

MORPHOPHONOLOGY IN TUWALI IFUGAO

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Tuwali Ifugao (TI) is a Philippine-type Austronesian language spoken in and around Kiangon, Ifugao Province. There are approximately 25,000 speakers of the language. This paper describes the morphology of verb forms in TI, and the intricate interaction between morphology and phonology. It is shown that TI makes use of affixation, reduplication, and gemination, both alone and in combination, to convey derivational and inflectional possibilities, with the affixation in particular serving in part to grant special referential status to one of the NPs of the clause.

1. Introduction

Tuwali Ifugao is a Philippine-type Austronesian language spoken in and around Kiangon, Ifugao Province. There are approximately 25,000 speakers of the language.

This paper is a description of the interaction of morphological and phonological phenomena that determine the final form of words in the language. The processes of affixation, reduplication, gemination, syllabification, and stress placement are described and exemplified with data that has been excerpted from natural texts. Because the morphology of the language is both highly productive and complex, involving inflection, derivation, lexical semantics and referential features of discourse, it has been necessary to analyze the morphophonology with its semantic effects at the lexical, syntactic and higher-level contexts of the language.

The focus of this paper is on the interaction of morphology and phonology, with the result that some description of the morphology is needed. We are primarily limiting the scope of this description to: (1) a limited sketch of the main verb classes, including the designation of default affixes associated with each verb class, and (2) some derivational processes. These two topics have the most significance for the word formation processes related to the phenomena presented in this paper. In some instances, however, we will describe additional data involving affixes other than the default affixes, and lexical categories other than verbs for further exemplification of the phenomena.

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1.1 Description of the Tawali Ifugao language

The Tawali Ifugao language is more fully described in *A Communicative Grammar of Tawali Ifugao* (Hohulin and Hohulin, forthcoming). The following excerpts have been chosen, and in some cases rewritten, to indicate clearly the significance that the data have for this paper.

1.1.1 Phonology

The Tawali Ifugao orthography has 14 consonants and five vowels, shown in the charts below.

Figure 1. Consonants

| | Bilabial | Alveolar | Velar | |
|--------------------|----------|----------|-----------------|----------------|
| Stops | | | | |
| Voiceless | p | t | k | |
| Voiced | b | d | g | ʔ ¹ |
| Continuants | | | | h |
| Resonants | | | | |
| Oral | | l | | |
| Nasal | m | n | ng ² | |
| Semi-vowels | w | y | | |

Figure 2. Vowels

| | Front | Central | Back |
|-------------|-------|---------|------|
| High | i | | u |
| Mid | e | | o |
| Low | | a | |

1.1.2 Syllable Patterns

There are four types of morphemes that need to be considered when studying the syllable patterns of Tawali Ifugao: roots, affixes, reduplicants, geminates.

- **Roots.** Lexical categories that tend to be free morphemes are nouns, adjuncts, adjectives, demonstrative and personal pronouns,

¹ The hyphen, -, symbolizes the glottal stop in the orthography and it is written only when it occurs within a consonant cluster; however, in this paper the symbol, ʔ, is used for the glottal stop and is indicated for every occurrence to help readers see changes in the morphophonology more clearly.

² The digraph, ng, symbolizes the velar nasal, a single phoneme in the orthography and in this paper.

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determiners, conjunctions and linkers. Some verb roots are free morphemes, but most are bound, occurring only with affixes.

- **Affixes, reduplicants and geminates.** All affixes, reduplicants and geminates are bound morphemes.

There are two canonical syllable patterns in Tuwali Ifugao: CV and CVC. This analysis of canonical syllable patterns is based on free morphemes, which may be monosyllabic, di-syllabic, tri-syllabic and, more rarely, quadri-syllabic. Di-syllabic morphemes are the most common. When morphemes are combined, the number of syllables in a word may reach as high as seven.

Roots

Monosyllabic morphemes are members of closed classes of words:

| | | |
|-----|-----|--------------------------------------|
| CV | mu | you |
| CV | bo | also, again |
| CV | hi | determiner (indefinite) |
| CVC | nan | determiner (definite/specific) |
| CVC | hin | subordinating conjunction, 'if/when' |

Di-syllabic morphemes are the most common patterns statistically:

| | | |
|---------|----------|-----------------------|
| CV.CV | ha.pe | type of woven blanket |
| CV.CV | ka.ba | type of basket |
| CV.CVC | ma.nuk | chicken |
| CV.CVC | ba.ket | old woman |
| CV.CVC | da.lit | eel |
| CVC.CV | hab.ʔu | bird specie |
| CVC.CV | kul.pi | agricultural ritual |
| CVC.CVC | ʔab.lan | loom |
| CVC.CVC | gaw.wang | crow |

Tri-syllabic morphemes are less common:

| | | |
|-------------|---------------|---------------------------|
| CV.CV.CV | ʔa.ba.de | shawl |
| CVC.CV.CV | dud.du.ti | dragonfly |
| CVC.CV.CVC | bak.ku.kul | turtle |
| CVC.CVC.CV | bul.yag.go | light brown color of hair |
| CVC.CVC.CVC | gul.ling.ngay | pipe for smoking |

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Quadri-syllabic morphemes exist but are rare:

| | | |
|----------------|------------------|---------------|
| CV.CV.CV.CVC | ba.la.ki.bak | bark of tree |
| CV.CV.CVC.CVC | gi.na.let.get | woven skirt |
| CVC.CV.CVC.CVC | ?ik.?i.king.ngan | little finger |
| CVC.CV.CVC.CVC | gaw.ga.wa?.?an | middle finger |

Affix, reduplicant and geminate syllable patterns

There are four types of affixes in Tuwali Ifugao: prefixes, infixes, suffixes and circumfixes³. Their syllable patterns are shown below. Reduplicants have the same syllable patterns as prefixes, i.e., CV or CVC or a combination. The consonant resulting from the gemination process is always the coda C of a syllable.

All of the morphemes introduced here to illustrate permissible structures for affixes will be exemplified and discussed in detail in the sections to follow.

- **Prefix examples:**

Prefixes may consist of either syllable pattern: CV or CVC or a combination⁴:

- CV: ma-, ni-, ka-, ?i-
- CVC: muN-, maN- puN-, paN-⁵
- Combination prefixes are: *mangi-*, *nangi-*, *pangi-* These consist of the morphemes *maN-*, *naN-*, *paN-*⁶ combined in some inflectional patterns with the morpheme *?i-* to serve as a single morpheme in the combined form. The glottal stop of the *?i-* prefix drops when combined with the other prefixes.⁷

- **Infix examples:**

Infixes consist of a VC pattern with only one consisting of a VCC pattern:⁸

VC: -um-, -in-, -an-

³ TI has many forms that are combinations of affixes. When a combination is discontinuous, but functions as a single morpheme, the combination is interpreted as a circumfix, even though some homophonous affix forms in the combination can and do function independently in other contexts.

⁴ Most affix combinations function together as meaningful single units.

⁵ The capital *N* in affix forms signifies that the nasal is underspecified for place of articulation and will assimilate these features from the following consonant.

⁶ The nasal in these affixes manifests as the velar nasal, *ng*, in these combinations.

⁷ This combining process thus results in a sequence of two syllables, CV.CV.

⁸ As will be seen below, the VCC syllable pattern of this infix is not canonical and therefore, results in resyllabification.

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VCC: -imm-

- **Suffix examples:**

Suffixes consist of VC patterns only:

VC: -on, -an

- **Circumfix examples:**

Circumfixes consist of a combination of prefixes, infixes and suffixes:

Prefixes (CV.CV or CV) and suffixes (VC): mangi- -an, ka- -an, ki- -an

Infix (VC) and suffix (VC): -in- -an

1.2 Morphology

1.2.1 Roots

Roots form the core of the lexicon of Tawali Ifugao. Verb roots have patterned and very productive word formation processes. The number and types of affixes which may co-occur and the functions and change of meaning resulting are statistically higher than for any other root lexical category. For that reason, in this paper we have given more attention to verb formation processes than to the processes that apply to other lexical categories of roots.

There are five morphological processes by which TI verb roots can be formally altered to adjust their meanings to fit their syntactic and communicational contexts: prefixation, suffixation, infixation, reduplication and gemination.

1.2.2 Verb inflection

There are 19 differentiated sets of inflectional and derivational affixes that may be attached to nouns, adjectives and verbs. However, since our focus is on verbs, this section will describe verb inflection only. The inflectional affixes code referential, syntactic and semantic information.

Tense. Tawali Ifugao has a binary tense system, past and non-past, encoded in affixes. Some affixes also encode aspect components that parallel aspect components in the verb roots; a part of the classification of verb roots is based on whether they have an inherent durative or punctiliar aspect component.

Aspect. The aspect system, other than durative and punctiliar aspects, is encoded in reduplicant forms. These forms co-occur with tense inflectional affix forms. There are four main aspects:

- just completed – completed immediately preceding the ‘now’ point on a time line
- iterative – done repeatedly, usually refers to a punctiliar-aspect action, and in contrast to the habitual aspect may have reference to a time line

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- continuative – refers to an action or activity that continues over a period of time in reference to a time line
- habitual – refers to an action or activity that is customary but has no reference to a time line

Mode. The modality system⁹ is encoded in affix or geminate forms and expresses one of the following:

- abilitative: the ability, expertise or pretense of the agent of the action or activity
- affectedness: the tendency or facility of an experiencer or undergoer to be affected by an action or activity
- intensity: the degree of intensity of the action, experience, or state encoded by the verb

1.2.3 Verb root classification

Because the morphology to be discussed in detail in this paper is dependent upon the classes of verbs, it is important to present a summary of that classification system. Six classes of verb roots have been semantically and grammatically categorized according to a study of their basic meaning components, their grammatical function components, their inflectional and derivational possibilities, and the morphophonological and morphosyntactic processes that they undergo.

The purpose for describing these classes is to provide criteria for the distribution of affixes and the applicability of morphophonological processes. This description will be brief and selective, highlighting only the particular morphological meaning or word formation processes that are significant to the topics in this paper (see Hohulin and Hohulin, forthcoming for details). The following points should be kept in mind:

- The range of reference of verb roots relates to the types of actions, activities, experiences, processes or states that a verb root may refer to in the referential world. There are sub-classes of the six main classes, and the meaning components of each class constrain the choice of affix, reduplicant and geminate morphemes.
- The inherent time aspect components of roots are particularly important in determining which reduplicant morphemes encoding other aspects may co-occur.

⁹ There is also a lexical category of adjuncts. The members of this category also encode parts of the modality system e.g. *tuwali* 'in fact/in reality'; *kaya* 'certainly'; *kal-ina* 'probably'.

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- Affixes:
 - Each verb root class has a set of default affixes that are compatible with the meaning and grammatical components inherent to the members of the class. For example, durative and punctiliar aspects are inherent in both roots and default affixes; non-default affixes that co-occur signal changes or modification of the inherent components of the root.
 - Each default affix cross-references either the subject or an object (direct or indirect)¹⁰ of a clause. This particular grammatical component of the affixes matches the transitivity component of the members of the root classes. The application of a non-default affix can change the cross-referencing process. Nevertheless, all affixes, whether default or non-default, cross-reference either the subject or object.

With that background, consider the six classes of verb roots and their characteristics.

1.2.3.1 Class 1

Class 1 verbs are active,¹¹ intransitive verbs referring to movement from one place (source) to another (destination). They are classified as activity¹² verbs because a durative time aspect is inherent to them, i.e. the movement takes place over a period of time. There are two sub-classes of these movement verbs. One sub-class (labeled 1A) has a manner component that is important, and the other (1B) has a directional component that is important. The primary valent of both classes is a volitional agent. The default affix for this class is the prefix *muN-*. The past tense affix form is the prefix *nuN-*. These prefixes cross-reference the subject in a sentence.

Examples of 1A are *dalan* ‘to walk’, *keke* ‘to swim’

Examples of 1B are *dayyu* ‘to descend’; *tikid* ‘to ascend’

¹⁰ The terms subject, direct object and indirect object are grammatical relations postulated for the language. These three grammatical relations have been analyzed and defined on the basis of 1) word order 2) the contrastive semantic roles that each encodes 3) the cross-referencing of NP arguments by verbal affixes, and 4) the operation and function of syntactic processes related to them. In this regard the term ‘indirect object’ is used more broadly than its traditional sense and refers to arguments that are neither subjects nor direct objects.

¹¹ The term ‘active’ is used in contrast to ‘stative’ and ‘passive’.

¹² The term ‘activity’ is used in contrast to ‘action’. These terms are used to contrast verb root classes that differ in regard to inherent durative (activity) and punctiliar (action) aspects.

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1.2.3.2 Class 2

Class 2 verbs are also active, intransitive verbs; they are divided into three main subclasses: actions, experiences and processes. The actions subclass is divided into two movement sub-classes: both have a punctiliar time component, but one portrays movement from one place to another, and the other portrays simply a change of position. The experiences sub-class is further divided into verbs portraying emotions and verbs portraying physiological functions. The emotions sub-class is further divided into verbs portraying feelings and verbs portraying sounds that are made related to those feelings; with these sub-classes, the punctiliar time component might be better described as an episodic time component. The final sub-class, processes, is divided into those verbs portraying meteorological phenomena and those portraying non-meteorological processes. For all Class 2 verb roots, the default affix is the infix *-um-*. The past tense affix form is the infix *-imm-*. These prefixes cross-reference the subject in a sentence.

Examples are *hogop* 'to enter'; *lahʔun* 'to exit'; *taddog* 'to stand up'; *ʔubun* 'to sit down'

1.2.3.3 Class 3

Class 3 verbs are active, transitive verbs with the core meaning component expressing the movement of an object away from the agent. Each sub-class has a core component expressing what is done with the object after being moved, e.g. whether it is repositioned, or released, or combined with another object, or attached to another object. All members of this class tend to have a punctiliar aspect component. The default affix for this verb root class is the prefix, *ʔi-*. The past tense form is the prefix *ʔiN-*. These affixes cross-reference the object in a sentence.

Examples are *talu* 'to hide something', *bobod* 'to tie something'.

1.2.3.4 Class 4

Class 4 verbs are active, transitive verbs that express many different actions involving the touching of an object; the degree of pressure involved in a touch is important in determining how much of an effect the touch has on an object. The pressure may vary from gentle, which has little effect on the object, to forceful, which changes the structure of the object. All members of this class tend to have a punctiliar aspect component. The default affix for this verb root class is the suffix *-on*. The past tense affix form is the infix *-in-*. These affixes cross-reference the object in a sentence.

Examples are *dadag* 'to destroy something,' *duntuk* 'to punch someone.'

1.2.3.5 Class 5

Class 5 active, transitive verbs express a state-change action on a site-type object. That means that the object that is referenced stays in place and intact while another object is added to it or subtracted from it, changing its state but not its structure. All members of this class tend to have a punctiliar aspect component. The default affix for Class 5 verb roots is the suffix *-an*. The past tense affix is the circumfix consisting of the infix *-in-* and the suffix *-an*. These affixes cross-reference the object in a sentence.

Examples are *?adug* ‘to guard something,’ *tamtam* ‘to taste something.’

1.2.3.6 Class 6

Class 6 verbs are state and state-process intransitive verbs that express non-agentive, descriptive states or processes. These verbs express properties of entities that undergo what is perceived of as non-agentive change. When a human is involved, as in physiological state-processes, the human is perceived of as an experiencer rather than a volitional agent. The default affixes for state and state-process verbs are *ma-* and *na-* for non-past and past tense. To encode process, the default affixes are the infixes *-um-* and *-imm-*. All of these default affixes cross-reference the subject in a sentence.

Examples are *?agang* ‘to be hungry’, *?uwo* ‘to be thirsty’.

2. Affixation and phonological rules¹³

There are four morphophonological rules that will be illustrated in this section: Assimilation, Syncope and Consonant Reduction, and Syllabification. Syllabification may best be seen as a purely phonological process; it applies to all forms, irrespective of their morphological structure. As will become clear below, it is necessary to distinguish CVC reduplication (where the second C is the coda consonant of the syllable being reduplicated) from CV.C reduplication (where the second C is the onset consonant of the following syllable being reduplicated). To account for this difference, it is necessary to assume that syllabification is continuous throughout the derivation. Nevertheless, for ease of presentation, we limit the indication of syllable structure to the final line of the derivations.

2.1 Syllabification

As noted earlier in this paper, the analysis of the two canonical syllable patterns, CV and CVC, is based on free morphemes. Only infixes and suffixes have a VC pattern. In addition to the evidence offered by free

¹³ In the examples, syllables will be separated by the use of the period symbol.

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morphemes, the syllabification process itself demonstrates that the VC pattern is not a canonical pattern.

- Our data will show that an onset C is obligatory in every syllable, so that when affixes are attached, a syllabification process takes place that will result in every syllable of a word having an onset C. For example:

| | |
|------------------------------|------------------------------------|
| tam.tam | 'to taste' |
| tinamtaman | default affixation -in- -an |
| ti.nam.ta.man | final syllable structure |
| '(someone) tasted something' | |

- Additional evidence that an onset C is obligatory for all syllables is seen when vowel-initial suffixes **-on** or **-an** are added to a verb root ending in a vowel. A transitional consonant is obligatorily inserted between the root and the suffixes, and that consonant becomes the onset C of the final syllable. If the root ends in a front vowel, **y** is inserted. If the root ends in a mid-vowel, **ʔ** is inserted, and if the root ends in a back vowel, **w** is inserted. Consider the following examples.

| | | |
|-------------------------|----------|--------------------------------------|
| ka.li 'to speak' | + -an | ka.li.yan 'to speak to s.o.' |
| pi.li 'to choose' | + -on | pi.li.yon 'to choose s.t.' |
| ba.ba 'lower' | + ka--an | ka.ba.ba.ʔan 'lowered thing' |
| hang.ga 'to face' | + -on | hang.ga.ʔon 'to face s.o.' |
| pat.ʔu 'to hit on head' | + -an | pat.ʔu.wan 'to hit s.o. on the head' |
| da.mu 'meet' | + -on | da.mu.won 'to meet s.o.' |

- The same phenomenon as described immediately above also functions at the sentence level with specific morphemes. In particular, the first person pronoun **ʔak** when attached to roots ending in front vowels loses the glottal stop and a **y** is inserted; it retains its initial glottal stop when attached to roots ending in the /a/ vowel.

| | | |
|----------------|--------------|--------------------|
| ʔu.ma.li + ʔak | ʔu.ma.li.yak | 'I will come.' |
| ʔu.ma.la + ʔak | ʔu.ma.la.ʔak | 'I will get some.' |

- In addition to the requirement that every syllable have an onset consonant, there also appears to be a preference, though not obligatory, for the final syllables of words to be closed. When words with open final syllables are followed by certain free morphemes with

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a one-syllable CV pattern (e.g. the determiner *hi*¹⁴ and the pronouns *ku* ‘I, my’ and *mu* ‘you, your’), the V of the second morpheme is dropped, and the remaining C is attached to the preceding word with a final open syllable, making it a closed syllable.

| | | |
|--------------------------------|----------|---|
| ʔim.ba.ba.le ‘son/daughter’ | ku ‘my’ | ʔim.ba.ba.lek ‘my son/daughter’ |
| mih.di ‘stays’ | hi ‘DET’ | mih.dih muyung ‘stays (in a) forest’ |

- There is a monosyllabic linker, *ʔan* that also attaches to preceding words that end in a vowel. Both the glottal stop and the vowel /a/ are dropped, and the /n/ becomes the coda C of the word.¹⁵

| | | |
|-----------------------|----------|--|
| ʔo.ha ‘one’ | ʔan ‘LK’ | ʔo.han ʔal.go ‘one day’ |
| ha.na.da ‘DEM- those’ | ʔan ‘LK’ | ha.na.dan ʔi.ʔi.ba.na ‘those relatives’ |

Verbs in TI have the broadest and most complex range of inflectional and derivational possibilities, and therefore, the syllabification process operates most commonly within this lexical category. The process does, however, operate on members of other lexical categories, and some examples below will illustrate that fact.¹⁶

2.1.1 Prefix *mangi-*

The prefix *mangi-* and its past tense form *nangi-* are forms that combine two prefixes, *maN-* and *ʔi-*. When combined, the *N-* of *maN-* becomes a velar nasal¹⁷ and reduces the glottal stop, and the combination prefix then undergoes syllabification to yield CV.CV. This particular combined affix co-occurs only with Class 3 verb roots.

¹⁴ The determiner *hi* is multi-functional; the two primary functions are (1) to mark proper personal names and (2) to mark indefinite/non-specific common nouns.

¹⁵ Some speakers of the language close V final words with the nasal *n* even when the *ʔan* linker is not functionally needed in the structure.

¹⁶ Reduplication and gemination processes also invoke the syllabification phonological process. This will be discussed and illustrated in later sections.

¹⁷ This appears to be a type of assimilation in TI. See Section 2.2 below.

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2.1.3 Suffixes

The VC syllable pattern of suffixes, *-on* and *-an*, invokes syllabification, resulting in an onset C for the suffix:

| | |
|--------------------|------------------------------------|
| dun.tuk | ‘to punch’ |
| duntukon | default affixation with <i>-on</i> |
| dun.tu.kon | final syllable structure |
| ‘to punch someone’ | |

Other examples are included in Figure 6:

Figure 6. Syllabification with suffixes *-on* and *-an*

| Root | English | Root plus suffix | English |
|---------|----------|------------------|--------------------|
| gal.gal | chew | gal.ga.lon | chew something |
| ʔu.mut | obstruct | ʔu.mu.tan | obstruct something |

2.1.4 Circumfixes

A circumfix combining prefixes, infixes and/or suffixes invokes the same types of syllabification as the single affix morphemes:

| | |
|--|--|
| tam.tam | ‘to taste’ |
| tinamtaman | default affixation with <i>-in-</i> <i>-an</i> |
| ti.nam.ta.man | syllabification |
| ‘for someone to have tasted something’ | |

Other examples are included in Figure 7:

Figure 7. Syllabification with circumfix *-in--an*

| Root | English | Root plus circumfix | English |
|--------|----------|---------------------|--------------------|
| ʔa.yag | call for | ʔi.na.ya.gan | called for someone |
| hi.gid | sweep | hi.ni.gi.dan | swept something |

2.2 Nasal assimilation

All nasals in the final position of prefixes are underspecified. They assimilate to the point of articulation of the initial consonant of the roots to which they are attached. *These* prefixes are *muN-* and the past tense form *nuN-*, *ʔiN-*, *ʔaN-* and infix *-in-*¹⁹.

¹⁹ The infix shown throughout this paper as *-in-* also manifests nasal assimilation when the nasal occurs preceding a medial consonant following syncope of the vowel /o/. Examples: *homok* ‘to pity s.o.’ + *-in-* → *himmok*; *dongol* ‘to hear’ + *-in-* → *dingngol*. This suggests that the underlying form *iN-* has the alveolar nasal as the default form preceding vowels.

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| | |
|---|-----------------------------|
| pap.tok | 'to care for s.o. or s.t.' |
| muNpaptok | affixation with <i>muN-</i> |
| mumpaptok | nasal assimilation |
| mum.pap.tok | final syllable structure |
| 'to care for someone or something as an activity' | |

Other examples are included in Figure 8:

Figure 8. Prefixes and nasal assimilation

| | | | |
|------|--------|-------------|--------------|
| muN- | da.lan | mun.da.lan | walk |
| muN- | ngu.nu | mung.ngu.nu | work |
| ?iN- | ta.nom | ?in.ta.nom | planted s.t. |
| ?iN- | ba.ga | ?im.ba.ga | asked s.t. |
| ?iN- | ku.yug | ?ing.ku.yug | led s.o. |
| ?aN- | du.ke | ?an.du.ke | long |
| ?aN- | bi.log | ?am.bi.log | wide |

2.3 Nasal Assimilation and Reduction of C₁ of a root

The final nasal consonant of the prefixes *maN-*, its past tense form *naN-* and *paN-* (underspecified for place of articulation and symbolized as N) assimilate to the point of articulation of the initial C of the root and then the root-initial C is deleted. The resulting form is then syllabified:

| | |
|------------------------------------|-----------------------------|
| pat.na | 'to try' |
| maNpatna | affixation with <i>maN-</i> |
| mampatna | nasal assimilation |
| mamatna | C1 reduction |
| ma.mat.na | final syllable structure |
| 'for (someone) to try (something)' | |

Additional examples are included in Figure 9:

Figure 9. Resyllabification with prefix *maN-*

| Root | English | Root plus prefix <i>maN-</i> | English |
|---------|------------|------------------------------|------------------------|
| ta.kang | open mouth | ma.na.kang | for s.o. to open mouth |
| kap.ya | make | ma.ngap.ya | for s.o. to make s.t. |

2.4 Syncope of the vowel /o/

There are four rules related to the syncope of the vowel /o/. Which rule applies depends on the syllable pattern of a root.

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2.4.1 Syncope of /o/ in CoCV(C) roots

When prefixes of the form CV- or infixes of the form -VC- are affixed to roots of the form Co.CV(C), they invoke syncope of the /o/ vowel in the first syllable of the root:²⁰

| | |
|---------|-------------------------------------|
| po.hod | 'to like' |
| pinohod | default affixation with <i>-in-</i> |
| pinhod | syncope |
| pin.hod | final syllable structure |

'(someone) likes or wants (something/someone)'

Additional examples are included in Figure 10:

Figure 10. Syncope of V /o/ in CoCV(C) roots

| Root | Affix | Resulting form | English |
|--------|-------|----------------|---------|
| po.hod | ma- | map.hod | likable |
| ho.mok | ma- | mah.mok | pitiful |
| ko.ga | -um- | kum.ga | to cry |

2.4.2 Syncope of /o/ in CV.Co(C) roots

When suffixes of the form -VC or circumfixes of the form CV- -VC are affixed to roots of the form CV.Co(C), they invoke syncope of the /o/ vowel in the second syllable of the root with subsequent syllabification:

| | |
|------------|--|
| ga.kod | 'to tie' |
| nagakodan | passive affixation with <i>na- -an</i> |
| nagakdan | syncope |
| na.gak.dan | final syllable structure |

'it is tied'

²⁰ There are a few instances of the syncope of the vowel /u/ resulting in affix reduplication: e.g.

| | |
|-------------|-------------------------------------|
| ?ubun | 'to sit' |
| ?umubun | default affixation with <i>-um-</i> |
| ?umbun | syncope |
| ?um?umbun | CVC reduplication (see below) |
| ?um.?um.bun | final syllable structure |

'for someone to continue to sit'

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Additional examples are included in Figure 11:

Figure 11. Syncope of V /o/ in CV.Co(C) roots

| Root | English | Affix | | English |
|-------------|------------|--------|-------------------------|---------------|
| hi.long (N) | night/dark | na--an | na.hil.ngan (stative V) | benighted |
| da.tong (V) | arrive | -an | dat.ngan (N) | arrival place |

2.4.3 Syncope of /o/ in Co.Co(C) roots

When roots are of the form Co.Co(C), suffixation invokes the syncope of the /o/ vowel of the second syllable. Therefore, we may conclude that the second syllable syncope rule takes precedence over the first syllable syncope rule because syncope of the /o/ in the first syllable would result in an unacceptable initial consonant cluster:

| | |
|-------------------|------------------------------------|
| ho.mok | ‘to pity’ |
| homokon | default affixation with <i>-on</i> |
| homkon | syncope |
| hom.kon | final syllable structure |
| ‘to pity someone’ | |

Additional examples are included in Figure 12:

Figure 12. Syncope of V /o/ Co.Co(C) roots

| Root | Affix | Resulting Form | English |
|---------|-------|----------------|--------------------------------|
| ho.gop | -an | hog.pan | entrance |
| po.hod | -on | poh.don | to like/want/love s.t. or s.o. |
| do.ngol | -on | dong.lon | to listen to s.t. |

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However, when roots of the form Co.Co(C) are circumfixed (CV- -VC), the first syllable syncope rule takes precedence.

| | |
|--------------------------|--------------------------------|
| po.hod | 'to like' |
| kipohodan | affixation with <i>ki- -an</i> |
| kiphodan | syncope |
| kip.ho.dan ²¹ | final syllable structure |
| 'benefit' ²² | |

Additional examples are included in Figure 13:

Figure 13. Syncope of V /o/ in Co.Co(C) roots with circumfixes

| Root | Affix | Resulting Form | English |
|---------|--------|----------------|----------------------|
| ko.do | mi--an | mik.do.wan | to be asked for s.t. |
| do.ngol | mi--an | mid.ngo.lan | to be influenced |

3. Reduplication and gemination processes

Reduplicant morpheme forms. There are two types of morphemes that may be reduplicated: roots and affixes. Reduplication morphemes have the following four syllable patterns:

1. CV
2. CVC
3. CV.C₂
4. CV(C).CV

It might appear to be possible to combine the CVC and CV.C₂ types of reduplication; however, the reduplicants are not only different in form, they are different in meaning. They encode two different aspects, and co-occur with different root classes. In addition, CVC reduplication requires non-morphological gemination if there is not already a CVC available to be reduplicated (as discussed in section 3.2.1 and elsewhere).

Reduplicant and geminate morphemes and their meanings. Reduplicant and geminate morphemes encode aspect, modality or quantitative meaning. The same forms have multiple meanings.²³ Disambiguation of meaning is contextual, that is, the meaning of any given form is related to the lexical

²¹ It is of interest to note that the resulting sequence of /p/ and /h/ across syllable boundaries does not conform to the Sonority Dispersion Principle, although that is the principle which can be proposed to account for the 'avoid onsetless syllables' resyllabification seen widely in the preceding examples. (Clements, 1990)

²² The meaning of this form is not predictable from the sum of its parts.

²³ Instead of postulating multiple meanings for the forms, one could instead postulate homophonous reduplicant and geminate forms.

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category or the semantic sub-class of co-occurring roots, and/or the co-occurring affixes. However, in general, reduplicants encode aspect and geminates encode modality. Only two cases of meaningless gemination have been identified (cf. 3.2.1 and 3.2.4). Geminants never occur as independent morphemes; they always occur in conjunction with other morphemes. Nevertheless, the combination of affixation and gemination together is meaningful.

As mentioned earlier, there are nine lexical categories in Tuwali Ifugao: verbs, nouns, adjectives, adjuncts, demonstrative and personal pronouns, determiners, conjunctions and linkers. Of those nine classes, only verbs, nouns and adjectives allow the reduplication process to operate.²⁴

Figure 14. Examples of lexical categories and CV reduplication

| Root | Meaning | Category | Reduplication - CV | Meaning |
|---------|-----------|-----------|--------------------|---------------------|
| bu.nut | cast lots | verb | bu.bu.nut | multiple action |
| ta.gu | person | noun | ta.ta.gu | plural - people |
| ?o.ngal | big | adjective | ?o.?o.ngal | big - plural things |

Disambiguation of meaning based on lexical categories, semantic sub-classes of roots and co-occurrence of affixes will be described further under the particular sections that describe the different forms of reduplicants and geminates.

Gemination. Which consonant of the root, the initial, medial or final, is geminated relates to other phenomena such as:

- Co-occurrence with reduplicant forms
- The difference in meaning of reduplicants based on whether or not there is consonant gemination
- Co-occurrence with affix forms only, with no reduplication
- Co-occurrence with different root classes and/or affixes

It should be noted that, in addition to the gemination process, there are roots containing consecutive homophonous consonants. These have the syllable pattern, CVC.CV(C) and therefore, block the gemination process (cf. 3.3.2). Evidence for homophonous consonants in roots are: (1) there are a large number of roots with homophonous consonants that do not undergo the gemination process, (2) these roots never occur without the homophonous consonant sequence, and (3) there are roots that differ only on the basis of a

²⁴ There are, however, three exceptions. These are the existential predicate, *wada*, its negative counterpart, *ma?id*, and the negation form, *?adi*, which may all be reduplicated.

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single medial consonant vs. a cluster of homophonous consonants, e.g. *tudu* ‘to teach’ vs. *tuddu* ‘to appoint.’

3.1 CV reduplication

The basic meaning of CV reduplication is augmentative, either in the number of entities involved (3.1.1 and 3.1.4), or in the intensity of the action being conveyed (3.1.2). Another meaning of the CV reduplication is continuative aspect when co-occurring with derived verbs (3.1.3).

3.1.1 Action verbs and CV reduplication with no gemination

- The roots are Class 4 action verbs.
- There is no gemination.
- The CV reduplication encodes a plurality of the agent-subject. The co-occurring *muN-* prefix cross-references the subject-agent.

Forms are derived most easily if the reduplication is carried out first, then the affixation of *muN-*. In this way the reduplication can be characterized as a reduplication of the initial CV of the form, without regard to any affixation it carries:

| | |
|----------------|---------------------------|
| bu.nut | ‘to draw lots’ |
| bubunut | CV reduplication |
| muNbubunut | affixation of <i>muN-</i> |
| mumbubunut | nasal assimilation |
| mum.bu.bu.nut | final syllable structure |
| ‘drawing lots’ | |

Additional examples are included in Figure 15:

Figure 15. CV, verbs, no gemination

| Root | English | muN- CV | English |
|--------|---------|----------------|------------|
| gu.bat | war | mung.gu.gu.bat | warring |
| gu.lu | disturb | mung.gu.gu.lu | disturbing |
| tu.tut | argue | mun.tu.tu.tut | arguing |

3.1.2 Emotion verbs and CV reduplication with C₁ gemination

- The roots are Class 2 emotion verbs.
- The CV reduplication, along with the C₁ gemination, encodes intensity of emotion.
- The co-occurring *-um-* (non-past) or *-imm-* (past) infixes cross-reference the subject-experiencer.

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| | |
|-------------------|--|
| ta.kut | 'to fear' |
| tatakut | CV reduplication |
| timmatakut | affixation by <i>-imm-</i> |
| timmatakut | gemination of C ₁ of the root |
| tim.mat.ta.kut | final syllable structure |
| 'to fear greatly' | |

Additional examples are included in Figure 16:

Figure 16. CV, verbs, gemination

| Root | English | -um- CV C ₁ | English |
|---------|---------|------------------------|----------------|
| hi.ngit | hate | hu.mih.hi.ngit | hate intensely |
| ?a.mo | jealous | ?u.ma?.?a.mo | very jealous |

A topic of theoretical interest with regard to required rule ordering should be pointed out here:

- CV reduplication must precede *-um-* or *-imm-* affixation because the forms are infixes after the reduplicated consonant.
- CV reduplication must precede C₁ gemination because C₁ gemination yields a CC-initial form that fails to match the CV template that is reduplicated.
- To apply C₁ gemination late in the derivation, however, requires that any other affixation occurring must not obliterate the root boundaries, because these boundaries are crucial to identifying the consonant to be geminated; we will see this again below with regard to C₃ gemination.

3.1.3 Derived verbs and CV reduplication, no gemination

- The roots are nouns, derived into Class 1 verbs with durative aspect.
- There is no gemination.
- The CV reduplication encodes continuative aspect.
- The *muN-* prefix cross-references the agent-subject.

| | |
|--------------|-----------------------------|
| da.la | 'blood' |
| dadala | CV reduplication |
| muNdadala | affixation with <i>muN-</i> |
| mundadala | nasal assimilation |
| mun.da.da.la | final syllable structure |
| 'bleeding' | |

Additional examples are included in Figure 17:

Figure 17. CV, derived verbs, no gemination

| Root | English | muN- CV | English |
|---------|---------|-------------------|--------------------|
| bi.yag* | life | mum.bi.bi.yag | living |
| da.lang | flame | mun.da.da.lang | flaming |
| kulabut | cloud | mung.ku.ku.la.but | cloudy, continuing |

*biyag is borrowed from Ilocano²⁵, but fits the Tuwali Ifugao pattern.

3.1.4 Nouns and CV reduplication with no gemination

- The roots are nouns.
- There is no gemination.
- The CV reduplication is inflectional, encoding plurality.
- There is no co-occurring affix.

| | |
|----------|--------------------------|
| ta.gu | ‘person’ |
| tatagu | CV reduplication |
| ta.ta.gu | final syllable structure |
| ‘people’ | |

Additional examples are included in Figure 18:

Figure 18. CV, nouns, no gemination

| Root | English | CV | English |
|--------|---------|-----------|-----------|
| ʔu.nga | child | ʔu.ʔu.nga | children |
| ba.ka | cow | ba.ba.ka | cows |
| ba.nga | pot/pan | ba.ba.nga | pots/pans |

3.2 CVC reduplication

There are two types of CVC reduplication; one involves a phonological process that geminates the medial consonant when the root form is CV.CVC, and the other is simply a reduplication process when the root form is CVC.CVC.

3.2.1 CVC reduplication and medial consonant gemination

The CVC reduplication form shown in the data below has the meaning of ‘continuative’ and is constrained by the following features of co-occurring roots and affixes:

- The co-occurring roots must be activities or derivable as Class 1 activities, i.e. taking place over a period of time. For example, the verb root *dopap* illustrated below is a member of Class 4.

²⁵ The Ilocano language is the lingua franca of the Tuwali Ifugao language area.

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- The prefixes *muN-* ‘non-past tense’ and *nuN-* ‘past tense’ are the required co-occurring affixes, cross-referencing the subject.
- In order for the CVC reduplication process to operate most elegantly, the medial consonant of the root must be geminated if it is of the shape CV.CV(C). In this case, the gemination process is meaningless; it simply provides the syllable pattern necessary for the CVC reduplication.

| | |
|-----------------|-----------------------------|
| do.pap | ‘to wrestle’ |
| doppap | gemination of medial C |
| dopdoppap | CVC reduplication |
| muNdopdoppap | affixation with <i>muN-</i> |
| mundopdoppap | nasal assimilation |
| mun.dop.dop.pap | final syllable structure |

‘continuative wrestling (two or more persons)’

Additional examples are included in Figure 19:

Figure 19. *muN-* CVC reduplication and root medial C gemination

| Root | English | <i>muN-</i> CVC | English |
|--------|---------|-----------------|----------|
| da.lan | walk | mun.dal.dal.lan | walking |
| da.sal | pray | mun.das.das.sal | praying |
| di.nol | trust | mun.din.din.nol | trusting |
| ka.li | speak | mung.kal.kal.li | speaking |
| ko.do | beg | mung.kod.kod.do | begging |
| to.pol | fast | mun.top.top.pol | fasting |

3.2.2 Examples with *muN-* prefix and no reduplication

All of the roots shown in the chart below have the form CV.CVC. When they co-occur with the prefix *muN-* a simple durative, not continuative, activity is expressed. In this case, there is no gemination process needed because, as noted above, that is necessary only for providing a CVC syllable in the root for reduplication, and there is no reduplication in these forms:

| | |
|------------|-----------------------------|
| do.pap | ‘to wrestle’ |
| muNdopap | affixation with <i>muN-</i> |
| mundopap | nasal assimilation |
| mun.do.pap | final syllable structure |

‘to wrestle as an activity’

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Additional examples are included in Figure 20:

Figure 20. *muN*- examples

| Root | English | <i>muN</i> - |
|--------|---------|--------------|
| da.lan | walk | mun.da.lan |
| da.sal | pray | mun.da.sal |
| di.nol | trust | mun.di.nol |
| ka.li | speak | mung.ka.li |
| ko.do | beg | mung.ko.do |
| to.pol | fast | mun.to.pol |

3.2.3 Medial gemination blocked with CVC reduplication

As might be expected, gemination of the medial consonant is blocked when the root form already has the shape CVC.CVC. Also, as pointed out previously, this syllable pattern is the one needed for the CVC reduplication, and if already present in the root is available for the reduplication process.

| | |
|--|------------------------------|
| pap.tok | ‘to care for’ |
| pappaptok | CVC reduplication |
| muNpappaptok | affixation with <i>muN</i> - |
| mumpappaptok | nasal assimilation |
| mum.pap.pap.tok | final syllable structure |
| ‘(someone) is continually caring for (someone or something)’ | |

Additional examples are included in Figure 21:

Figure 21. CVC reduplication with CVC.CVC root pattern

| Root | English | <i>muN</i> - CVC | English |
|----------|---------|------------------|-----------|
| nom.nom | think | mun.nom.nom.nom | thinking |
| hol.tap | suffer | mun.hol.hol.tap | suffering |
| bad.dang | help | mum.bad.bad.dang | helping |

3.2.4 CVC reduplication and other affixes

The data in the following table shows the CVC reduplication pattern with the meaning of ‘comparative’ when occurring with adjective roots. In this case, the first two roots shown are of the CVC.CV(C) pattern, and do not require gemination. However, note that the roots, *duke*, *tike*, *?ongal* and *?itay* all manifest the CV.CV(C) pattern and therefore require medial consonant gemination in order to provide the first syllable pattern necessary for the CVC reduplication morpheme. These forms give more evidence that this gemination process is purely phonological, and that the geminate itself is

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meaningless in contrast to the geminate morpheme that encodes the modal meaning ‘intensive’ discussed in 3.0 above:

| | |
|-------------------|---------------------------------------|
| du.ke | ‘long’ |
| dukke | gemination of medial C |
| dukdukke | CVC reduplication |
| ?andukdukke | affixation with ?an- |
| ?an.duk.duk.ke | final syllable structure |
| ‘longer’ | |
| | |
| du.ke | ‘long’ |
| dukke | gemination of medial C |
| dukdukke | CVC reduplication |
| kadukdukkean | affixation with <i>ka-</i> <i>-an</i> |
| kadukdukkeyan | consonant insertion |
| kadukdukkayan | vowel harmony [e -> a] ²⁶ |
| ka.duk.duk.ka.yan | final syllable structure |
| ‘longest’ | |

Additional examples are included in Figure 22:

Figure 22. CVC, comparative and superlative adjectives

| Root | English | Prefix + CVC | English | Circumfix + CVC | English |
|---------|---------|----------------|---------|----------------------|----------|
| ?ak.hop | low | na.?ak.?ak.hop | lower | ka.?ak.?ak.ho.pan | lowest |
| tag.?e | high | na.tag.tag.?e | higher | ka.tag.tag.?a.yan | highest |
| ti.ke | short | ?an.tik.tik.ke | shorter | ka.tik.tik.ka.yan | shortest |
| ?o.ngal | big | ?ong.?ong.ngal | bigger | ka.?ong.?ong.nga.lan | biggest |
| ?i.tay | small | ?it.?it.tay | smaller | ka.?i.?it.ta.yan | smallest |

3.3 CV.C₂ reduplication

3.3.1 Action verbs, CV.C₂ reduplication, no gemination

- The CV.C₂ reduplicant morpheme when the second C is the onset of the following syllable encodes the iterative aspect, i.e. actions that happen again and again. The semantic root sub-classes that co-occur with this reduplicant are Classes 4 and 5; these classes have default affixes *-on* and *-an* that cross-reference objects. The time aspect inherent in the roots tends to be ‘punctiliar,’ i.e. the beginning and the

²⁶ Vowel harmony is not a common phonological process in Tawali Ifugao. The only instances of the process are verbal roots ending in /e/ that allow the attachment of suffix *-an*.

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end are conceptualized as part of a single action. The iterative meaning with these affixes generally implies plural objects that are being cross-referenced.

- There is no gemination of the medial consonant with this iterative reduplicant morpheme.

| | |
|-----------------------------|---------------------------------|
| ba.liw | ‘to change’ |
| balbaliw | CV.C ₂ reduplication |
| balbaliwan | affixation with <i>-an</i> |
| bal.ba.li.wan | final syllable structure |
| ‘to change something again’ | |

Additional examples are included in Figure 23:

Figure 23. CV.C₂, verbs with suffixes -an or -on, no gemination

| Root | English | CV.C + -on or -an | English |
|--------|---------------------|-------------------|---------------------|
| ba.yad | pay | bay.ba.ya.dan | pay for s.t. again |
| da.pa | touch/feel for s.t. | dap.da.pa.ʔon | feel for s.t. again |
| ʔa.dal | learn | ʔad.ʔa.da.lon | learn s.t. again |

- Such actions may refer to an action that is distributive over time when co-occurring with the *muN-* prefix. In these cases, it is the agent-subject that is cross-referenced. This is a derivative process, signified by the change to durative time and agent-subject cross-referencing triggered by the prefix.

| | |
|-------------------|---------------------------------|
| ba.liw | ‘to change’ |
| balbaliw | CV.C ₂ reduplication |
| muNbalbaliw | affixation with <i>muN-</i> |
| mumbalbaliw | nasal assimilation |
| mum.bal.ba.liw | final syllable structure |
| ‘to change again’ | |

Additional examples are included in Figure 24:

Figure 24. CV.C₂, verbs with *muN-* prefix, no gemination

| Root | English | muN- CV.C | English |
|--------|---------------------|----------------|---------------------|
| ba.yad | pay | mum.bay.ba.yad | pay again |
| da.pa | touch/feel for s.t. | mun.dap.da.pa | feel for s.t. again |
| ʔa.dal | learn | mun.ʔad.ʔa.dal | learn again |

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- When the roots co-occur with *muN-* only, with no reduplication, the aspect tends to be durative with a single agent-subject that is cross-referenced (see examples in Fig. 20).

3.3.2 Action verbs, *-an-* infix, no gemination

Roots with the form CVC.CVC that are members of Classes 4 and 5 block CV.C₂ reduplication. In order to express the iterative aspect, the form *-an-* is infixed. In the forms below, this infix co-occurs with the infix *-in-* and the circumfix *-in- -an*. An object is cross-referenced with the default infix, *-in-* and circumfix, *-in- -an* for Classes 4 and 5, respectively; both affixes encode past tense.

| | |
|-------------------|--|
| hol.tap | ‘to suffer’ |
| hanoltap | affixation with <i>-an-</i> |
| hinaanoltap | affixation with <i>-in-</i> |
| hi.na.nol.tap | final syllable structure |
| | ‘(someone) caused (someone) to suffer again and again’ ²⁷ |
| | |
| bad.dang | ‘to help’ |
| banaddang | affixation with <i>-an-</i> |
| binanaddangan | affixation with <i>-in--an</i> |
| bi.na.nad.da.ngan | final syllable structure |
| | ‘(someone) helped (someone) again and again’ |

Here by ordering *-an-* infixation before *-in-* infixation, the language shows evidence that infixes can consistently be inserted following the initial consonant of a structure. This has been seen also for the infixes *-um-* and *-imm-* above.

²⁷ There is no explicit causative morpheme on the verb.

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Additional examples are in Figure 25:

Figure 25. Action verbs, -an- infix, -in-/-in--an, no gemination

| Root | English | -an- -in-/-in--an | English |
|---------|-------------|-------------------|----------------------|
| tam.tam | taste | ti.na.nam.ta.man | tasted again & again |
| hop.lat | beat/strike | hi.na.nop.lat | beaten again & again |

3.4 CV(C).CV reduplication

This form of reduplication co-occurring with verb roots encodes habitual aspect. If the root is of the form CV(C).CV then, the full root appears to be reduplicated. However, the reduplication process does not include the final C of a root with the form CV(C).CVC²⁸

This particular aspect reduplication form does not appear to be constrained in its co-occurrence with active verb root classes; it may co-occur with default or non-default affixes, but it will always have the meaning of ‘habitual.’

| | |
|----------------------|-----------------------------|
| tu.kal | ‘to be awake’ |
| tukatukal | CV(C).CV reduplication |
| muNtukatukal | affixation with <i>muN-</i> |
| muntukatukal | nasal assimilation |
| mun.tu.ka.tu.kal | final syllable structure |
| ‘to be always awake’ | |

Additional examples are included in Figure 26:

Figure 26. Verbs and CV(C).CV reduplication

| Root | English | Co-occurring affixes | CV(C).CV | English |
|---------|---------|----------------------|--------------------|-----------------|
| tu.gal | gamble | maki- | ma.ki.tu.ga.tu.gal | always gambling |
| bu.tong | drink | muN- | mum.bu.to.bu.tong | always drinking |
| ti.bo | see | -in- | ti.ni.bo.ti.bo* | always seeing |
| ka.li | talk | -um- | ku.ma.li.ka.li* | always talking |
| pa.te | kill | -um | pu.ma.te.pa.te* | always killing |

²⁸ *It is enticing to characterize these forms as full stem reduplication with subsequent simplification of the resulting consonant clusters. This seems to us unlikely, however, because in some monomorphemic forms comparable clusters are allowed (e.g., ʔalte ‘liver’, hongba ‘to broil’). It is still possible that there are different constraints operative on clusters that are derived from those that are lexical and thus non-derived, but we do not pursue that hypothesis here.*

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As shown in the derivation, the three verbs marked with asterisks illustrate the ordering of morphophonological rules, i.e. (1) reduplication and (2) affixation (infix). The infix is placed within the reduplicated form.

| | |
|----------------|--|
| ti.bo | ‘to see’ |
| tibotibo | CVC.CV reduplication ‘habitually seeing’ |
| tinibotibo | infixation with <i>-in-</i> |
| ti.ni.bo.ti.bo | final syllable structure |
| | ‘to always be seeing something’ |

3.5 Gemination and affixes

In this section, we will describe the meaningful gemination process that co-occurs with affixation only, rather than involving any form of reduplication. As mentioned earlier, there are three possible gemination types:

- Gemination of the initial consonant of the root
- Gemination of the medial consonant of the root
- Gemination of the final consonant of the root

The accurate analysis of the gemination process is dependent on an understanding of lexical semantics related to verb root classification, the specific co-occurring affixes, and sentence structure. Natural language contexts are needed for disambiguation of the meaning of these morphophonological phenomena.

3.5.1 *paka-* and *paka- ?i-* and no gemination

The basic meaning of this pattern is abilitative.

- There is no gemination.
- The prefixes encode the meaning that an agent-subject has the ability to do the action that is referred to by the verb root.
- A co-occurring negative form in the syntax negates the ability to do the action.
- The choice of specific prefix is dependent on the semantic root class. The *paka-* prefix co-occurs with Class 4 and Class 5 verb roots (see examples in Fig. 24). The *paka-* and *?i-* combination co-occurs with Class 3 verb roots (Fig. 25):

| | |
|-------------|------------------------------|
| pa.nu | ‘to arbitrate’ |
| pakapanu | affixation with <i>paka-</i> |
| pa.ka.pa.nu | final syllable structure |
| | ‘to be able to arbitrate’ |

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Additional examples are included in Figure 29:

Figure 29. *paka-* *ʔi-* and gemination of initial C of root

| Root | English | <i>paka-</i> and <i>i-</i> | English |
|---------|---------|----------------------------|-----------------------------------|
| ba.lo | revenge | pa.ka.ʔib.ba.lo | revenge s.t. well |
| bi.lang | count | pa.ka.ʔib.bi.lang | count s.t. well |
| ka.gu | concern | pa.ka.ʔik.ka.gu* | very concerned about s.t. or s.o. |

In the last example, marked with the asterisk, the gemination of the initial C encodes intensity, and the *ʔi-* prefix cross-references the object, but the *paka-* appears to lose its ‘ability’ meaning and simply signals that there is an agent-subject present in the transitive sentence structure.

3.5.3 *paka-* *-on* or *paka-* *-an* and gemination of medial C

- These two circumfixes co-occur with Class 4 verb roots (*paka-* *-on*) and Class 5 verb roots (*paka-* *-an*).
- The prefix *paka-* encodes the ability to perform an action.
- The suffixes *-on* and *-an* cross-reference objects in a sentence.
- The gemination of the medial C of the root encodes intensity; i.e. it intensifies the ability of the agent-subject, thereby encoding the information that the agent has the expertise to do something very well or completely.

| | |
|--|--------------------------------|
| ta.kut | ‘to fear’ |
| pakatakut | affixation with <i>paka-</i> |
| pakatakutan | affixation with <i>-an</i> |
| pakatakkutan | gemination of medial C of root |
| pa.ka.tak.ku.tan | final syllable structure |
| ‘to be able to frighten s.o. with expertise’ | |

Here, applying gemination early in the derivation will not cause any problems elsewhere, but in order to maintain the symmetry between all three types of gemination, we choose to order C₂ gemination after affixation, just as we do for C₁ and C₃ gemination, which must be ordered late.

Additional examples are included in Figure 30:

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Figure 30. *paka--on* and *paka--an* and medial C gemination

| Root | English | <i>paka--on</i> or <i>-an</i> | English |
|--------|--------------|-------------------------------|-----------------|
| ?a.dug | guard | pa.ka.?ad.du.gan | guard s.t. well |
| ?a.dal | learn | pa.ka.?ad.da.lon | learn s.t. well |
| da.yaw | praise/honor | pa.ka.day.ya.won | honor s.o. well |

3.5.4 *paka- -on* and gemination of final C

- The *paka- -on* form co-occurs with Class 4 verb roots.
- The prefix *paka-* encodes the ability to perform an action.
- The suffix *-on* cross-references the object in a sentence.
- The gemination of the final C of the root encodes intensity; however, in these examples, the gemination of the final consonant of the root does not intensify the ability of the agent-subject; instead, it encodes the intensification of the action or emotion.

| | |
|-----------------------------|------------------------------|
| ba.law | ‘to dislike’ |
| pakabalaw | affixation with <i>paka-</i> |
| pakabalawon | affixation with <i>-on</i> |
| pakabalawwon | gemination of root final C |
| pa.ka.ba.law.won | final syllable structure |
| ‘to intensely hate someone’ | |

As seen with C₁ gemination, C₃ gemination also must occur relatively late in the derivation, but it must make reference to the root boundary, suggesting that the suffixation does not obliterate that boundary.

Additional examples are included in Figure 31:

Figure 31. *paka--on* and gemination of final C of root

| Root | English | <i>paka- and -on</i> | English |
|--------|----------------|----------------------|-----------------------------|
| da.dag | destroy | pa.ka.da.dag.gon | totally destroy s.t. |
| pi.hul | scorn | pa.ka.pi.hul.lon | totally scorn s.t. |
| to.bal | accept/approve | pa.ka.to.bal.lon | totally accept s.t. or s.o. |

3.5.5 *maka- -an* and gemination of medial C

The circumfix *maka- -an* and medial C geminate appear to be a unified combination encoding ‘intensive’. The co-occurring roots are members of Class 6 statives or passives derived from Class 5, *danag* and *?awat*.

| | |
|--------|------------|
| da.nag | ‘to worry’ |
|--------|------------|

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| | |
|--|---|
| dannag | gemination of medial C |
| makadannagan | affixation with <i>maka-</i> <i>-an</i> |
| ma.ka.dan.na.gan | final syllable structure |
| ‘to worry intensely (about something)’ | |

Additional examples are included in Figure 32:

Figure 32. *maka—an* and gemination of the medial C

| Root | English | <i>maka-</i> and <i>-an</i> | English |
|---------|------------|-----------------------------|---------------------------|
| ʔa.gang | hungry | ma.ka.ʔag.ga.ngan | very hungry |
| ʔu.wo | thirsty | ma.ka.ʔu.ʔu.wo* | very thirsty |
| ʔa.wat | understand | ma.ka.ʔaw.wa.tan | understand s.t. very well |

*The ‘u’ vowel blocks the gemination of the medial ‘w’ and it requires the *maka-* prefix only.

3.5.6 *maka-* and gemination of medial C

The prefix *maka-* and the medial C geminate also appear to be a unified combination encoding ‘intensive.’ The co-occurring roots are derived stative from nouns or in some instances derived passives, as in the case of *dadag* (Class 4) in Figure 33 below.

| | |
|-----------------------|----------------------------|
| da.num | ‘water’ |
| dannum | gemination of medial C |
| makadannum | affixation of <i>maka-</i> |
| ma.ka.dan.num | final syllable structure |
| ‘to be full of water’ | |

Additional examples are included in Figure 33:

Figure 33. *maka-* and gemination of the medial C of root

| Root | English | <i>maka-</i> | English |
|--------|------------|---------------|----------------------|
| ʔa.hin | salt | ma.ka.ʔah.hin | very salty |
| ba.yag | long time | ma.ka.bay.yag | very long time |
| da.dag | to destroy | ma.ka.dad.dag | completely destroyed |

3.6 Syncope of vowel /o/ and reduplication

We mentioned above (section 2.4) that the vowel /o/ is subject to deletion in certain contexts. The CVC intensifying reduplication process is applied following this morphophonological rule of syncope of the vowel /o/ in roots.

| | |
|--------|-----------|
| po.hod | ‘to like’ |
|--------|-----------|

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| | |
|--|-----------------------------|
| mapohod | affixation with <i>ma-</i> |
| maphod | syncope |
| mapmaphod | CVC reduplication |
| map.map.hod | final syllable structure |
| ‘very likeable (very good)’ | |
| ko.ga | ‘to cry’ |
| kumoga | affixation with <i>-um-</i> |
| kumga | syncope |
| kumkumga | CVC reduplication |
| kum.kum.ga | final syllable structure |
| ‘to cry and cry’ | |
| po.hod | ‘to want/like/love’ |
| pinohod | affixation with <i>-in-</i> |
| pinhod | syncope of /o/ |
| pinpinhod | CVC reduplication |
| pin.pin.hod | final syllable structure |
| ‘for someone to continually like/love something’ | |

Additional examples are included in Figure 34:

Figure 34. Syncope of V /o/ in CoCV(C) syllable pattern and reduplication CVC

| Root | English | Affix + CVC | English |
|---------|--------------|----------------|--------------------------|
| ho.mok | to pity s.o. | mah.mah.mok | very pitiful* |
| do.ngol | to listen | ding.di.ngol** | listened again and again |

*someone is to be intensely pitied

**This is the CV.C₂ reduplication process

3.7 CVC reduplication of affixes

There are some constructions in which the CVC reduplication process applies to prefixes and infixes rather than roots, indicating that affixation has operated first. This specification in rule ordering appears to be restricted to two phonological rules: (1) assimilation and reduction of C₁ of the root; and (2) syncope of /o/ in Syllable 1 of a root. The result is that the CVC reduplication applies to the stem output of these morphophonological rules.

| | |
|-----------|-----------------------------|
| kap.ya | ‘to make s.t.’ |
| maNkapyā | affixation with <i>maN-</i> |
| mangkapyā | assimilation |
| mangapyā | reduction of C ₁ |

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| | |
|-----------------|---|
| mangmangapya | CVC reduplication |
| mang.ma.ngap.ya | final syllable structure |
| | '(someone) is continually making (something)' |
| ʔu.bun | 'to sit' |
| maNʔubun | affixation with <i>maN-</i> |
| mangʔubun | assimilation |
| mangubun | reduction of C ₁ |
| mangbun | syncope of V /u/ |
| mangmangbun | CVC reduplication |
| mang.mang.bun | final syllable structure |
| | '(someone) is continually sitting' |

4. Stress placement²⁹

Tuwali Ifugao consistently manifests penultimate stress, irrespective of the morphological structure of the word. It appears, therefore, that stress assignment is delayed until word construction is completed; there is no indication of stress being assigned earlier and leaving evidence in terms of secondary stress or segmental allophones. The examples in this section illustrate these facts of stress placement.

4.1 Penultimate syllable stress on monomorphemic words

The following examples show penultimate stress on monomorphemic words.

Penultimate syllable stress in di-syllabic words

| | | |
|---------|-----------|-----------|
| CV.CVC | 'ma.nuk | chicken |
| CV.CVC | 'ba.ket | old woman |
| CV.CVC | 'da.lit | eel |
| CVC.CVC | 'ʔab.lan | loom |
| CVC.CVC | 'gaw.wang | crow |

Penultimate syllable stress in tri-syllabic words

| | | |
|-------------|----------------|---------------------------|
| CV.CV.CV | ʔa.'ba.de | shawl |
| CVC.CV.CV | dud.'du.ti | dragonfly |
| CVC.CV.CVC | bak.'ku.kul | turtle |
| CVC.CVC.CV | bul.'yag.go | light brown color of hair |
| CVC.CVC.CVC | gul.'ling.ngay | pipe for smoking |

²⁹ Stress is symbolized by the single quote mark.

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Penultimate syllable stress in quadri-syllabic words

| | | |
|----------------|-------------------|---------------|
| CV.CV.CV.CVC | ba.la.'ki.bak | bark of tree |
| CV.CV.CVC.CVC | gi.na.'let.get | woven skirt |
| CVC.CV.CVC.CVC | ʔik.ʔi.'king.ngan | little finger |
| CVC.CV.CVC.CVC | gaw.ga.'waʔ.ʔan | middle finger |

4.2 Movement of stress

4.2.1 Movement of stress with suffixation

As might be expected, prefixation, reduplications and gemination do not invoke movement of stress. The fact that these processes do not affect stress placement implies that any addition of syllables or resyllabification to the left of roots will not invoke stress movement. Suffixation, however, adds a syllable to the right of a root and in so doing, invokes stress movement to the right to preserve the pattern of penultimate stress. Any circumfix with a suffix as part of the form will invoke stress movement also. For example:

| | |
|--------------------|--------------------------|
| 'ʔak.hop | 'low' |
| kaʔakʔakhopan | circumfix applied |
| ka.ʔak.ʔak.ho.pan | final syllable structure |
| ka.ʔak.ʔak.'ho.pan | stress placement |

Additional examples are included in Figure 35:

Figure 35. Movement of stress with suffixation

| Root | English | Prefixation | Reduplication | Suffixation |
|--------|---------|-------------|-----------------|-------------|
| ba.liw | change | mum.'ba.liw | mum.bal.'ba.liw | ba.'li.wan |
| ba.yad | pay | mum.'ba.yad | mum.bay.'ba.yad | ba.'ya.dan |
| da.pa | touch | mun.'da.pa | mun.dap.'da.pa | da.'pa.ʔon |
| ʔa.dal | learn | mun.'ʔa.dal | mun.ʔad.'ʔa.dal | ʔa.'da.lon |

4.2.2 Movement of stress with enclitic pronouns

Monosyllabic pronouns that become enclitics when attached to verbs ending with the front low vowel /e/ invoke stress movement to the right to preserve penultimate stress. There are two exceptions indicated in section 2.0: the monosyllabic pronouns *ku* 'I' and *mu* 'you' become enclitics that lose the /u/ and therefore, do not add a syllable; instead, the onset consonants of the two pronouns become coda consonants of the final syllable of a word:

| | |
|--------------|-----------------------|
| pi.'na.te | 'killed someone' |
| pi.na.'te.da | 'they killed someone' |

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But: pi.'na.tek (<pinate + =ku) 'I killed someone'
 Additional examples are included in Figure 36:

Figure 36. Movement of stress with enclitic pronouns

| Word | English | Enclitic pronouns | English |
|------------|--------------|-------------------|---------------------|
| ma.'ki.'ʔe | go with s.o. | ma.ki.'ʔe.yak | I will go with s.o. |
| 'tak.le | hand | tak.'le.na | his hand |

5. Conclusion

Finally, the account proposed in this paper suggests at least the following concerns for the theory of morphology:

1. As pointed out repeatedly in this paper, the proposed analysis requires that affixation not obliterate root boundaries. In section 3.1.2, for example, we show examples in which CV reduplication, infixation, and gemination of the initial consonant of the root all occur. Because the affix *-imm-* is inserted following the reduplicated consonant, that affixation must follow CV reduplication. In addition, because CV reduplication in its most prototypical form requires C and V as consecutive segments, it must precede gemination as well because gemination of the initial consonant yields CC as the initial sequence of the root. Further, even if the CV reduplication is treated as template driven (Marantz, 1982), with the proviso that the template can skip over non-complying segments to find the next complying segment, the result of applying gemination early in the derivation yields a CC-initial form that is not found in the language. This is not a fatal flaw, of course, because there is no requirement that intermediate forms be pronounceable, but it would be a surprising derivational strategy for a language that is so insistent on enforcing CV and CVC syllable patterns. Comparable patterns are found also in sections 3.5.2 and 3.5.4.
2. An interesting pattern is evident with reference to rules deleting the vowel /o/ (discussed in section 2.4). Here, in roots containing two /o/ vowels, there is one process that deletes the first /o/, and a different process that instead deletes the second /o/. In that the deletion of the vowel in question regularly yields a closed syllable in the penultimate position (which is ultimately the syllable that receives stress), it may be possible to motivate these vowel deletion processes on phonological grounds. The fact that forms containing circumfixes (described in section 2.4.3) delete instead the /o/ that results in the

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antepenultimate syllable being closed argues against this analysis, but there may be conditioning factors yet to be discovered.

3. There are two reduplication patterns that make reference to reduplicating a CVC sequence. In the first of these (discussed in section 3.2), the pattern requires that the second C be the coda consonant of the input syllable (enforcing gemination of the medial root consonant if there is no coda consonant already in that position). In the second (discussed in section 3.3.), the reduplication process requires that the second C be the onset consonant of the following syllable. Formally, these two processes could be combined, but the fact that these are two different morphemes (CVC is an inflectional morpheme conveying the continuative aspect, CV.C is an inflectional morpheme conveying iterative aspect), coupled with the fact that CVC reduplication requires gemination of the medial consonant if there is no coda consonant on the syllable to be reduplicated, supports an analysis that keeps these two reduplication processes distinct.
4. The analysis of lexical categories and root classes has been the basis for understanding affix combinations. It has been proposed in this discussion that there are morpheme combinations that function as a single morpheme while appearing to consist of morpheme forms that may occur independently in other contexts. For example, the circumfix *-in- -an* is the default past tense affix form for Class 5 verb roots. However, the infix *-in-* may occur independently as the past tense default affix form of Class 4 verb roots, and the suffix *-an* may occur independently as the non-past default affix form for Class 5 verb roots. The circumfix combination *-in- -an*, though, relates only to Class 5 verb roots.

Another example of a morpheme combination that functions as a single morpheme, but consists of affixes that relate to different root classes is the prefix *mangi-*. The prefix *maN-* functions independently with Classes 5 and 6 verb roots, while the *i-* prefix functions independently as the non-past default affix form for Class 3 verb roots. The combination prefix *mangi-* relates only to Class 3 verb roots.

Some examples are even more convincing. In Section 3.2.4, we show the affix combination *ka- -an*, along with the CVC reduplication. This combination functions to express the superlative modal. In this case, neither the prefix *ka-* or the suffix *-on* suffix can occur independently with a modal meaning. Also, the *ka- -an* combination cannot co-occur with verb roots and therefore, has no

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relationship to verb root classes. The circumfix co-occurs only with the lexical category, adjective.

A final example for underlining the need for understanding root classes are the circumfixes *ʔi-* *-an* (non-past) and *ʔiN-* *-an* (past). These two circumfixes function to cross reference a beneficiary-object; in this case, the prefixes *ʔi-* and *ʔiN-* are the default affixes for Class 3, and the suffix *-an* is the non-past default affix for Class 5, but as a combination single morpheme, the circumfixes may cross-reference a beneficiary-object for any class that has the potential for having a beneficiary semantic role.

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