Phonological strengthening in Hsiukuluan Amis

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1. Introduction. The Amis language is the largest Austronesian language spoken on Taiwan.[1] There are today about 150,000 members of this ethnic group, which makes it much larger in size than the next aboriginal language of the island. The Formosan languages of Taiwan, including Amis, are generally regarded as having diverged from the parent language quite early. Blust (1992:31) notes that the Austronesian homeland, from both linguistic and archeological evidence, must have been "on or near the island of Taiwan." Though Taiwan might once have been at the center of the Austronesian world, that is no longer the case. Amis, like the other Formosan languages, is losing speakers rapidly, as is evidenced by the fact that the language is spoken today mostly by people over 50 years of age. Still, there are many very good speakers in their native areas on the east side of the island along the coast from Hualien to Taitung and in the inland rift valley running between these two cities. Not surprisingly, previous linguistic work on Amis has mostly focused on history and comparison and includes important contributions by Professor Paul J.-K. Li. Another body of work has come from missionary linguists Edvard Torjeson and Virginia Fey, the former the developer and the latter the propagator of the Amis romanized writing system. The Torjeson script is illustrated in the *New Amis Primer*. There is also a complete translation of the Bible *Fagcalay codad*. Selected previous work on Amis would include Wang 1976, Chen 1982, Fey 1986, and He et al 1986.

Amis has a number of dramatic linguist features. Its grammar demonstrates typologically VSO ergative features with mostly prefixes and prepositions. Phonologically, most words begin and end in consonants with a canonical word shape CVC(C)...(C)VC; indeed, most Amis words evidence a shape CVCVC...VC. Morphologically, Amis has a very rich inventory of prefixes for several grammatical categories.

2. Sound and word structure. The seventeen contrastive consonants and four contrastive vowels with their conditioned phonetic realizations are displayed in 1:[2]

(1)
p [p pʰ]   t [t tʰ]   k [k kʰ]   ' [ʔ ʕʰ]
c [ts tʃ]
f [f v]   s [s ʃ]   x [x]   h [ɦ]
d [ɬ]   w [w]   y [j]   r [ɾ r]

        l   [l]
m [m]   n [n]   g [ŋ]
ɪ [i ɪ e ɛ] o [u ɯ o ɔ]   e [ə]   a [ɑ]

The liquids *r* and *l* are often not clearly distinguished.

The Amis word is easiest to define in terms of stress, for only one main stress or orthotone per word is allowed. Inflectional markers and prepositions do not carry full stress and are thus best regarded as clitic. Furthermore, reduplication is exempted from the one main stress per syllable rule. Orthotonic words have stress on the ultimate syllable.

Amis typically exhibits words of more than one syllable. To some extent this predilection is the result of morphological inflection or derivation. But the root forms of many content words--nouns and verbs--are themselves polysyllabic in character, even if morphological affixing is ignored. Some examples are:

(2) a. ma-olah 'to love'
     b. kakowan-an 'I (nom)'
     c. mi-kalat-ay 'have bitten'
     d. ma-to'as-ay 'ancestor, elder'
     e. tamdaw 'person, human'
     f. sapi-kikog 'hope chest at a wedding ceremony'

Although polysyllable words are the norm, there are nevertheless a few monosyllabic forms in Amis even among the roots of nouns and verbs.

(3) a. pog 'hole'   e. fek 'to hit'
     b. faw 'to buy a group'   f. kof 'corn'

c. pek 'to hit sharply'   g. kog 'owl'
d. feg 'to throw'   h. dok 'wild strawberry'

Examples of monosyllabic content words in Amis, however appear infrequently. But, among grammatical particles it is easier to find to monosyllabic words, e.g. *ho* 'still', *ha* politeness particle, and *saw* rhetorical question particle. The case markers are monosyllabic as well:

(4)   a. ko nominative
      b. to accusative
      c. no genitive

Amis is also a language that eschews syllables beginning, ending, or transitioning only in vowels. If there is no consonantal beginning or ending, then a rule applies to introduce a glottal stop. Within words homo-organic glides *j* and *w* are similarly introduced near *i* and *o* to separate syllables. Nonetheless, the segments *w*, *y*, and *ʔ* also occur in environments other than those requiring them by rule. That means these three segments have both lexically-specified and rule-generated existence. Some examples of the epenthesis process can be seen in, for example, *olah* 'love', a glottal is added to cover the initial o-, and in the verb *soal* 'to say', a -w- is epenthesized intervocalically [sowalː]. While spaces limits to only this brief discussion of the epenthesis rule, we can note that glides are added between vowels when one of the vowels is /i o/ and glottal stops are added when the vowels are identical or at word boundaries. More examples of the rule are:

(5)   a. [ʔiʃɛ ʕʰ] < /isiʔ/ 'to urinate'
      b. [ʔinaʔ] < /ina/ 'mother'
      c. [ʔamaʔ] < /ama/ 'father'
      d. [rumaʔ] < /roma/ 'other'
      e. [natʲiraʔ] < /nacira/ 'yesterday'
      f. [pitoʔ] < /pito/ 'seven'
      g. [tusaʔ] < /tosa/ 'two'
      h. [turuʔ] < /toro/ 'three'
      i. [limaʔ] < /lima/ 'five'

j. [ʔotˢur] < /otˢor/ 'to send'
k. [saʔan/ < /saan/ 'to say'

The covering of word onset or offset represents a fundamental process in this language whose effects touch many aspect of its phonology. Sometimes alternation among morphologically related words or allegro forms are the only indicators of whether glottal stops are underlying or derived. Chen (1987:25-8) also point this out, citing the example of *ama* 'father', which occasionally appears in construction with the personal article *ci* to give a compound [tˢijamaʔ] < /ci-amaʌ/. Yet, in isolation, *ama* becomes [ʔamaʔ]. The appearance of [j] sometimes and [ʔ] others indicates that these changes are rule-governed and not underlying.

For the purposes of covering onset/offset the glides behave as if they were consonants. It is also to be noted that there are no consonant clusters in Amis. When consonants come together, they must be assigned to different syllables. Thus there are only VG-sequences (vowel-glide sequences) and never VGC. That means Amis has forms such as:

(5) a. tamdaw [tamɬaw] 'person, human'
     b. fafoy [fafoj] 'pig'
     c. kayakay [kajakaj] 'bridge'
     d. cicay [tˢḭtsaj] 'one'
     e. si'enaw [ʃiʔə̥naw] 'cold'
     f. ma-cidalay [matˢiɬalaj] 'to be sunny, have fair weather'
     g. fiwfiw [fiwfiw] 'sound of a gentle breeze'
     h. radiw [raɬiw] 'song'

There are no cases of word shapes such as *[tamɬawʔ]. Therefore, the use /w j/ are consonantal everywhere and are never vocalic satellites of diphthongs as far as the rules of the language are concerned.

3. Stress. Amis also has a nearly inviolable rule of ultimate stress. Every orthotone has is stress prominence on the last syllable. The clitic case markers and personal articles are unstressed and so fail to have this pattern. Another exception to the ultimate stress rule are instances of reduplication and a few

special deictic forms for comparative and superlative that have prosodic underlining. We have illustrated these in 5.

(5)   a. takalaway [takala'waj] 'tall'
   b. takala:way [taka'lawaj] 'taller, tallest'

Virginia Fey, who worked and lived with the Amis for many years and who was well informed about many varieties of Amis (especially in the south of Taiwan), told us once that in some places a syllable other than the last syllable might take the stress. She also stated that initial glottals followed by *a* have the accent on the first syllable. She cited examples such as *címa* 'who', *káko* 'I', and the personal name *ci Áto*, and for the cases with initial glottal plus *a*, she suggested *ánegag* 'chair, stool' and *o sáfa áko* 'my sibling'. This rule does not appear in all varieties of Amis. In Hsiukuluan Amis the non-ultimate stress is perhaps an alternative, for example, of the form *cimá* 'who', but ultimate stress is the general pattern of Hsiukuluan Amis, although some speakers and some lects may show exceptions to this generalization.

Stress assignment in Amis is always autosegmental in character in the sense that the main stress is not assigned lexically to a particular syllable or segment but able to float to the last syllable after the form is fully inflected. In other words as Goldsmith (1976) argued there are separate tiers for segments and for stress, etc. The two tiers are then linked with association according to certain rules. Moreover, only consonants can be assigned a consonant slot in a syllable template, only vowels can be assigned to vowel slots in a syllable template, there is one-to-one assignment with extra slots discarded, there may also be language-specific fixing of a segment, and the association of segments and syllable templates may be either *segment-driven* or *template-driven.* We believe that Amis, just as French (1988) has argued for Tagalog, employs template-driven association and not segment-driven association. An illustration of the template-driven nature of Amis association is seen in the *Ca+cardinal number* construction. When counting things that are [+animate], the cardinal number takes a prefix formed from the initial consonant of the cardinal number plus the vowel *a*. As 6 below shows how the template "looks" for segments.

(6) Numeral construction for animate nouns *la-lima* 'five'
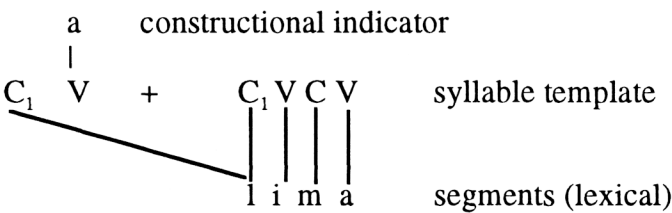
The autosegmental nature of stress will also dictate that suffixes beginning with vowels always resyllabify to incorporate the last consonant of the root as the initial of the last syllable. For example, the form *hakelog-en* 'follow-PASSIVE' will have the syllable structure even *-g* [ŋ] is the final consonant of the lexical items /hakelog/:

(7)

[ħakəloʼŋən]
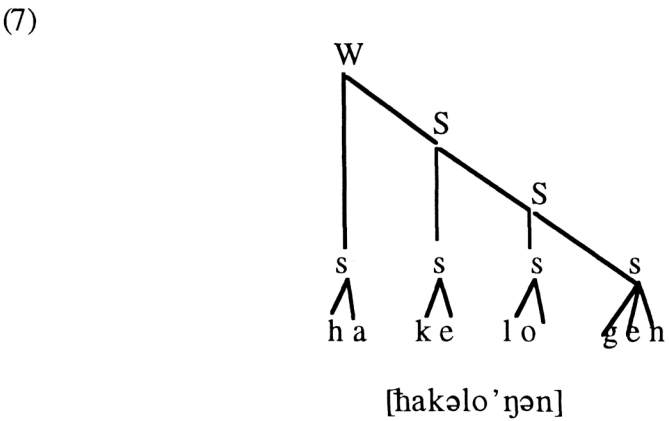
Suffixes are thus incorporated into the syllable structure of a word as if they were a part of the stem. Prefixes, however, are treated differently. As we will discuss below, Amis devoices the vowels *i* and *e* when they make up the nucleus of the first root syllable. Vowel devoicing does not apply, however, to vowels of prefixes.

4. Word final strengthening. Amis is a language whose phonology requires that the final syllable or a word exhibit a strengthened or fortited closure. As Chen (1987:28) notes, "The plosive p, t, k, and q (glottal stop—JAE and HTC) are aspirated in word-final position. In initial and medial positions they are

unaspirated." She also found that other sound types in word-final position generally became stronger, but they were weaker initially and medially. She says, of example, of the retroflex liquids, "The retroflex *r* is a flap [ɽ] in all but syllable-final positions where it is a trilled [r]." In fact, Chen's observations apply more generally; all classes of sounds undergo some kind of strengthening word-finally. Aspiration and trilling represent only two quite obvious manifestations of reinforced syllable closure. Other processes are:

(8)   Unstressed position Stressed position Process

a. stops	[p t k ʔ]	[pʰ tʰ kʰ ʕʰ]	Aspiration
b. affricate	[ts]	[tsh]	Aspiration
c. fricatives	[f s ɬ x]	[fː sː ɬː xː]	Lengthening
d. liquids	[l ɽ]	[lː rː]	Lengthening, Trilling
e. nasals	[m n ŋ]	[mː nː ŋː]	Lengthening

We have examined sound spectrograms of several tokens of Huang Tung-chiou's speech. The results are tabulated in 9:

(9)

Item	Unstressed	Stressed
ṣa'etip 'west'	119ms	---
to'aṣ 'ancestor'	---	281ms
kaackan̲an 'dirty'	84ms	
kaackanan̲ 'dirty'	---	153ms

5. Pharyngealization. As the above discussion of Amis segments and prosodies has demonstrated, there are several features that must be regarded as noteworthy. One not mentioned heretofore is the *pharyngealization* effects of glottal segments /ʔ h/. Both of these segments leave an unmistakable influence on neighboring vowels. In order to verify the pharyngealized nature of /ʔ h/, we presented tape-recorded tokens of /ʔ h/ to speakers of Palestinian and Saudi Arabic. They were quite struck by them, finding them to be identical with the corresponding sounds in their languages. In fact, these students thought that the Amis words presented were taken from some obscure variety of Arabic they did not know. On another occasion these native

speakers burst out laughing because one of the Amis words happened to coincide with an Arabic obscenity. Therefore, we are fairly confident of the transcriptions [ʕ ɦ]. The following list shows that /h/ is found in all word positions.

(10) a. hon [ɦonː] 'book' (from Japanese)
  b. hitay [ɦitajː] 'army'
  c. hemek [ɦəmək^h] 'to admire'
  d. harateg [ɦaratəŋː] 'thoughts'
  e. fihon [fiɦonː] 'makeup'
  f. fohet [foɦət^h] 'flying squirrel'
  g. fohat [foɦat^h] 'to open'
  h. 'olah [ʔolaɦː] 'to love'
  i. 'epah [ʔəpaɦː] 'alcoholic beverage'
  j. omah [ʔomaɦː] 'field'

The glottal stop is a particularly interesting segment, because it comes from two sources. At the absolute ends of words it is possible to determine the source, as only the underlying glottals undergo fortition. Consider these near minimal pairs:

(11) a. loma' [lumaʕ^h] 'house' vs. roma [rumaʔ] 'other'
  b. pona' [punaʕ^h] 'muddy road' vs. pona [punaʔ]
        'navel'
  c. sa'efit [saʕəfit^h] 'trick' vs. safit [safit^h] 'cloth'
  d. mafoti' [mafutɛʕ^h]'to sleep' vs. soni [soniʔ] 'noise'
  e. liso' [lisɔʕ^h] 'reunion visit' vs. miso [misoʔ] 'you'
  f. tono' [tonɔʕ^h] 'precipice' vs. tono [tunoʔ] 'swelling'
  g. tapi' [tapɛʕ^h] 'to work in future spouse's house' vs.
        tafi [tafiʔ] 'Japanese sandals'

From the data above it can be seen that the two glottal consonants not only demonstrate distinctive fortition effects, but also they have lowering and backing effects on neighboring vowels.

Amis vowels /i e/ at the beginning of a word stem can devoice. This devoicing, however, will only occur when the vowel is preceded by an underlying and not an epenthesized consonant. Before the details of this process can be discussed, we need to examine vowel devoicing.

6. Vowel devoicing. We assume that Amis has a four-vowel system /i e a o/. This is the typical pattern of Philippine-like languages, cf. Schachter-Otanes (1972). Moreover, these vowels will be realized differently in differing environments. Most of the time the variation of realization involves vowel height. A stressed vowel in general is higher except for those next to glottal consonants, which lower and back such vowels.

There is a mirror image in Amis phonology to the rule of stressed-syllable fortition. Whereas in strengthening the word-final syllables are fortited, the beginnings of words can undergo weakening, through vowel devoicing. For Hsiukuluan Amis only the front vowels /i e/ are involved. This rule is very much subject to speed of articulation. In very slow speech the usual realization of a vowel may occur. In fast speech the vowel may become voiceless and short. We indicated voiceless vowels with a circle under the vowel. Some examples are:

(12) a. 'enem [ʔə̥nəm:] 'six'
    b. 'emin [ʔə̥min:] 'all'
    c. 'enip [ʔə̥nipʰ] 'soft-shelled turtle'
    d. teki' [tə̥kekʰ] 'fist'
    f. cicay [tʲi̥tˢaj:] 'one'
    g. 'icep [ʔi̥tˢəpʰ] 'betelnut'
    h. cikeoh [tʲi̥kə̥rɔɦ] 'to push'

The devoicing of vowels in Amis leads to a number of highly-marked surface clusters. Torjeson chose not to write these devoiced vowels in the orthography, spelling the items in the above as *'nem, 'min, 'nip, tki', ccay, 'cep,* and *ckroh*. However speakers are capable of distinguishing which vowel has been deleted just as in English we know that *visting* comes from *visiting*.

Allegro rules often do produce highly marked clusters in a language, which may later be lexicalized. In English a stewardess was once observed to utter [ŋaiʔ] for *goodnight!*, the *good* being retained only in the velarization of the *ŋ*. Nevertheless, there can be little doubt that the vowels /i e/ are present underlyingly in Amis. For one thing, speakers know which vowels will reappear in slow speech. Moreover, they sense the phonological changes of palatalization of /i/ on preceding

sibilants, e.g. *cicay* 'one', *cikeroh* 'to push', *cidem* 'sweet', and *cikel* 'to lock the door'.

The vowel devoicing rule is also limited to the vowels /i e/. Also no morphological materials is ever involved in devoicing, so only content categories can undergo vowel devoicing. In Hsiukuluan the devoicing of vowels is also limited to one vowel per word, but Fey (1986) that more than one vowel can disappear in other varieties of Amis. In addition to *ckroh* 'to push', she gives *crnoh* 'to stand on end of body hair or fur' as an example.

There is every reason to believe that vowel reduction is just the flipside of the word final strengthening rule of Amis. The metrics of Amis phonology are simply iambic in character; the first syllable of the word tune is weaker and the second stronger. That's why the vast majority of words showing the vowel reduction are disyllabic and usually CVCV(C) becoming CCV(C). A few examples of this change are: *'pah* 'wine', *dfak* 'bowl', *gric* 'to grind the teeth', *knod* 'the inside of anything', *lfek* 'to break apart from having been cracked', *mdok* 'to do something unannounced', *sga* 'to be bored' (all examples from Fey 1986). There are also some examples of trisyllabic roots undergoing this change. In these cases the vowel devoicing begins in the stem-initial syllable and spreads to the right. There is, of course, the restriction that only the vowels /e i/can be involved. Examples are: *hakelog* 'to follow', *pafeli* 'to give', *celahad, cemahad, ceronoh, felalac, lacicay*. We thus conclude that metrical strength in Amis is built up from right to left in a way to make syllables on the left progressively weaker and thus susceptible to reduction. One manifestation of this strength on the right is the fortition of the word-final syllable. Amis thus provides us with another example of a language in which suprasegmental prosodies—in this case the all important category of stress—have manifestations that dock on the segmental tier.

Notes

1. A part of this research was carried out in the summer of 1981 under a fellowship granted to the first author by the Pacific Cultural Foundation, Taipei, Taiwan.

2. In actuality we give the graphs of the romanized script, which correspond to these phonological contrasts.

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