

# The Metrical Structure of Thai in a Non-Linear Perspective

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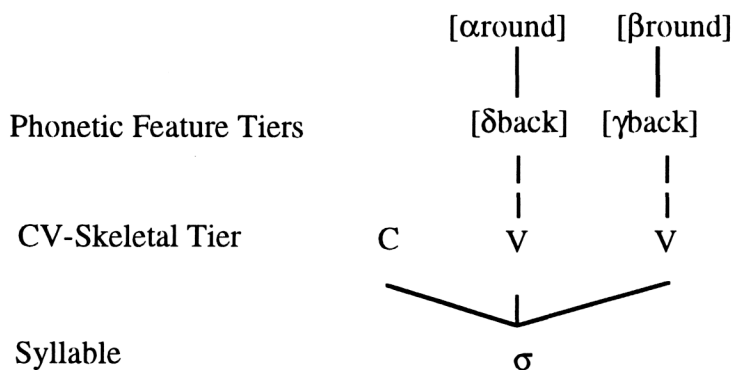
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## 1. SYLLABLES IN AUTOSEGMENTAL AND METRICAL PHONOLOGY

Syllables and stress patterns have been considered suprasegments, external to segmental features of consonants and vowels. In a more recent approach to phonological analysis, the autosegmental approach (Goldsmith, 1976, 1990), the distinction between segments and suprasegments is, more or less, neutralized to autosegments. That is, consonants and vowels, phonetic features, and tones are all viewed as autosegments on their own separate tiers. Although autosegments are independent of one another, they are geometrically linked to one another by association lines which express simultaneity in time: Linked elements jointly represent a sound.

While Clements and Keyser (1985) see syllables as elements on their own syllable tier in a multi-linear representation, Goldsmith (1990) takes a syllable to be a “hierarchical structure organized on the skeletal tier.” Syllables themselves constitute a phonological plane of metrical structure, upon which stress assignment is based. For example, see (1).

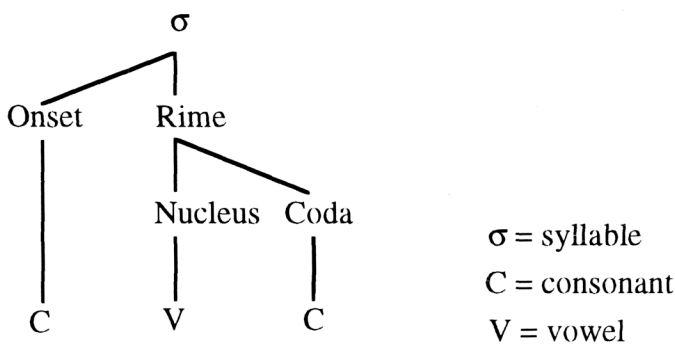
(1)



## 2. SYLLABLE ORGANIZATION

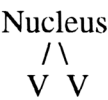
The “hierarchical” internal structure of a syllable according to Goldsmith, consists of two major constituents, onset and rime, with nucleus and coda as the subconstituents of the rime. The internal structure of the syllable on the syllable plane can be charted as in (2).

(2)



For a complex nucleus, the nucleus node is branching as in (3).

(3)



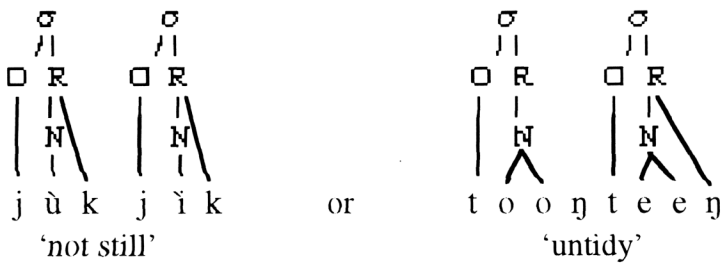
This internal structure of the syllable is psychologically real and is well attested cross-linguistically in such phenomena as language games, speech errors, etc. These constituents and subconstituents of the syllables are evidenced in the Thai language game Kham Phứán (Surintramont, 1973) in which rimes are permuted, and in a form of reduplication in Thai (Luksaneeyanawin, 1986) in which the syllable nucleus behaves differently than the syllable coda in reduplication as in (4).

(4)a. Kham Phứán (Surintramont, 1973): rimes permutation



Here tones as autosegments may or may not move with the “melodic” segments of the rime. Thus, [duu nǎŋ] > [daŋ nùú] or [dǎŋ nuu].

(4)b. Special Reduplication (Luksaneeyanawin, 1986): vowel ablaut



Whereas Kham Phùán takes a larger unit of rime permutation regardless of the internal structure of the rime itself, the special reduplication in (4)b looks at the subconstituent of the rime, the syllable nucleus. Both phenomena are good evidence of the reality of the internal structure of the syllable for Thai speakers.

A notion that has been given much weight in Goldsmith (1990) is “extrasyllabicity,” which is an extra element of the internal structure of the syllable. Such an element is a consonant in either initial or final position of a syllable which, if it is not syllabified during the word-formation process, will be deleted in the phonetic form. In word-final position such a segment has been called an “appendix” or a “termination” (1990, p. 107). Extrasyllabic segments are evidenced in Thai and may be said to be comparable to [tua kàʔran] in Thai (to be discussed in section 4.2).

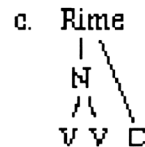
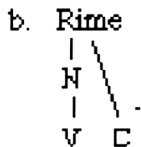
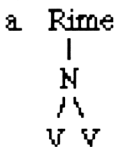
### 3. SYLLABLE WEIGHT, STRESS, AND METRICAL STRUCTURE

Metrical Phonology (tree theory) analyzes stress patterns as hierarchical representations of relative prominence of syllables and higher constituents in the metrical structure (metrical tree). In general, stress assignment is based on rhythm and/or syllable weight, which looks at the rime structure. While rhythm alternates stress at regular intervals, syllable weight distinction, which is in general binary, i.e., light and heavy, counts moras in the rimes. Heavy syllables are those with branching rimes, while light syllables are single-moraic with non-branching rimes (cf. (5) & (6)). In a quantity-sensitive language, heavy syllables are the ones that attract stresses.

(5) Light syllables are of this form:



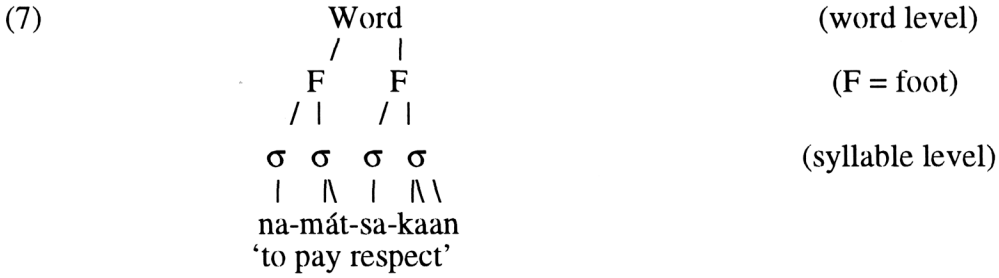
(6) Heavy syllables may take one of the following internal structures of the rime:



Syllable weight is crucial to stress assignment in Thai (to be discussed in sections 4 and 5).

Metrical Theory, developed from Liberman and Prince (1977) and Prince (1980) (cf. Goldsmith, 1990), sees three main hierarchical constituents in the metrical tree:

- The syllable, which is the lowest level constituent, with internal structure of the rime being crucial to stress attraction.*
- The metrical foot, which is a higher-level constituent, consisting of a strong syllable and one or more weak ones. A foot may be degenerate, i.e., dominating a single syllable.*
- The word, which is the highest level, consisting of a strong foot and one or more weak feet. For example, see (7) (from Luangthongkum, 1977).*



A strong node, denoted by a vertical line at the level of either F or W, represents prominence.

#### 4. THAI SYLLABLES

Surface structures of Thai syllables can be summarized as follows:

(8)  $C_1(C_2) \{V(V)(C_3)\}$

That is, all the structures in (9) are possible phonetic forms, with constraints shown in (10);

(9) a.  $C_1(C_2)V$                       b.  $C_1(C_2)VV$                       c.  $C_1(C_2)VC_3$                       d.  $C_1(C_2)VVC_3$

(10) Syllable-Structure Constraints

- a.  $C_2 = \{l, r, w\}$ , and  
 if  $C_2 = [w]$ , then  $C_1 = [k, kh]$  (Luksaneeyanawin, 1993)
- b.  $*[\alpha \text{ son}] [\alpha \text{ son}]$

That is, in a cluster onset, the consonants cannot both be [+son] or both be [-son]. For example, \*pt, \*rl, or \*kk are all ill-formed. The language does not allow a sequence of stops or approximants in the onset position.

c.  $C_3 = \{m, n, \eta, w, j, p, t, k, ?\}$