋa 'a strong house / the strong house'
- b. V-final stem:
bálla? lómpo / bálla? lompóa 'a big house / the big house'
- c. *r,l,s*-final stem:
bálla? rántasa? / bálla? rántasaka 'a dirty house / the dirty house'
(*bálla? rantása)

As (6c) shows, *r,l,s*-final stems undergo epenthesis of vowel and glottal stop before the determiner, as before clitics. With respect to stress, the determiner also patterns with clitics when attached to a stem ending in one of the permitted coda consonants (glottal stop or velar nasal), as in (6a). But when attached to a vowel-final stem, as in (6b), the determiner is inside the stress domain, patterning with the true suffixes (6b).

Our task is therefore to account not only for the differing behavior of true suffixes and clitics, but also to account for the mixed behavior of the determiner.

3. The analysis

We have already argued that clitics attach to a prosodic word while true suffixes form a prosodic word with their stems. We illustrate the distinction with the forms in (2a) *gassíŋa?* 'stronger' and (3a) *gássiŋa?* 'I am strong'. We assume that these forms have the prosodic word structure in (7), where parentheses indicate foot boundaries:

7. Stress Contrast

- a. [gas(síŋaŋ)]_{PWD} 'stronger'
- b. [(gassíŋ)]_{PWD}a? 'I am strong'

Given these structures, the constraints in (8a-c), requiring a binary trochaic foot at the right edge of a prosodic word, will ensure the proper stress for the forms in (7).

8. Stress-related Constraints

- a. FT FORM=TROCHAIC: feet are trochaic.
- b. FT BIN: feet are binary at the syllable level.
- c. ALIGN-RIGHT (PWORD, FOOT): the right edge of each prosodic word must be aligned with the right edge of a foot.

- d. HEAD-DEP (Alderete, to appear): Every segment contained in the head of a prosodic word must have a correspondent in the input.

Constraint (10d), HEAD-DEP, forbids epenthetic material from being included in the stress foot (which is the head of the prosodic word). This will ensure that in *r,l,s*-final stems like those in (6c), the foot is aligned far enough to the left of the prosodic word edge to avoid including epenthetic material, as shown in (9).

9. *r,l,s*-final Stress: /rantas/
 a. [(ranta)sa?]_{PWD} 'dirty' b. [(ranta)sa?]_{PWD} a? 'I am dirty'

The facts of epenthesis can be accounted for with one additional constraint, given in (10):

10. a. FINAL-C: A prosodic word must end in a consonant. (McCarthy and Prince 1994)

FINAL-C, proposed by McCarthy and Prince (1994), requires that prosodic words end in a consonant. Glottal stops are inserted word-finally or before a clitic after *r,l,s*-final stems — the two positions that we equate with prosodic word edge. (The failure to insert glottal stop in prosodic word-final position after underlying vowels is due to a higher ranked constraint mandating alignment of right stem edge and right syllable edge.)

The puzzling case is the determiner. As shown in (6), the epenthesis facts suggest that determiners are also attached to a prosodic word, since *r,l,s*-final stems undergo epenthesis before a determiner. C-final forms with determiners show the antepenultimate stress which is characteristic of clitic forms. However, vowel-final stems with determiners have penultimate stress, like forms with true suffixes. We must therefore account for the sensitivity of determiners, but not of other clitics, to the phonological makeup of their host.

11. Summary
- a. true suffixes: inside stress domain; no *V?* epenthesis
 - b. absolutive, emphatic clitics: outside stress domain; *V?* epenthesis
 - c. determiner: outside stress domain with C-final stem, but inside stress domain with V-final stem; *V?* epenthesis

We account for these facts as follows. First, following Selkirk (1995), we assume two types of clitic: the determiner is an *affixal clitic*, which joins to a prosodic word to form another prosodic word (12a), while the absolutive suffixes in (3) are *free clitics*, joined with the host only at the level of the phonological phrase (12b).

12. a. affixal clitic (determiner) b. free clitic (absolutive)
 PWd PPhrase
 / /
 PWd clitic PWd clitic

The fact that the epenthetic vowel and glottal stop appear before both the determiner and the free clitics is consistent with the assumption that both types of clitics follow prosodic words. These structures are also consistent with the distributional facts of these suffixes. In relative clauses, both the determiner and the absolutive marker may be found on the verb, as illustrated in (13):

13. Determiner and Absolutive
 a. tu-la-am-paka-bájik-a=i ballak-a
 REL-FUT-SBFOC-CAUS-good-DET=3ABS house-DET
 'the one who will renovate the house'

The position of the determiner inside the absolutive is consistent with the assumption that the determiner attaches to a prosodic word to form another prosodic word, while the absolutive simply occurs to the right of a prosodic word. We would therefore not expect to find the determiner to the right of the absolutive.

We derive the different prosodic structures through the ways in which the syntactic categories are mapped to prosodic categories. There is syntactic evidence to suggest that the element to which the determiner is suffixed actually adjoins to the determiner via syntactic head movement (see Finer 1997 for details). Briefly, the head of the complement of D left-adjoins to D, creating a structure along the lines of the following:

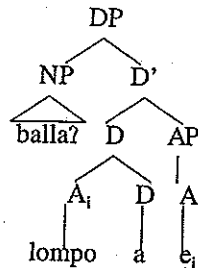
- 14.
- ```

 D*
 / \
 D XP
 / \ |
 Xi D X
 |
 ei
 where X= N, Adj, C+I+V, ...

```

The example considered earlier, *bállá? lompóa* 'big house', would therefore have the structure in (15).

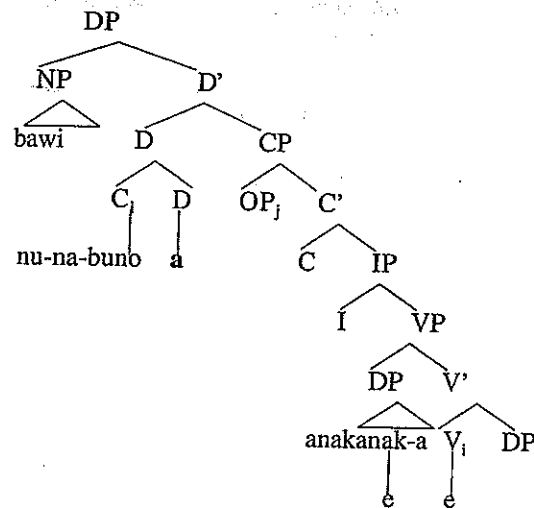
15.



Other cases illustrating that the determiner is a target for syntactic adjunction include relative clauses. Here, the verb of the relative clause undergoes iterated head movement, and is ultimately adjoined to the determiner. Consider the data below, showing the simple clause (16a), a relative clause formed on the object (16b), and a relative clause formed on the subject (16c). Note that the determiner of the relative clause as a whole (boldfaced) is attached to the verb of the relative clause. Example (16b) has the structure shown in (17) at the interface between syntax and phonology (the full adjunction structure has been simplified, as has the representation of functional heads between C and V).

16. a. *anakanak-a na-buno=i bawi-a*  
*boy-DEF 3ERG-kill=3ABS pig-DEF*  
 'The boy killed the pig'
- b. *bawi nu-na-buno-a anakanak-a*  
*pig REL-3ERG-kill-DEF boy-DEF*  
 'the pig that the boy killed'
- c. *anakana? tu-am-buno-a=i bawi-a*  
*boy REL-SBFOC-kill-DEF=3ABS pig-DEF*  
 'The boy who killed the pig'

17.



We assume that a zero-level syntactic element is in general mapped to a phonological word. Therefore the top D node as well as the C node above and the X node in (17) will be PWDs (the bare D, however, does not receive full prosodic word status), and the relevant constraints will apply.

The syntactic distribution of the absolutive clitic, on the other hand, is much freer, so much so that Friberg (1991) names it 'peripatetic'. It will attach to the right edges of verbs, the right edge of phrases, complementizers, negations, and in extreme circumstances in Kofijo and Bugis, it will cliticize to the left edge of a verb. While most of its syntactic properties are quite unclear, it does not obviously behave as if it were the syntactic head of an Agr projection, although we assume that it is initially generated above VP and below T in the clausal structure. Heads undergoing head-movement may skip it, and it may skip over heads when it moves; this behavior points toward XP status for it; we will provisionally assume that it is adjoined to an AgrP and that it undergoes movement in certain unclear situations. Given this, it will not participate in the adjunction structures that the determiner is part of, and so there be no A-over-A prosodic structure to mirror the syntactic structure. We assume that, in (16c), V raises across the clitic on its way to D, and that the clitic is simply linearly adjacent to its host at the relevant level of representation (where adjacency is evaluated with respect to phonetically specified material — empty categories of different sorts (traces, null operators and pronouns, etc.) may intervene between the clitic and its host). (18) is a statement of the mapping between the syntax and the phonology.

18. ...X...cl .... (group *cl* with X, where ... is phonetically null)

We now consider how these two different structures can help us to account for the different behavior of the determiner and the free clitics with respect to stress. Recall the constraint ALIGN-Right (PWd, Foot), which forces alignment of a foot to the right edge of a prosodic word. This constraint ensures that free clitics will be outside the stress domain, since they are not part of a prosodic word.

Affixal clitic forms, however — forms with a determiner — have two right PWd edges. Therefore, a foot could in principle align with either of these right edges. In consonant-final stems with determiner, stress is antepenultimate, requiring alignment of the foot with the innermost PWd edge. We ascribe this to the constraint in (19):

19. PWD CONTAINS FOOT: A foot is contained entirely within a prosodic word.

This constraint chooses the antepenultimate stress pattern in (20a) over the pattern in (20b). In (20c), where we have two prosodic word edges followed by a phonological phrase edge, we see the same alignment of the foot with the innermost prosodic word edge:

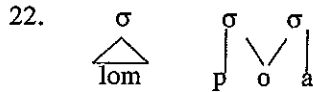
20. a. [[(gassin)]<sub>PWD</sub> a]<sub>PWD</sub> 'the big...' b. \*[[gas(sin)]<sub>PWD</sub> a]<sub>PWD</sub>  
 c. [[tulanapaka(bajik)]<sub>PWD</sub> a]<sub>PWD</sub> i]<sub>PPH</sub>

However, in vowel-final stems such as *lompóa*, the foot aligns with the outermost PWD edge, violating PWD CONTAINS FT. The question then is what higher constraints would force the violation of PWD CONTAINS FT in vowel-final stems.

The answer lies in closer examination of the phonetics. Vowel-final stems normally exhibit an epenthetic glide before a vowel-initial suffix. This glide shares the backness of the preceding vowel, as in (21):

- 21. a. bátu / batú<sup>h</sup>a 'boat / the boat'
- b. lómpo / lompo<sup>h</sup>a 'big / the bigger...'
- c. báwi / bawí<sup>h</sup>a 'pig / the pig'
- d. birálla / birallé<sup>h</sup>a 'corn / the corn'

We assume, first, that the epenthetic glide is a result of linking the first of two adjacent vowels to the second syllable. We postpone for the moment the motivation for this double linking (we will argue below that the obvious explanation, that it is triggered by the ONSET constraint, is not correct). This linking creates the structure shown in (22):



We then assume a constraint CRISP EDGE (Foot, R), which bans multiple linking of the segment at the right edge of the foot (following Ito & Mester 1995).

- 23. CRISP EDGE (FOOT, R): Linking across the right edge of the foot is prohibited.

If ranked below ALIGN-Right (PWD, Foot), this constraint will have no effect on vowel-final stems before free clitics, since these offer only one position for alignment of PWD and foot, as shown in (24).

- 24. Free clitic 'I was big'

| input: lompo, a?                               | ALIGN PWD,<br>FT | CRISP<br>EDGE | PWD ≥ FT |
|------------------------------------------------|------------------|---------------|----------|
| a.<br>$[(lompo)]_{PWD} \quad a?$               |                  | *             |          |
| b.<br>$[lom \quad (p \quad o)]_{PWD} \quad a?$ | *!               |               | *        |

The determiner structure, however, provides two equally good foot alignment possibilities, as shown in (25).



25. Affixal clitic 'the big...'

| input: lompo, a                                     | ALIGN PWD, FT | CRISP EDGE | PWd≥FT |
|-----------------------------------------------------|---------------|------------|--------|
| <p>a. [[(lompo)]<sub>PWD</sub> a]<sub>PWD</sub></p> | *             | *!         |        |
| <p>b. [[lom(po)]<sub>PWD</sub> a]<sub>PWD</sub></p> | *             |            | *      |

The choice then falls to CRISP EDGE, which favors the footing in (25b), with the right edge of the foot corresponding to a crisp syllable edge. The ranking ALIGN-Right (PWd, Foot) >> CRISP EDGE >> PWd≥FT therefore ensures that free clitics will be outside the stress foot regardless of the phonological structure of their host, while affixal clitics will vary according to the syllabification of the stem edge.

We now consider consonant-final stems. In these stems, no double linking is required to satisfy ONSET, so long as the stem-final consonant is syllabified with the following vowel. The fact that a stem-final glottal stop is realized as *k* before a determiner is consistent with the assumption that this is serving as an onset, as shown in (26).

26. Affixal clitic >the house=

| Input: balla?, a                                      | ALIGN PWD, FT | CRISP EDGE | PWd≥FT |
|-------------------------------------------------------|---------------|------------|--------|
| <p>a. [[(balla)]<sub>PWD</sub> k a]<sub>PWD</sub></p> | *             |            |        |
| <p>b. [[bal (la)]<sub>PWD</sub> ka]<sub>PWD</sub></p> | *             |            | *!     |

However, if the stem-final consonant is syllabified outside the prosodic word, the epenthetic glottal stop inserted at the end of *r, l, s*-final words should also presumably be syllabified outside the prosodic word. This glottal stop is in fact realized as *k* before a determiner, indicating that it is an onset. However, in McCarthy and Prince's (1994) analysis, the motivation for the epenthesis of glottal stop is to create consonant-final prosodic words, the optimal prosodic word structure. If the epenthetic consonant surfaces outside the prosodic word, this motivation is lacking. We will assume, then, that stem-final consonants before clitics are not recruited as onsets to the following

clitic vowel until the level of phonetic implementation, where the *k/?* alternation and the epenthetic glides of word-internal vowel sequences are handled.

Thus, the constraint requiring syllables to have onsets is presumably not strong enough to motivate the double linking seen in the vowel-final stems. We will argue that instead, this double linking is a result of a different constraint, specific to the determiner. This constraint, in (27), requires a determiner to be aligned with a glide:

### 27. ALIGN DET-L, GLIDE

Evidence for this constraint comes from another class of stems, those ending in the low vowel *a*. In this case, we find an inserted geminate glide *y* between the stem vowel and the determiner, as shown in (28):

### 28. *a*-Final Stems

- a. *máta* / *matáyya* 'eye / the eye'      b. *tóa* / *toáyya* 'old / the old...'

The insertion of geminate *y* between two low vowels is specific to the determiner. Normally, both *as* are maintained, as in (29):

### 29. Other *aa*-sequences

- a. *tóa* / *toáaŋ* 'old / older'      b. *jáma* / *najámaa?* 'work / I work'

The insertion of *y* is therefore triggered by the ALIGN DET, GLIDE constraint (where 'Glide' is interpreted as a set of vocalic features attached to a non-syllable head position). In consonant-final stems, the syllable structure constraints of Makassaréŋe make it impossible to meet this requirement. Neither form in (30) meets the phonotactic constraints of the language, which require word-internal codas to share place with following onsets.

30. a. \**balla?ya*      b. \**gassiŋya*

ALIGN-DET, GLIDE is therefore violated in favor of maintaining the stem-final consonant. In vowel-final forms, however, this requirement can be met either by inserting a glide, or by double-linking the vocalic nucleus to a non-head position.

In *a*-final forms, we have several choices. (31a), with no glide before the determiner, violates the constraint requiring the determiner to be preceded by a glide. (31b) violates the coda constraints of the language, since syllable-final glides are possible only when associated with a release position, that is, when part of a geminate glide. Both (31c) and (31d) satisfy the coda constraints and the determiner alignment constraint, (31c) by placing the glide in onset position, and (31d) by making it a geminate. The choice between these two falls to the FINAL-C constraint, which prefers prosodic words ending in consonants.

31. Determiners with *a*-final stem

| input: mata, a                                  | CODA | ALIGN<br>DET | DEP C | FINAL-C |
|-------------------------------------------------|------|--------------|-------|---------|
| a. mata] <sub>PWD</sub> a] <sub>PWD</sub>       |      | *!           |       | *       |
| <br>b. ma tay] <sub>PWD</sub> a] <sub>PWD</sub> | *!   |              | *     |         |
| <br>c. ma ta] <sub>PWD</sub> ya] <sub>PWD</sub> |      |              | *     | *!      |
| <br>d. ma tay] <sub>PWD</sub> a] <sub>PWD</sub> |      |              | *     |         |

The winning candidate, (31d), involves multiple linking of the glide, which is both final in the inner prosodic word to satisfy FINAL-C, and linked to the onset of the next syllable to satisfy the coda constraints. This double linking will of course prevent alignment of the stress foot with the innermost prosodic word, giving the penultimate stress characteristic of vowel-final stems with determiners.

The last three forms in (31) all violate DEP C, which discourages insertion of consonants by requiring that each consonant in the output have a correspondent in the input. When the stem ends in a non-low vowel, it is possible to create a glide without insertion of features, by linking the vowel features to a consonantal position. That is the tack taken with stems like *lombo* and *batu*, as we see in (32). (32a) fails on ALIGN DET, while (32b) satisfies this constraint, but at the cost of violating DEP C. The best candidate is then (32c), which recruits the nonlow vowel to serve as a glide to the left of the determiner without inserting any new material by attaching it to the onset of the following syllable. Because the nonlow vowel is now both a vowel and a consonant, this form also satisfies FINAL-C.

32. Determiners with non-low vowel-final stem

| input: batu, a                                 | CODA | ALIGN<br>DET | DEP C | FINAL-C |
|------------------------------------------------|------|--------------|-------|---------|
| a. batu] <sub>PWD</sub> a] <sub>PWD</sub>      |      | *!           |       | *       |
| b. batu] <sub>PWD</sub> ya] <sub>PWD</sub>     |      |              | *!    | *       |
| <br>c. ba tu] <sub>PWD</sub> a] <sub>PWD</sub> |      |              |       |         |

#### 4.0 Conclusion

To sum up, then: we have examined three types of dependent elements in Makassarese: true suffixes, which form part of the prosodic word, and clitics, which attach to prosodic words. The clitics further subdivide into those that always fall outside the domain of stress assignment, and those that vary according to the phonological makeup of their host. We accounted for these three patterns by assuming that the determiners attach to a prosodic word to form a larger prosodic word, while the other clitics are not part of any prosodic word. The recursive prosodic word structure of determiners provides two options for alignment of the stress foot. The preference for avoiding multiple linking across feet expressed in the CRISP EDGE constraint selects the rightmost prosodic word edge as the locus of the stress foot in vowel-final stems, since these involve multiple linking. The analysis developed here therefore accounts for the behavior of suffixes, determiners, and free clitics with respect to stress and epenthesis.

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