

## RIGHTWARD REDUPLICATION IN FORMOSAN LANGUAGES REVISITED\*

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Rightward reduplication, first adopted by Chang's (1998) analysis on Thao, has been followed and claimed to be found in other Formosan languages, such as Siraya (Adelaar 2000), Paiwan (Tseng 2003), Pazeh (Lu 2003), and Amis (Yeh 2004). Li and Tsuchida (2001) question the necessities of classifying this kind of pattern, considering rightward reduplication as a subtype of full reduplication based on their semantic and functional similarities. This paper attempts to resolve the question of whether there should be 'rightward reduplication' in Formosan languages. By adopting the approach to analyze this reduplication within the model of Morphological Doubling Theory (Inkelas and Zoll 2000), this paper shows that the paradox of directionality and base-reduplicant locality existing in the analysis via Correspondence Theory (McCarthy and Prince 1995) can be eliminated. In this model the base and the reduplicant are considered two copies which originate from two morphosyntactically identical inputs. Under this assumption there is no rightward reduplication, nor the base or the reduplicant, but two inputs which each undergoes a specific cophonology to yield the desirable combination. In conclusion, this paper thus calls for a consistent treatment of the reduplicative pattern as a subtype of full reduplication, and tentatively suggests that there is no need of terming 'rightward reduplication' in Formosan languages.

### 1. INTRODUCTION

The current treatment of reduplication with the affixation approach (e.g. Marantz 1982, McCarthy and Prince 1986 *et seq.*) and Correspondence Theory (McCarthy and Prince 1995) faces two fundamental problems: directionality of a reduplicative pattern and location of the base and the reduplicant. Correspondence Theory assumes a phonological identity between the base and the reduplicant; however, there occurs in some data the difficulty to determine which part is the base and which part is the reduplicant. In the affixation approach, directionality of the reduplicative pattern as leftward or rightward is based on the decision as to which part is the base, thus there can be two possibilities for the directionality if the two elements are almost phonologically identical. This paradox is highlighted when coming to the analysis of the so-called 'rightward reduplication' in some Formosan languages.

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This paper is devoted to the discussion of ‘rightward reduplication’, considered here as one of the four variations of full reduplication. The analysis in this paper differs from other works in the literature which regard ‘full reduplication’ in some Formosan languages as ‘rightward’ or ‘suffixal’ (e.g. Lu 2003, Tseng 2003, and Yeh 2004), where four languages are studied: Amis, Thao, Paiwan, and Pazeh. The discussion is divided into three parts: first, the rationale behind the arguments for rightward reduplication; secondly, my arguments against rightward analysis; and thirdly, presentation of an alternative analysis via Morphological Doubling Theory (Inkelas and Zoll 2000, 2005), followed by the conclusion.

## 2. RATIONALE BEHIND RIGHTWARD ANALYSIS

Chang (1998: 283) first recognizes a reduplicative pattern in Thao which is considered as copying from the right edge of the base and thus terms it as ‘rightward reduplication’:

‘In addition to full and Ca-reduplications, more than twenty reduplicated forms exhibit a pattern that copies the last three or four segments from the right edge of the base, skipping the final C if there is one. The base of this rightward reduplication include...’

The following data are taken from Chang (1998: 284) as examples of this pattern. The underlined part is considered the reduplicant.

### (1) Rightward Reduplication in Thao

a. /ʔqi.ði/	‘to look after, protect’	ʔ-uŋ-qiði- <u>qiði</u>	‘to protect, watch over’
b. /qu.li.ʉf/	‘long’	mia-quliu- <u>liuʃ</u>	‘to straighten, stretch out’
c. /bu.qnur/	‘anger, hatred/’	mia-buqnu- <u>qnur</u>	‘to be irritable’
d. /siŋ.ki/		siŋki- <u>ŋki</u>	‘to kneel’
e. /dut.khun/		mia-dutkhu- <u>khun</u>	‘to hunch over, bend over’

Chang observes that in Thao rightward reduplication ‘applies to bases containing two or more syllables, and if the base is disyllabic, it must contain a consonant cluster in either initial or medial position within the morpheme’ (p. 284). From the data it can be seen that rightward reduplicant is followed by a final consonant which is part of the base, as in (1b, c, d, e). According to Chang, this is the skipped consonant of the base. However, Chang does not justify the reason why it is the second part which is considered as the reduplicant, instead of the first part, given that both are phonologically identical. In addition, Chang notes that rightward reduplication overlaps with full reduplication in terms of the semantic functions. This supports our analysis here to consider rightward pattern as a variation of full reduplication (Lee, 2005).

The quotation above shows that Chang’s analysis in Thao reduplication distinguishes full reduplication from rightward reduplication. In the works by Lu (2003), Tseng (2003), and Yeh (2004), there is no difference between full reduplication and rightward/suffixal reduplication. Not much explanation is given by Lu (2003) regarding the reason why rightward reduplication is considered a common pattern in the four languages: Amis, Paiwan, Pazeh, and Thao. However,

in Pazeh there is a pattern which he terms as CVCV-reduplication, which I consider as one variation of full reduplication. Contrary to Li and Tsuchida's (2001) view that no distinction is needed between CVCV- and rightward reduplication, he claims that these two patterns are different based on the observation that 'stative verbs can apply rightward reduplication to indicate the intensive, but not CVCV- reduplication (p. 51)'.<sup>1</sup>

Arguments for rightward reduplication are provided in Tseng (2003: 22-29) for Paiwan. First of all, the data in Paiwan are divided into two classes of reduplication: (1) Preservation of the Base, where nothing is deleted from the base; and (2) 'Non-preservation of the Base', where segments are deleted. Following the discussion that the reduplicant candidates in 'non-preservation of the Base' are considered unjustifiable, two choices of reduplicants are left under the assumption of 'Preservation of the Base', being either 'left' or 'right':

(2) Preservation of the Base (Tseng 2003: 28)

Consistent Left or Far Right Reduplication (affixes are bold-faced)

Left Reduplication

Right Reduplication

a. k-ə**m**-akan

a'. k-ə**m**-a-ka-n

b. s-ə**m**-u-tjira-tjiray

b'. s-ə**m**-u-tjira-tjira-y

c. si-sə-vəsə-vəsəv

c'. si-səvəsə-vəsə-v

d. a-rava-ravan

d'. arava-rava-n'

It is clearly seen from the data that in some cases excluding affixes, the reduplicant can be an infix apart from being a prefix in leftward and a suffix in rightward reduplication. Take the word (d) for example. If reduplicating leftward, then the base is *ravan*. In this way the first segment *a* is inexplicable. If rightward, then the base is *arava*. In this way the reduplicant is an infix subtracting the base from the word-final coda *n*. Tseng goes for a rightward analysis based on two pieces of evidence she claims: First, suffixal reduplication is also found in other languages, such as in Dakota the form *haska* is reduplicated as *haska-ska* (Marantz 1982: 450). Secondly, the word-final coda in rightward analysis can be accounted for if it is considered extraprosodic.

Similar pattern in Amis is also analyzed as suffixal by Yeh (2004). Like Thao, rightward reduplication in Amis also applies to disyllabic words with word-initial consonant clusters such as CVCCVC. Thus a word such as /kuhtiŋ/ is reduplicated as /kuhti-hti-ŋ/. Yeh (2004) claims that leftward or prefixal analysis cannot deal with examples like these. One could argue that the reduplicant in a tri-syllabic word is the underlined part of  $C_1V_1C_2V_2C_3V_3$  - $C_2V_2C_3V_3$ - $C_4$  based on the possibility of the  $C_1V_1$  being a historical prefix, so the root is a bound - $C_2V_2C_3V_3$ . Her reason against this consideration is because 'we are unable to clarify the historical prefix

<sup>1</sup> Although Blust (1999: 353) also points out this correlation between copying rightward foot for stative verbs and leftward foot for dynamic verbs, he also provides a counterexample *turikan* 'spotted' and *turi-turikan* 'very spotted' which breaks down this correlation. A diachronic interpretation is provided: '*turikan* probably was \*turik-an, and it is possible that the reduplication pattern in Pazeh developed before the suffix in this form was reanalyzed as part of the base'.

from synchronic data, ...it is difficult to reduplicate the root but not the whole word' (p. 98). Therefore, it appears that the proposal for rightward reduplication is simply a synchronic observation. This implies that considering leftward reduplication based on diachronic concern cannot be totally ruled out.

### 3. ARGUMENTS AGAINST RIGHTWARD REDUPLICATION

Following the problems based on the analysis of 'rightward reduplication', in this section I shall bring about my arguments against the rightward proposal. However, these arguments do not necessarily imply the position in favour of leftward reduplication, even though in terms of markedness leftward reduplication has been considered default mechanism (cf. Harrison 1973, Broselow and McCarthy 1983, Spaelti 1997).

First of all, Li and Tsuchida (2001:22) deserve the credit as those who firstly question the stipulation of this rightward analysis. In their brief description of Pazeh morphology, the following conclusion is reached:

"Reduplication is limited to a disyllabic part of a stem, e.g. *kizə-kizəŋət* or *ki-zəŋə-zəŋət* 'to be learning again', ...Is there a right-branching reduplication rule, as suggested by Laura Chang (1998)? Or is it simply due to the fact that every root is limited to a disyllabic form, i.e., the roots being *zəŋət* rather than *kizəŋət*, *riŋir* rather than *harigir*,...? Our evidence seems to indicate that limitation to a disyllabic part of a stem is the correct interpretation." (p. 22)

The position in this paper follows Li and Tsuchida (2001), but extends the investigation to other Formosan languages. My first argument concerns a diachronic perspective. Harrison's (1973: 423) analysis of Mokilese reduplication suggests that a better solution of determining the direction of reduplication in some cases may be found once 'more work is done on the historical phonology of Mokilese'. An analysis based on synchronic observation may appear insufficient, especially if the data contain historical residues like some unknown affixes. Looking at the reduplication data considered rightward, one can understand the reason why the rightward analysis was formed. Since the first syllable of the base cannot be determined as part of the root or as a fossilized prefix, to play safe it is thus taken as part of the base for reduplication

However, if we compare the list of the data a parallel similarity emerges among these word-initial syllables. Take Pazeh for example. The following data are some of which Lu (2003: 49) considers as resulting from rightward reduplication:

#### (3) Pazeh reduplication as rightward (Lu 2003: 49-50)

##### Stative Verbs

- |               |            |   |                           |                 |
|---------------|------------|---|---------------------------|-----------------|
| a. tu-baŋaxux | 'fragrant' | > | tu-baŋaxu- <u>ŋaxu</u> -x | 'very fragrant' |
| b. tubabix    | 'ugly'     | > | tubabi- <u>babi</u> -x    | 'very ugly'     |
| c. tuluzuk    | 'deep'     | > | tuluzu- <u>luzu</u> -k    | 'very deep'     |

##### Active verbs

- |            |            |   |                           |                      |
|------------|------------|---|---------------------------|----------------------|
| d. kaŋəsən | 'to scare' | > | kaŋəsə- <u>ŋəsə</u> -n-ən | 'to scare/be scared' |
|------------|------------|---|---------------------------|----------------------|

e. kahapət	‘to love’	>	maa-kahapə- <u>hapə</u> -t	‘to love each other’
f. kasibat	‘to teach’	>	kasiba- <u>siba</u> -t	‘to keep teaching’

A closer look at these data above reveals that some bases share the same initial syllable, such as *tu-* in (a) to (c), and *ka-* in (d) to (f). This similarity cannot be explained as mere coincidence and may suggest that {*tu*} or {*ka*} is a prefix which conveys some meaning or grammatical function. Li and Tsuchida (2001) notes that {*ka-*} is attached to roots to indicate ‘inchoative’, while {*tu-*} ‘stative’ (see also in Blust 1999). My field notes also show that the prefix *tu-* attaches to some roots whose meaning are related to ‘smell’, such as *tubaŋazi* ‘very smelly’, *tubaŋər* ‘stinky smelly’, *tuasəm* ‘stinky and sour smelly’, and *tuziah* ‘smelly (as from a toilet)’. In turn the reduplicative forms of these words are *t-in-u-baŋa-baŋazi*, *t-in-u-baŋə-baŋər*, *t-in-u-asə-asəm*, and *t-in-u-zia-ziah*, all with intensified meaning.

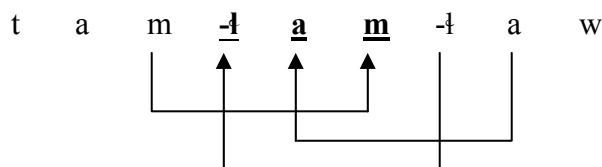
Syntactic comparison suggests that Pazeh reduplication may apply to a root that is usually bound rather than to an independent stem. For example, the sentence *m-in-a-təkə-təkən imisiw a saw* renders the implication that the base should be a bound root *-təkən*, which cannot be uttered independently and must be realized in conjunction with proper affixes. Even though the meaning of the prefix as the first syllable may remain unknown so far, such as {*i-*} in *itəkən* or {*ba-*} in *bahilak*, one should not disregard the diachronic interpretation that exists in Pazeh morphology. These bound roots also conform to the canonical shape as disyllabic content words in most Austronesian languages.

Since there is a CVCV-reduplication (leftward) in Pazih (Lin 2000, Li and Tsuchida 2001, Lu 2003), which is the third variation of full reduplication (Lee, 2005) and whose base contains at least three syllables, the analysis can be made consistent if the so-called rightward reduplication is actually leftward. Following Li and Tsuchida (2001), I conclude that first, full reduplication in Pazih applies to the root, be it bound or free, as a respect to the morphological structure of the language. Secondly, the direction of full reduplication in Pazih is leftward by default, and limited to disyllables.

My second argument is related to the analysis of full reduplication under the rubric of ‘reduplication as the Emergence of the Unmarked’ (Steriade 1988, McCarthy and Prince 1994, Spaelti 1997). As has been seen, the data in rightward reduplication involve two types of stem shapes: (i) stems with the canonical shape of CVCVC, CVCV and CVVC, thus the reduplicants are disyllabic or bimoraic CVCV or CVV. (ii) stems with one or two closed syllables, CVC.CV(C) or CVC.CCVC, as seen in Amis *tamlaw* ‘person’, *kihpic* ‘be thin’, and in Thao *marfað* ‘to fly’, *dutkhun* ‘hunched over’, and the reduplicants are analyzed rightward as a CCV shape. Reduplicants from the first type correspond to the prosodic shape of full reduplication, i.e. disyllabic, following the previous arguments they can also be analyzed as prefixal preceding a foot. It is the second type which makes the whole thing complicated. Perhaps based on the reduplicant shape this kind of pattern should be categorized as partial reduplication.

However, another way of looking at these data reveals that this pattern of reduplication is a system of syllable-recycling, motivated by resyllabification which creates a CVC reduplicant (cf. Spaelti 1997, Yu 2005). Phonologically, this CVC reduplicant respects the syllable properties of the original base. That is, the segments in the reduplicant correspond to those in the base of the same position in a syllable, onset as onset, nucleus as nucleus, coda as coda. In such a CVC reduplicant, the first consonant is taken from the second onset of the base, the vowel from the second nucleus of the base, while the coda from the first coda of the base. See the following data as analyzed:

(4) Syllable-recycling: onset to onset, nucleus to nucleus, coda to coda



There are several advantages of this analysis. First, the reduplicant is realized as a basic CVC syllable, which reflects the recycling of the stressed syllable and the first coda of the base. Typologically speaking, a CVC syllable as a reduplicant is less marked than a CCV one in terms of \*COMPLEX (Steriade 1998, Prince and Smolensky 1993), if a reduplicant is defined prosodically under the nature of The Emergence of the Unmarked (henceforth TETU, McCarthy and Prince 1994, Spaelti 1997). Secondly, in this analysis reduplicants appear to be sandwiched between the two syllables of the base, demonstrating that there can be no ‘rightward’ reduplication in Formosan languages, as the reduplicants appear to be an infix. In fact, as illustrated in (4) the direction of reduplication is rather insignificant. Thirdly, this analysis indicates that reduplication is motivated by well-formedness of syllables. It can account for the reduplicant of the following data as well, such as *qu.liu.f* ‘long’ in Thao, and *nəŋ.nəŋ* in Amis. Under this analysis the reduplicated form of the first example turns out to be *qu.liu.liu.f*. Again we see that the reduplicant takes the first part of the stressed syllable. Since the first syllable lacks a coda, this is compensated by taking another vowel from the second syllable, achieving a bimoraic syllable. Similarly, the reduplicated shape of *nəŋ.nəŋ.nəŋ* ‘be thinking’ from *nəŋ.nəŋ* ‘think’ is well-justified. Moreover, the reduplicated form *dut.khu.khun* deserves a note. This form at a first glance appears to be a counterexample to this analysis. However, a closer look of this datum reveals that the reduplicant is a result of the emergence of the unmarked. Under the analysis the reduplicant is supposed to be realized as *–\*khut–*, which is a CCVC syllable, this marked form thus gives way to the unmarked open syllable CCV, at the same time avoids two concessive word-medial consonant clusters across syllable boundaries such as *\*dut.khut.khun*. To sum up, this reduplicative pattern, unlike those found in full reduplication, creates a whole new syllable in which the sequence of the segments is different from that of the syllables in the base. Therefore, reduplication as syllable recycling is a copy-and-stop system (Alderete *et. al.* 1996, Spaelti 1997).

Those languages which are claimed to be displaying ‘rightward reduplication’ can also be analyzed as another variation of full reduplication. In terms of reduplication, Pazeh, Paiwan, Amis, and Thao all display a similarity, that is, their full reduplication are limited to two syllables, and applies to roots.<sup>2</sup> Following BR Correspondence Theory and given that the two elements which share correspondence relation are phonologically identical, the data mentioned above can also be analyzed as leftward with the ranking of constraints as ALIGN-RED- $\sigma_2$  » ALLFOOTLEFT, PARSE- $\sigma$ , NO-CODA » MAX-BR, in accordance with the ranking schema of TETU: faithfulness » well-formedness » BR-identity. This shows that full reduplication in Formosan languages demonstrates the property of TETU, a point being overlooked by the previous rightward analyses.

Overall, these arguments suggest that using directionality as a dimension for categorizing these reduplicative data may be problematic as it fails to reveal how these patterns are phonologically motivated. Even though Base-Reduplicant Correspondence Theory has its strength in dealing with these data, it would be more instructive to see whether an alternative analysis via a different model provides a better account rather than to argue against different directions.

#### 4. ANALYSIS VIA MORPHOLOGICAL DOUBLING THEORY

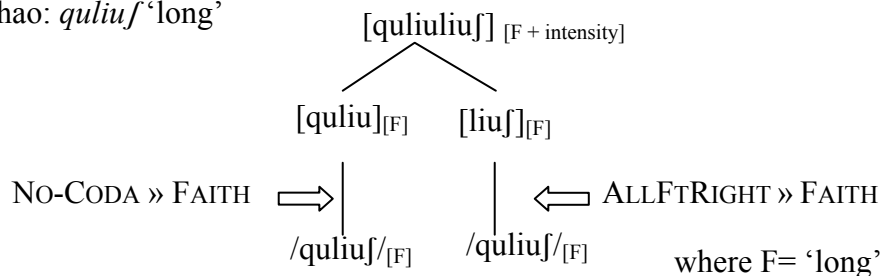
In this section I propose an alternative treatment by adopting Inkelas and Zoll’s (2000, 2005) model ‘Morphological Doubling Theory’. In this model the base and the reduplicant are considered two copies which originate from two morphosyntactically identical inputs. Under this assumption there is no leftward/rightward reduplication, nor the base or the reduplicant, but two inputs which each undergoes a specific cophonology to yield the desirable combination.

##### 4.1. Disyllabic Pattern

Analyzing the rightward variation of full reduplication via this model shows some differences in the constraint ranking of both cophonologies and the outputs. In this variation both inputs undergo truncation to some extent, thus FAITH is dominated in both cophonologies. The first output undergoes the same constraint ranking of NO-CODA » FAITH in Cophonology X. Yet in the second input it is the last two syllables that are reduplicated. Thus the output undergoes Cophonology Y with the constraint ranking of ALLFTRIGHT » FAITH (or OUTPUT= $\sigma_2\sigma_3$  if templatic). It is plausible that the preference for preserving the rightmost foot can be attributed to the location of the stress. The constraint ALLFTRIGHT in Cophonology Y only states how the input is truncated. As directionality and BR-identity in this model is irrelevant, this in turn implies analytical superiority of this model in dealing with this variation. The analysis is illustrated as below:

<sup>2</sup> Tseng (2003) is correct in that full reduplication in Paiwan is also termed ‘Root Reduplication’, yet her analysis that this pattern is suffixal proves to be doubtful. For example, if ‘Root Reduplication’ in Paiwan is suffixal, it cannot account for the following data found in Chang (2000): *l-əm-əŋləŋis* ‘roasting (pig skin)’, which is incompatible with her suffixal analysis. The example shows that the reduplicant is a CVC syllable *ləŋ-* with the direction preferably leftward.

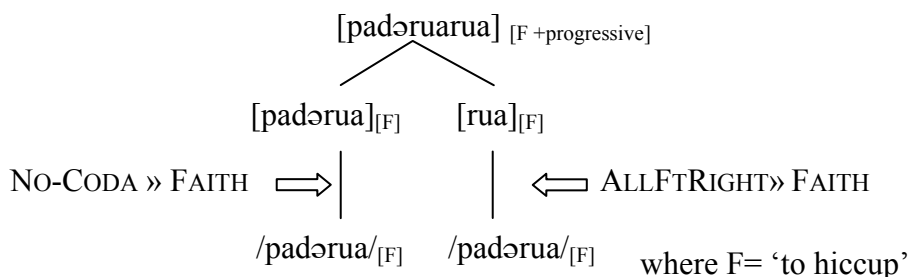
(5) Thao: *quliuf* ‘long’



A few remarks need to be made here. First, recall in section 5.1 conclude that following Li and Tsuchida (2001) it is unnecessary to make a distinction between rightward and full reduplication in Pazih, and reduplication in Pazih can apply to roots and affixes. If analyzing the data via Correspondence Theory, the domain of the base needs to be defined, i.e. a stem or a bound root. For example, for *rakirakihan* the base is a stem (*ra-kihan* ‘child’ < the bound root *-kihan* ‘young’<sup>3</sup>), while for *ʔitəkətəkən* the base is a bound root *-təkən*. However, analysis within the MDT model this problem is eliminated as there is no Base and Reduplicant but two identical inputs linked with the same morphosyntactic feature. This is descriptively appropriate for the data in Thao, where defining the morphological status of the base may be difficult. Secondly, the shared constraint ranking NO-CODA » FAITH of Cophonology X in the variations of full reduplication further demonstrates that they should be subtypes (Lee, 2005).

Thirdly, note also that the constraint NO-CODA targets the input-final coda in the variations, thus if there is no coda in the input, the input is realized intact as the output. This explains how the reduplicated form such as *paderua* ‘to hiccup (Northern Paiwan), entry from Tseng (2003: 100)’ is *paderuarua* ‘be hiccupping’. See below:

(6) Northern Paiwan: *padərua* ‘to hiccup’

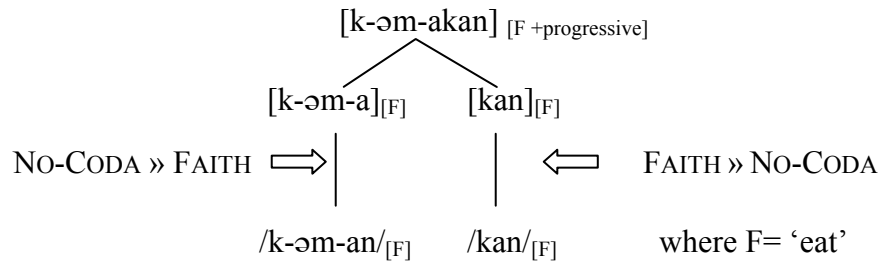


The final note is that since this design allows two inputs with different morphological status, the problem of encountering verbal infixes such as Agent Focus {m} when analyzing the data leftward is also resolved. With full reduplication the Agent Focus {m} as the infix *-əm-* or *-m-* or a prefix *m-* is usually attached to the first input of this model, as demonstrated below:

<sup>3</sup> It can be seen that in the MDT model this inherited meaning is carried over to the final output, even though the input is a derived noun ‘child’.



(7) Northern Paiwan: *k-əm-an* ‘eat’



Therefore, it can be seen that compared with Correspondence Theory, the MDT model can carry phonological, morphosyntactic, and meaning information which defines the reduplicated form as a whole, while maintaining descriptive strength of being neat, precise, and economical. There is no need to concern the domain of the base, nor is directionality an issue. Since directionality is immaterial, no appeal to Anchor constraints is needed either.

#### 4.2. Monosyllabic Reduplicants from Syllable-recycling

In this sub-section our attention is turned to the data in Amis and Thao which are recognized as instances of ‘rightward reduplication’. My arguments against rightward analysis have been outlined in section 3, where I point out that ‘rightward reduplication’ is a result of mixing up two patterns, disyllabic vs. monosyllabic reduplicants. The first pattern is analyzed as one variation of full reduplication, the second pattern is considered due to ‘syllable recycling’, which is our focus here. From the data listed below it can be seen that Thao and Amis display the similar pattern. This pattern is also found in languages such as Paiwan and Tanan Rukai, which involves the monosyllabic root cognate *\*nəm* > *\*nəmənəm* ‘think’ (Proto forms reconstructed by Wolff 1999).

(8) Reduplication from syllable-recycling (reduplicants as tentatively the underlined)

- a. Amis (Wu 2000, Lu 2003, Yeh 2004)
  - i. tamlaw ‘person’ > tam.lam.law ‘people’
  - ii. kuhtiŋ ‘angry’ > kuh.tih.tiŋ ‘very angry’
  - iii. kihpic ‘be thin’ > kih.pih.pic ‘very thin’
- b. Thao (Chang 1998, Blust 2003)
  - i. buqnur > buq.nuq.nur ‘to be irritable’
  - ii. rambak > mia-ram.bam.bak ‘fall open, as one’s mouth when startled’
  - iii. marfað > mar.far.fað ‘to keep flying around’
- c. Paiwan (Chang 2000)
  - i. nəmənəm ‘think’ > ki-nəm.nəm.nəm ‘is thinking’
- d. Tanan Rukai (Li 1975)
  - i. qimqim ‘think’ > ki-qim.qim.qim ‘thinking’

Unlike the previous works on these languages aforementioned, I consider these data as displaying a CVC-reduplicant, composed of the coda of the first syllable and the onset and the nucleus of the second syllable in the base. There are two arguments for this analysis: First, this type of reduplicant is more unmarked than a CCV one under rightward analysis. Secondly, a CCV reduplicant such as *-mla-* or *-hti-* contradicts with the syllable structure in Amis, where such a syllable has not been found. Under the assumption that syllables of reduplicants should be a subset syllable of the whole language's (cf. Alderete *et. al* 1999), these types of reduplicants appear very unnatural prosodically and segmentally. On the other hand, CVC syllables are very productive in this language.

As for Thao, a CCV reduplicant is found in full reduplication, such as *blu-bluθ*, obviously attributed to the shape of the root. However, Blust (2003: 71) notes that syllabification in Thao confronts 'the disconformities between syllable and morpheme boundaries', which 'caused some confusion in morphological analysis'. Regarding rightward analysis, he further states that 'perhaps the most striking disconformities between morpheme boundaries and syllable boundaries are seen in rightward reduplications of stems which contain a consonant cluster, as in /mia-dutkhu-khun/ = mi.a.dut.khu.khun 'hunch over' (stem: /dutkhu/) or /pa-rbu-rbu-an/ 'place where something is baked (stem:/parbu/)'. Given this syllabification, the disconformities can be avoided by recognizing the reduplicant as the infix CVC, taking the segments from different syllables in the base.

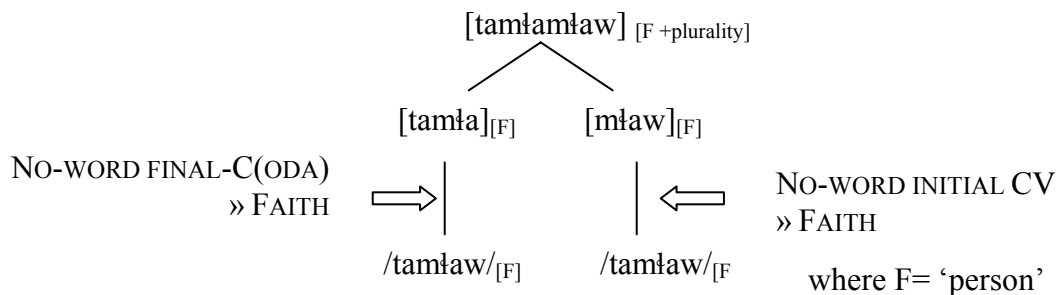
The analysis as such poses challenges to application of Correspondence Theory, where Base-Reduplicant identity and Edge effect are required. Although rightward analysis conforms to the 'edge-in association' regarded as a tendency in reduplication, there are also the languages which display 'non-local correspondence' (Riggle 2004), which means that the reduplicant does not have to be next to the base, such as *mitqamɪ* in Chukchee. Besides, the final consonant of the base at the right edge in Thao and Amis is always like a lumber which makes the rightward analysis rather imperfect. On the other hand, rightward analysis fails to capture the motivation of this type of reduplication—to generate a new syllable from segmental rearrangement. In light of this observation BR identity is disrupted by the reordering of the segments.

Analyzing the data in (8) via Morphological Doubling Theory resembles the cophologies proposed in the analysis of full reduplication. Both inputs undergo truncation: the first one loses the word-final coda, and this loss is compensated by retaining the first coda in the second input and its following segments. In some cases such as *dutkhu* and *arqtu* where there are three consonant clusters in the input, only the second syllable with CCV(C) is retained in the output in order to decrease markedness. Generally speaking, in this pattern the consonant clusters seem to be valued in the second output, whose realization always begins with the first consonant cluster found in the input. In this way, the first consonant in the cluster can be either the coda of the first syllable (in most cases) or the first onset in the second syllable (as seen in the two examples aforementioned).

It follows that Cophonology X is characterized by NO-WORD FINAL-C(ODA) » FAITH, while Cophonology Y NO-WORD INITIAL CV (ONSET AND NUCLEUS) » FAITH. Since reduplication of this type is formation of a new syllable through truncation, both Cophonologies need to compensate each other in terms of segments fit for a new syllable. Thus while Cophonology X is truncated by deleting the final coda rightward, Cophonology Y is truncated by eliminating the first onset and nucleus leftward in order to reduce the total syllables of the final output down to three. This pattern as syllable-recycling supports Yip's (2003) view that syllable structure should be linear phonotactic sequences rather than hierarchical levels of onset and rhyme. Therefore, the two cophonologies capture the motivation of this pattern by complementarily restoring and rearranging the segmental appropriateness for the final output.

The formal representation captures the notion of syllable recycling manifested by the infixal reduplicant. Analyses of this pattern in the languages are demonstrated below:

(9) Amis: *tamlaw* 'person'



These two cophonologies can handle most similar examples in Amis and Thao. However, in Thao there are examples with three consonant clusters in the input, such as *du<sup>t</sup>khun*, which Cophonology Y can only yield the output as *\*tkhun*, an unacceptable syllable in the language. To deal with this type of data an equally-ranked constraint \*CLUSTER (Yu, 2005) is added to Cophonology X in order to decrease markedness of the syllable before joining into the final output.

(10) \*CLUSTER: Avoid three or more consonants in a row.<sup>4</sup>

See the following tableau for Cophonology Y:

(11)

<i>Cophonology Y</i>	<i>du<sup>t</sup>khun</i>	NO-WORD INITIAL CV	* CLUSTER
a.	<i>du<sup>t</sup>khun</i>	*!	
b.	<i>tkhun</i>		*!
c.	<i>khun</i>		

<sup>4</sup> This constraint is different from \*COMPLEX in terms of the number of segments involved. In the situation where the constraint \*COMPLEX outranks \*CLUSTER only the simple syllable will survive. On the contrary, if \*CLUSTER dominates \*Complex, then a complex onset or coda with up to two consonants does not incur any violation against \*CLUSTER. In this Thao example, \*CLUSTER must outrank \*COMPLEX.

With the aid of this rather less language-specific constraint \*CLUSTER the syllable wellformedness of the output is guaranteed. Thus it can be seen that these two constraints in Cophonology Y are active in reduplication of these languages.

## 5. CONCLUSION

In this paper I argue that the so-called ‘rightward reduplication’ is a mix-up of two reduplicative patterns. The one with disyllabic reduplicants can be categorized as a subtype of full reduplication, which in general demonstrates the properties of TETU (FAITHFULNESS » WELL-FORMEDNESS » MAX-BR) and minimal word requirement; whereas the other one is a partial reduplication resulted from syllable recycling.

Due to the problems incurred in the rightward analysis of these data via Correspondence Theory as reviewed in Lee (2005), an alternative analysis of the same data via Morphological Doubling Theory is provided. The nature of this alternative analysis echoes Steriade’s (1988: 75) insight that ‘partial reduplication is full reduplication accompanied by the independent operations of stem truncation.’ With the arguments for analyzing the data within this model presented in section 4, it can be seen in this paper that the data are analyzed more intuitively and economically, revealing the motivation of reduplication in accordance with syllable wellformedness and structure unmarkedness.

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