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An Overview of Reduplication in Formosan Languages

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The goal of this study is three-fold: (i) provide an overview of the patterns of reduplication found in twelve Formosan languages (Amis, Atayal, Bunun, Paiwan, Pazeh, Puyuma, Rukai, Saisiyat, Siraya, Seediq, Thao and Tsou), (ii) reassess certain generalizations that have been made of various Formosan languages and (iii) show which are the most prototypical, based on Kiyomi's (1995) study.

Key words: Formosan languages, reduplication, typology

1. Introduction[1]

Since the end of the 1990's, an influx of studies has been carried on reduplication in the Formosan languages within different orientations, both descriptive and theoretical. Though the literature on reduplication in most Formosan languages is now quite extensive, there is no overall description pertaining to this phenomenon. An attempt of this kind has recently been made by Lu (2003), who examines reduplication in Pazeh, Amis, Paiwan and Thao because certain of their reduplicative patterns are "strikingly similar" (p.2). Our aim is to fill in this gap in a much broader perspective.[2]

[1] An earlier version of this paper was presented at the Taiwan-Japan Joint Workshop on Austronesian Languages, June 23-24, 2005. We are grateful to all the participants and in particular to Robert Blust, Hui-chuan Huang and Paul Jen-kuei Li for their suggestions and remarks. Amy P. Lee, Stacy Teng, Laurent Sagart and Shigeru Tsuchida later also made remarks on an earlier draft version. We would like to show our deepest appreciation to Laurent Sagart for his insightful comments. Last but not least, we would like to thank two anonymous reviewers for their pertinent observations.

[2] The present paper is dedicated to Prof. Li, who laid the path on the study of the Formosan languages and has a keen interest in reduplication. Prof. Li was Elizabeth Zeitoun's teacher and mentor at the National Tsing Hua University and has been a senior colleague at Academia Sinica for the past fourteen years. This research was carried out during the post-MA program, under which Chen-huei Wu was trained for a year (2003/8-2004/7) at the Institute of Linguistics, Academia Sinica under the co-supervision of Elizabeth Zeitoun and Paul Jen-kuei Li. The paper was written by Elizabeth Zeitoun, but could have not been finalized without the discussions both authors had on this topic.

The goal of this study is three-fold: (i) provide an overview of the patterns of reduplication found in twelve[3] Formosan languages (Amis, Atayal, Bunun, Paiwan, Pazeh, Puyuma, Rukai, Saisiyat, Siraya, Seediq, Thao and Tsou)[4] (section 2); (ii) reassess certain generalizations that have been made of various Formosan languages (section 3) and finally (iii) show which are the most prototypical, based on Kiyomi's (1995) study (section 4). Even though this paper is written in a typological perspective,[5] it might also be of interest to historical linguists working on Proto-Austronesian.

2. Previous research on reduplication in the Formosan languages

The present section sets the stage of this study by summarizing the research carried out on reduplication in Formosan languages. We provide an overview of the patterns of reduplication found in the twelve Formosan languages (Amis, Atayal, Bunun, Paiwan, Pazeh, Puyuma, Rukai, Saisiyat, Siraya, Seediq, Thao and Tsou) where this phenomenon has been examined (to a lesser or greater extent) and the semantic meanings associated with them. Whenever necessary, additional notes are made to rectify or question these previous analyses. A summary is given in section 2.14.

2.1 Preliminaries

To avoid countless repetitions, we first introduce the orthography used to transcribe the Formosan languages in this paper and mention a number of definitions pertaining to the different patterns of reduplication found in these languages. These will be illustrated in subsequent sections in languages where they apply. Terms used by a minority of scholars will be defined in the course of the paper. We also briefly discuss the theoretical frameworks upon which the studies we will refer to have been carried out.

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[3] We have left out languages where there is, for the time being, not much data available, cf. Saaroa, Kanakanavu and Kavalan. We have decided not to integrate data on Yami, as it is closer to the Philippine languages. For a detailed study of Yami reduplication, see Rau (2005).

[4] There are still fourteen extant Formosan languages, four of which are moribund and are preceded with an asterisk in the list that follows: Atayal, Amis, Bunun, *Kanakanavu, Kavalan, Paiwan, *Pazeh, Puyuma, Rukai, *Saaroa, Saisiyat, Seediq, *Thao, and Tsou. Yami, the fifteenth language, is spoken on Orchid Island, which is politically part of Taiwan but is genetically closer to the Philippine languages (Batanic subgroup). The extinct languages consist of Keta(n)galan, Taokas, Papora, Babuza, Favorlang, Hoanya, Siraya, Makattao and Taivoan.

[5] Lee's (forthcoming) Ph.D. dissertation is also dedicated to the typology of reduplication in Formosan languages in a more theoretical (and formal) approach.

2.1.1 Orthographic conventions

The Formosan languages exhibit fairly simple phonemic inventory systems consisting usually of no more than twenty consonants and four vowels, which typically include: (i) a series of voiceless and voiced stops /p, t, k, q, ʔ, b, d, g/, (ii) an affricate /ts/, (iii) at least two fricatives, usually /s, z/, (iv) a series of nasal /m, n, ŋ/, (v) liquids /l, r/ and (vi) four vowels /a, i, u, ə/. Of course, there is great variation among these languages which has arisen through repeated phonological changes. They won't be detailed in the present paper. Most noticeably, Paiwan has developed a series of palatals /c, ɟ, ʎ/; Rukai, Paiwan and Puyuma exhibit a partial/full series of retroflexes /ʈ, ɖ, ɭ/. Atayal, Seediq, Bunun, Paiwan and Thao distinguish between velar and pharyngeal sounds, while Amis differentiates glottal and epi-glottal sounds (Li 1992). A few languages such as Squliq Atayal, Tsou, Maga Rukai and Saisiyat have developed more complex vocalic systems. All the consonants and vowels found in the Formosan languages are given in Table 2 below. Equivalent orthographic symbols used throughout this paper if they appear are added in parentheses.[6]

Table 1: The phonemic inventory of the Formosan languages

【Consonants】

		labial	dental	palatal	retroflex	velar	pharyngeal	epi-glottal	glottal
stop	-vd	p	t	c (tj)	ʈ (tr)	k	q	ʡ (q)	ʔ (')
	+vd	b ɓ (b)	d ɗ (l)	ɟ (dj)	ɖ (dr)	g			
affricate			ts (c)						
fricative	-vd	f ɸ (f)	θ (th) s	ʃ (sh)	ʂ (s)	x	χ (x)	ħ (h)	h
	+vd	β (b) v	ð (z/dh) z	ʒ (z)	ʐ (z)	ɣ (g)	ʁ (rh)		
nasal		m	n			ŋ (ng)			
liquid			l ɬ (lh)	ʎ (lj)	ɭ (lr)				
trill/flap			r ɾ (r)						
glide		w		y					

[6] Most authors make use of a Romanized orthographic system, and this is the reason why we have followed this tendency here. Note that [θ] is represented as *c* in Thao, [ɬ] is written *d* in Amis and [ɗ] is replaced by *l* in Tsou. We have kept these conventions here. In Maga Rukai where both [ə] and [e] occur, we have kept these two symbols to represent these vowels.

【Vowels】

	front	central	back
high	i	ɨ ʉ	u
mid	e	ə (e), œ (oe)[7]	o
low	æ (ae)	a	

In most languages, the basic syllable structure is CVC, though both Rukai and Tsou now exhibit a CV syllable structure. Consonant clusters occur in only a few languages (e.g., Tsou, Maga Rukai and Thao). Conventionally, identical vowels are indicated by a colon ':' but to avoid any confusion, we will consistently indicate identical vowels as: *aa*, *oo*, *ii*. These might represent either long vowels occurring in the same syllable, or two identical but distinct vowels belonging to two different syllables. If that is the case, we will indicate the syllable boundary with a dot '.'. Stress is usually non-phonemic, but if it is, it is predictable by rules, and thus does not need to be marked.

2.1.2 Definitions and constraint

The subsequent definitions apply to different *patterns* of reduplication. Patterns of reduplication (outlined in the following subsections) are opposed to *structures* (discussed in section 3) in that a pattern only refers to one type of reduplication, while a single underlying structure can subsume different patterns of reduplication which perform the same (or similar) functions. In that respect, we follow Blust (forthcoming): "Patterns are surface phenomena while structures are the more abstract forms which underlie them."

Lexicalized reduplication refers to a fossilized and thus no longer identifiable root that can be shown to have undergone full reduplication, e.g., Isbukun Bunun *bunbun* 'banana'.

Ca- reduplication (Blust 1998) refers to the reduplication of the first consonant plus /*a*/, or the occurrence of /*a*/ if there is no initial consonant, e.g., Tungho Saisiyat *hiyop* 'blow, puff' > ***ha-****hiyop* 'puffing pipe', Thao *apu* 'grandparent' > *min-**a-**apu* 'great grandparent, become a great grandparent' (Blust 2003:193).

C- reduplication copies the first consonant of the first syllable, e.g., Squliq Atayal

[7] According to Wu (2004), the vowel /æ/ is a central back vowel, much closer to /a/ than what has been primarily reported, while /œ/ is a slightly rounded, mid central vowel, very close to /o/. A merger between *a*/*æ* on the one hand and *o*/*œ* on the other is in progress in Saisiyat (see also Zeitoun and Wu 2005)

qmayah 'field' > ***q-****qmayah* 'all the fields'.

CV- reduplication involves the reduplication of the first syllable, or the first vowel is if there is no onset, e.g., Nanwang Puyuma *drua* 'two' > ***dru-****drua-a* 'two (non-human referents)'.

CVC- reduplication consists of the reduplication of the first syllable including the coda or the first syllable and the onset of the second, e.g., Tungho Saisiyat *pangran* 'pineapple' > *pang-pangran* 'a place full of pineapples', *bato'* 'stone' > ***bat-****bato'-an* 'a place full of stones'.

CVV- reduplication copies two distinct syllables $CV_1.V_1$. The output (i.e., the reduplicant) consists of a syllable with a long vowel, CVV-, e.g., Tungho Saisiyat *ka.at* 'write' > ***kaa-****ka.at* 'keep on writing'.

Full reduplication is usually understood as consisting of the copying of the entire disyllabic root with or without the last consonant if there is any, e.g., Mantauran Rukai *o-'odho* 'carry (on back)' > *o-**'odho-**'odho* 'carry often', Central Amis *temok* 'have palpitation' vs. ***temok-****temok* 'keep on having palpitation'.

CVCV- reduplication (or disyllabic reduplication) reduplicates two syllables in tri- or quadrisyllabic words, e.g., Mantauran Rukai *ma-dhalame* 'like, love' > *ma-**dhala-**dhalame* 'like/love very much'.

CV.V- reduplication reduplicates the first two syllables $C_1V_1C_2V_2$ with the exclusion of C_2, e.g., Mantauran Rukai *ma-dhalame* 'like, love' > *ma-**dhaa-**dhalame* 'like/love more'.

Rigthward reduplication (L. Chang 1998) copies the last or the last two syllables of di-, tri- or quadri-syllabic roots, with or without the final consonant, e.g., Thao *rambak* 'open, of the mouth' > *mia-ramba-**mbak* 'fall open, as the mouth when one is startled' (Blust 2003:195).

Triplication involves the reduplication of the same part or the totality of the root twice in a unitary process, e.g., Thao *apa* 'carry' > /***apa-apa-****apa-n*/ [apapápan] 'be carried' (Blust 2003:196). This term is to be distinguished from *serial* reduplication, which consists of the reduplication of a segment that has already been reduplicated (Blust 2001), e.g., Mantauran Rukai *ma-**ta-**tobi* 'cry for each other' > *ma-**ta-tobi-**tobi* 'cry for one another'.

The major cross-linguistic constraint that governs all these reduplicative patterns is that at most two syllables can be reduplicated.

2.1.3 Theoretical orientations

Whatever their theoretical background, most scholars treat reduplication as a kind of affixation, following Marantz (1982), Broselow and McCarthy (1983) and McCarthy

and Prince (1999).

While Ross (1995), Blust (1998 and 2001), Adelaar (2000), Li and Tsuchida (2001), Zeitoun (2002), Zeitoun and Wu (2005), Zeitoun (in press) and Teng (forthcoming) discuss certain aspects of reduplication from a typological, historical or a language-specific point of view without committing themselves to a particular theory, all the other analyses have been conducted within one of the following three theoretical approaches: (i) autosegmental, (ii) operations and rule-ordering and (iii) OT.

Within the autosegmental model developed by Marantz (1982), reduplication is treated as a morphological process, whereby affixation and the copied material constitute a fixed template. This framework has been adopted by Yeh (2000b) to account for Bunun and Saisiyat reduplication.

Another framework laid out by Steriade (1988) has been taken up by Hsin (2000) in her analysis of Maga Rukai reduplication. In this framework, reduplication always begins with full reduplication; partial reduplication results from eliminating syllables or segments under certain operations, such as syllable markedness, transfer parameters and truncation rules, i.e., the surface form is obtained through rule ordering of different phonological constraints that apply to eliminate segments or syllables disallowed by the template.

Several studies (Chang 1998, Chen 2002, Wu 2002, 2003, Lu 2003, Tseng 2003, Lin 2004) have been carried out within OT, developed by McCarthy and Prince (1999). These account for reduplication in Formosan languages by providing a ranking among the set of violable Universal Grammar constraints.[8]

In this paper, there will be no attempt to commit ourselves to either a constraint-based or a rule-based approach. Rather, we will try to provide an overall description that will lead to a number of generalizations.

2.2 Reduplication in Amis

Reduplication in Amis (central dialect) has been examined by J. Wu (2000), C. Wu (2002), Chu (2003), Yeh (2003) and Lu (2003). Our presentation is drawn from the latter.

Lu (2003:91) mentions that Amis exhibits only two major types of reduplication: C*a*- reduplication and rightward reduplication.

C*a*- reduplication applies to nominal, numeral and verbal bases and is used to (i)

[8] Lee (forthcoming) reflects on the conflicting theoretical orientations developed by two competing theories within the framework of Optimality Theory: Base-Reduplicant Correspondence Theory (McCarthy and Prince 1995) and Morphological Doubling Theory (Inkelas and Zoll 2005).

form nominalized verbs and abstract nouns, (ii) count human referents and (iii) verbal aspect (repetitive/continuous).

Rightward reduplication applies to trisyllabic and to disyllabic roots with or without a medial consonant cluster. In the latter case, Lu (2003:96) concedes that this pattern could be identified as full reduplication but refutes this hypothesis on the basis of the semantic meaning attributed to it. He also mentions that rightward reduplication is specifically used with nouns and stative verbs (2003:92). In nouns, it yields quantification/collectivity (this latter notion being sometimes associated with a locative meaning, depending on the nominal base)[9], and in stative verbs, it indicates intensity and/or refers to a plurality of referents.

Lu (2003) does not deal with full reduplication in Amis. Full reduplication yields a plural/collective/distributive meaning in nouns and repetitive/continuous aspect in verbs, e.g. *cima* 'who'~ *cima-cima* 'anybody', *posi* 'cat' ~ *posi-posi(-an)* 'those cats, each cat', *temok* 'have heartbeat, palpitation' ~ *temok-temok* 'keep on having heartbeat, palpitation'.

Table 2: Reduplication patterns in Amis based on Lu (2003)

Patterns of reduplication	Reduplicant domain	Meanings	Subpatterns	Base	Reduplicated form
1.C*a*-reduplication	1st consonant plus /a/	1. nominalization	$C_1V_1C_2V_2C(VC) \rightarrow C_1a\text{-}C_1V_1C_2V_2C(VC)$	**tayal** 'work'	**ta-*tayal*-en** 'things to be done'
		2. counting of human referents		**tosa'** 'two'	***ta*-tosa'** 'two (persons)'
		3. continuous/ repetitive aspect		**mi-rosaros** 'saw'	**mi-*ra*-rosaros** 'keep sawing'
2.rightward reduplication	last two syllables *or* penultimate C and last syllable without final C	1. quantification/ collectivity	$C_1V_1C_2V_2C_3V_3C \rightarrow C_1V_1C_2V_2C_3V_3\text{-}C_2V_2C_3V_3\text{-}C$	**romi'al** 'day'	**romi'a-*mi'a-l*** 'every day'
		2. collective/ locative	$(C_1)V_1C_2V_2C \rightarrow (C_1)V_1C_2V_2\text{-}C_1V_1C_2V_2\text{-}C$	**itsep** 'betel nut'	**itse-*itse*-p-an** 'betel nut plantation'
		3. intensification	$C_1V_1C_2C_3V_2C \rightarrow C_1V_1C_2C_3V_2C\text{-}C_2C_3V_2\text{-}C$	**fuhtsal** 'white'	**fuhtsa-*htsa*-l** 'all very white'
3.full reduplication	entire root	1. plurality/ collectivity/ distributivity	$C_1V_1C_2V_2(C) \rightarrow C_1V_1C_2V_2(C)\text{-}C_1V_1C_2V_2(C)$	**posi** 'cat'	***posi*-posi(-an)** 'those cats/each cat'
		2. continuous/ repetitive aspect		**temok** 'have palpitation'	***temok*-temok** 'keep on having palpitation'

[9] Two notes are in order: (i) the meaning yielded by rightward reduplication in nouns is not plurality as assumed by Lu (2003) but quantification/collectivity; (ii) Lu (2003:94) analyzes bases (e.g., *angtsep* 'burn') as nouns whereas they actually are stative verbs.

2.3 Reduplication in Atayal

Reduplication has been treated in Rau (1992) and W. Lin (2004) but neither study seem convincing enough to make full use of the data at hand. Data on reduplication can also be found in Huang (1993) though this topic is not the focus of that study. Based on these considerations, our analysis is primarily based on the corpus on Squliq Atayal[10] available on the Formosan Language Archive (http://formosan.sinica.edu.tw). We refer to W. Lin (2004) and Huang (1993) whenever necessary.

Our analysis concords with Lin (2004) in that in the corpus on Squliq Atayal there is only one main pattern of reduplication -- which we label after her -- C- reduplication.

C- reduplication applies on di- and trisyllabic nominal and verbal roots. It is used to indicate (i) plurality/collectivity in nouns (ii) continuous/repetitive aspect in dynamic verbs and (iii) intensification stative verbs; (iv) according to Huang (1993) and W. Lin (2004) it also marks "future" tense in NAF constructions; (v) C- reduplication is also found in co-occurrence with a number of affixes, most notably focus and nominalizing affixes, e.g., *n-niq-un* 'food'; in co-occurrence with a prefix *m-/p-* it denotes reciprocity.

The deletion of the vowel after the first consonant makes it difficult to determine whether C- is derived from the same structure. We suspect that it has actually evolved from CV- and C*a*- reduplication, the first structure carrying over (i)-(iii) and the second (iv)-(v)[11].

W. Lin (2004:29ff) reports another pattern, "full reduplication", that applies on so-called adjectives, nouns, verbs and numerals, with a wide array of meanings that correspond to those carried over by C(V)- reduplication. The kind of data she presents as evidence, e.g. *qexi' qexi'* 'very thin', *qutux qutux laqi'* 'every child' and the doubling of NPs as in *qutux laqi qutux laqi'* are not found in the Archive. We leave this issue for further investigation.

[10] Twenty texts were recorded and preliminary analyzed by Y. Yeh (2003-4) with the help of E. Zeitoun on Squliq as spoken in Jianshih Township, Hsinchu County. We are grateful to Y. Yeh for comments on this section.

[11] This hypothesis is confirmed by a comparison with the C'uli' dialects of Atayal (and in particular Mayrinax).

Table 3: Reduplication patterns in Squliq based on Y. Yeh (2003)

Patterns of reduplication	Reduplicant domain	Meanings	Subpatterns	Base	Reduplicated form
1. C- reduplication	1st consonant	1. plural/collective	$C_1V_1C_2V_2C \rightarrow C_1\text{-}C_1V_1C_2(V_2C)$	**qmayah** 'field'	***q*-qmayah** 'all the fields'
		2. continuous/ repetitive aspect		**n-buw** 'drank'	***b*-n-buw** 'would drink'
		3. intensification		**zik** 'below'	***z*-zik** 'very deep'
		4. predicative/ irrealis/future		--[12]	
		5. reciprocity		**m-kut** 'cut'	**m-*k*-kut** 'cut each other'

2.4 Reduplication in Bunun

Reduplication in Isbukun Bunun has been well-documented in Yeh (2000b) and our account relies on her study, with a few modifications whenever necessary.

Besides lexicalized reduplication, three patterns of reduplication are attested in Isbukun Bunun, (i) full reduplication, (ii) CV- reduplication, and (iii) -CV- reduplication. CV- reduplication is the most productive. Another reduplication pattern is mentioned in Li (1997:315), C*a*- reduplication, used in the formation of [+human numerals].[13]

Full reduplication occurs rarely in this language. It involves two subpatterns, the first in which the whole root including the coda is copied, and the second in which the coda is excluded from reduplication. No semantic function is drawn from the data, but it can be said to: (i) indicate intensification in nouns, (ii) change the lexical category of verbs and (iii) convey progressive aspect in verbs.

CV- reduplication applies to disyllabic roots with a CVCV, C(G)VCVC or CVC/GCVC structure[14] and occurs quite frequently with an affix. According to Yeh (2000), it can be divided into four subpatterns, but the first is the most productive:

[12] We were not able to find any illustrative example in the Formosan Language Archives but the future interpretation can be found in Huang (1993), e.g., *saku* 'put' > ***sa-suku-un*** 'will put' (Huang 1993:187).

[13] We are thankful to one of the reviewers for mentioning this to us.

[14] We have slightly modified the syllable structures given in M. Yeh (2000b) to conform to our analysis of the data.

(i) CVCV(C) → CV-CV(C)CV(C)
(ii) CGVCV(C) → CGV-CGVCV(C)
(iii) CVGCV(C) → CV-CVGCV(C)[15]
(iv) CVCCV(C) → CVC-CVCCV(C)

CV- reduplication is used to indicate: (i) plurality on nouns, (ii) continuative/ repetitive aspect on verbs and (iii) collectivity on stative verbs.

-CV- reduplication is actually in complementary distribution with CV-, and is triggered by PF suffixation as (i) the same verbs occur with CV- reduplication in co-occurrence with an AF or IF affix. At last, from the data at hand, it seems that -CV- reduplication only conveys repetitive aspect.

Table 4: Reduplication patterns in Isbukun Bunun based on Yeh (2000b)

Patterns of reduplication	Reduplicant domain	Meanings	Subpatterns	Base	Reduplicated form
1. lexicalized reduplication	entire root	--	--	--	**pilpil** 'eyelash'
2. full reduplication	disyllabic root with(out) coda	1. nominal intensification	$C_1V_1C_2(V_2C)\rightarrow$ $C_1V_1C_2(V_2C)$-$C_1V_1C_2(V_2C)$	**habas** 'before, ago'	***habas*-habas-an** 'a long long time ago'
		2. lexical category change		**hud** 'drink	***hud*-hud** 'neck'
		3. progressive	$C_1V_1C_2V_2(C)\rightarrow$ $C_1V_1C_2V_2$-$C_1V_1C_2V_2(C)$	**'ama** 'carry on back'	***'ama*-'ama** 'be carrying on back'
3a. CV-reduplication	1st syllable with(out) coda (C)	1.plural	$C_1V_1C_2V_2(C)\rightarrow$ C_1V_1-$C_1V_1C_2V_2(C)$	**min-duwadh** 'lad'	**min-*du*-duwadh** 'lads'
		2. continuous/ repetitive aspect	$C_1V_1C_2C_3V_3(C)\rightarrow$ $C_1V_1C_2$-$C_1V_1C_2C_3V_3(C)$	**lunghu** 'rest'	***lu*-lunghu** 'keep on resting'
				ma-pinkaylas 'wake s.o up'	**ma-*pin*-pinkaylas** 'often wake s.o up'
		3. plurality/ collectivity/ quantification	$C_1GV_1C_2V_2(C)\rightarrow$ C_1GV_1-$C_1(G)_1C_2V_2(C)$	**ma-syadh** 'good'	**ma-*sya*-syadh** 'all good'
			$C_1V_1GC_2V_2(C)\rightarrow$ C_1V_1-$C_1V_1GC_2V_2(C)$	**ma-dayngadh** 'old man'	**ma-*da*-dayngadh** 'old men'
3b. -CV-reduplication	within stem	repetitive aspect	$C_1V_1C_2V_2(C)\rightarrow$ C_1V_1-C_2V_2-$C_2V_2(C)$	**kilim** 'search'	**ki-*li*-lim-un** 'often searched'
4. C*a*-reduplication	1st consonant plus /a/	Formation of +human numerals	$C_1V_1C_2V_2(C)\rightarrow$ C_1a-$C_1V_1C_2V_2(C)$	**dusa (tu hadham)** 'two (birds)'	***da*-dusa (tu 'uvadh)** 'two (children)'

[15] Subpatterns (iii) and (iv) correspond to what we have defined as CVC- reduplication in the introduction.

2.5 Reduplication in Paiwan

Reduplication in Paiwan (so-called "Northern" dialect) has been examined by A. Chang (1998, 2000), Lu (2003) and Tseng (2003). Despite the fact that the terminology and the data[16] vary to some extent, our description will refer to the last two studies, and to a lesser extent to A. Chang (2000).[17]

A. Chang (2000), Lu (2003) and Tseng (2003) recognize two main patterns of reduplication in Paiwan, (i) root reduplication (A. Chang 2000 and Tseng 2003) or rightward reduplication (Lu 2003) and (ii) C*a*- reduplication. According to Tseng (2003:2), root reduplication is the most productive pattern. C*a*- reduplication is less prototypical, not only from a phonological perspective but also from a semantic point of view as it exhibits more specialized semantic functions.

Though the terminology differs, Tseng (2003) actually argues, like Lu (2003), that root reduplication is suffixal.[18] Disagreement arises, however, regarding the reduplicant base. According to Lu (2003:124ff) and A. Chang (2000), rightward reduplication applies to trisyllabic roots, disyllabic roots (with or without a medial consonant cluster) and monosyllabic roots[19], with (in all cases) the final consonant excluded from reduplication. Tseng (2003) believes, on the other hand, that reduplication only applies to di- or tri-syllabic roots[20]. Her analysis relies on the assumption that words are minimally disyllabic since monosyllabic verbs, like *kan 'eat' must occur with an infix

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[16] The analyses provided by A. Chang (1998) and (2000) differ rather drastically. In her (1998) paper, A. Chang classifies reduplication in Paiwan as prefixal and suffixal. In her (2000) study, she recognizes two different patterns of reduplication, root reduplication (term later adopted by Tseng 2003), and C*a*- reduplication. Though she further divides root reduplication into six subpatterns, she does not say anything about whether it is "prefixal" or "suffixal".

[17] No reference is made to lexicalized reduplication in Paiwan in any of these works though it is attested in this language, cf. *bel-e-bel* 'banana' (see Ferrell 1982).

[18] In these three works, treating Paiwan reduplication as suffixal is somewhat problematic because the same reduplicated form can be analyzed as undergoing reduplication on the left or on the right. Thus, while *kulavalavaw* 'small mouse' is rendered as *kulava-**lava-**w*, it could as well be analyzed as *ku-**lala-**lavaw* (see section 3 for further discussion). The same holds true for disyllabic and monosyllabic roots, cf, *ma-pa-pana-**pana-**q* ~ *ma-pa-**pana-**panaq* [ma-C*a*Red-shoot-Full Red-Root ~ ma-C*a*Red-Full Red-shoot] 'shoot one another' *ma-ka-ka-**ka-**c* ~ *ma-ka-**ka-**kac* [ma-C*a*Red-Root-Full Red-bite ~ ma-C*a*Red-Full Red-bite] 'bite one another'. A similar remark is found in Lee (2005).

[19] Lu (2003:127-129) mentions that when rightward applies to disyllabic stems, the lexical output resembles full reduplication, whereas when it applies to monosyllabic roots, the reduplicant is a CV sequence.

[20] She actually defines syllables as moras from which word final codas (but not word-internal codas) are excluded.

<*em*>, thus as *k*<*em*>*an* 'eat'[21]. Meanings carried over by root/rightward reduplication are, to some extent, consistent in these studies and can be summarized as follows: nouns are given a diminutive (Lu 2003)/facsimile (Tseng 2003)[22] interpretation, stative verbs are intensified while dynamic verbs are either interpreted as continuous/repetitive or referring to a plurality of participants in reciprocals.

Both Lu (2003) and Tseng (2003) qualify C*a*- reduplication of "prefixal". In both analyses, the semantic functions attributed to C*a*- reduplication are problematic: Lu (2003) is unable to find coherent meanings associated to C*a*- reduplication in nouns,[23] while Tseng (2003) does not recognize the relation between reduplicated reciprocal verbs and nouns (both refer to a plurality of participants).[24] Based on their data, it can be ascertained that C*a*- reduplication applies to nouns and verbs and serves to form (i) locative and instrument nouns and (ii) reciprocal verbs.

Table 5: Reduplication patterns in Paiwan based on Lu (2003) & Tseng (2003)

Patterns of reduplication	Reduplicant domain	Meanings	Subpatterns	Base	Reduplicated form
1. lexicalized reduplication	entire root	--	--	**--**	**bel<e>bel** ' banana'
2. rightward reduplication (Lu 2003) also coined root reduplication (Tseng 2003)	(last) two syllables/ moras *or* penultimate C and last syllable/mora without final C	1. diminutive/ fascimile	$C_1V_1C_2V_2C_3V_3C \rightarrow C_1V_1C_2V_2C_3V_3\text{-}C_2V_2C_3V_3\text{-}C$	**kulavaw** 'mouse'	**kulava-*lava*-w** 'small mouse'
		2. intensification		**kamuraw** 'pomelo'	**kamura-*mura*-w** 'very small pomelo'
			$C_1V_1C_1{\cdot}C_2V_2C \rightarrow C_1V_1C_1{\cdot}C_2V_2C\text{-}C_1{\cdot}C_2V_2\text{-}C$	**ma-gong-gong** 'crazy'	**ma-gong-gong-*ngong*** 'very crazy'
		3.continuous/ repetitive aspect	$C_1V_1C_2V_2C \rightarrow C_1V_1C_2V_2\text{-}C_1V_1C_2V_2\text{-}C$	**lrelay** 'mend'	**lrela-*lrela*-y** 'be mending'
		4. plurality of participants (reciprocal)		**ma-pa-panaq** 'shoot each other'	**ma-pa-pana-*pana*-q** 'shoot one another'
3. C*a*- reduplication	1st consonant plus /a/	1. nominalization	$C_1V_1C_2V_2CVC \rightarrow C_1a\text{-}C_1V_1C_2V_2CVC$	**pacun** 'look, see'	***pa*-pacun-an** 'place for looking'
		2. reciprocal		**ma-dreqong** 'bow'	**ma-*dra*-dreqong** 'bow to each other'

[21] Such a definition cannot account for words like *nyaw* 'cat' > *nya-nya-w* 'wild cat', mentioned in Lu (2003:129).

[22] Tseng (2003) provides a network-like interpretation that will not be detailed here. See section 5.

[23] Lu (2003) analyzes *ka-* in *ka-kay-an* 'original language, as spoken by the ancestors' as a reduplicated segment, but *ka-...-an* actually forms a circumfix 'genuine, true'.

[24] She analyzes the prefix *ma-* occurring with C*a*- reduplication as the "actor pivot for stative verbs" but in her examples the prefix *ma-* actually attaches to dynamic verbs.

2.6 Reduplication in Pazeh

Reduplication in Pazeh[25] has been discussed in several studies, including Ferrell (1970), Lin (1998, 2000), Blust (1999), Li and Tsuchida (2001) and Lu (2003). Our account draws on the last three. Controversies that arise regarding different patterns of reduplication are mentioned in the course of the presentation.

The following patterns are recognized in Pazeh: (i) lexicalized reduplication, (ii) full reduplication, (iii) rightward reduplication, (iv) C*a*- reduplication, (v) CV- reduplication and (vi) CV:- reduplication involving vowel lengthening.

Lexicalized reduplication consists of a doubled root syllable, with a vowel inserted between the two syllables that usually "echoes" the first syllable (Li and Tsuchida 2001:20). Blust (1999:354) notes that "no reduplication process was recorded with historically reduplicated monosyllables."

Full reduplication applies to disyllabic stems, usually leaving the final consonant out of the reduplicated portion. It implies plurality with nouns, repetitive or continuous aspect with dynamic verbs and intensity with stative verbs. Blust (1999) makes a distinction between "full reduplication" and "leftward/rightward" reduplication in trisyllabic roots. Lu (2003:51), on the other hand, believes that CVCV- reduplication applies only to bi- and tri-syllabic dynamic verb roots, while rightward reduplication is found in stative and dynamic verbs. His affirmation is not correct, as stative verbs (like dynamic verbs) can also undergo full reduplication (or in his terms, CVCV-reduplication) to indicate a plurality of participants in reciprocals, cf. *maa-ka-lia-liak* 'hate one another' (*ma-liak* 'hate'), *maa-ka-baza-bazah* 'know one another' (< *ma-bazah* 'know').

C*a*- reduplication mostly derives (canonical and less canonical) instrumental nouns from verbs.

Both Li and Tsuchida (2001) and Blust (1999) mention CV- reduplication. They agree that it usually indicates a progressive, continuing or repetitive aspect. The former also indicate that CV- reduplication is used to form ordinals. CV- reduplication is not recognized by Lu (2003). On the other hand, he reports a CV:- reduplication[26] pattern, whereby the vowel in the first syllable is lengthened. Though also mentioned in Li and Tsuchida (2001), it is not clear whether lengthening is part of the reduplication process or occurs afterwards. The semantic overlap between CV- reduplication and CV:- reduplication (both indicate aspect) is not explained either.

[25] Transcribed as Pazi̱h in/since Li and Tsuchida (2001).

[26] We label this pattern CV:- to avoid the confusion with CVV- reduplication in Saisiyat.

Table 6: Reduplication patterns in Pazeh based on Blust (1999), Li and Tsuchida (2001) and Lu (2003)

Patterns of reduplication	Reduplicant domain	Meanings	Subpatterns	Base	Reduplicated form
1. lexicalized reduplication	root (CV(C))	--	--	--	**deng-*e*-deng** 'boil in water'
		--	--	--	**hir-*i*-hir** 'grind'
		--	--	--	**buk-*u*-buk** 'bamboo pipe'
2a. full reduplication	entire root or entire root except C#	1. plurality	$C_1V_1C_1 \rightarrow C_1V_1C_1\text{-}C_1V_1C_1$	**saw** 'person'	***saw*-saw** 'persons'
		2. continuous/ repetitive aspect	$C_1V_1V_2C_2 \rightarrow C_1V_1V_2\text{-}C_1V_1C_2V_2C$	**mu-hium** 'blow on s.t'	**mu-*hiu*-hium** 'blow on s.t repeatedly'
		3.intensification	$C_1V_1C_2V_2C \rightarrow C_1V_1C_2V_2C\text{-}C_1V_1C_2V_2C$	**ma-kuris** 'skinny'	**ma-*kuri*-kuris** 'very skinny'
		4. plurality of referents in reciprocals		**maa-ka-bazah** 'know each other'	**maa-ka-*baza*-bazah** 'know one another'
2b. CVCV-reduplication	trisyllabic roots	same as 2a	$C_1V_1C_2V_2C_3V_3C \rightarrow C_1V_1C_2V_2C\text{-}C_1V_1C_2V_2C_3V_3C$	**ma-habahar** 'fly'	**ma-*haba*-habahar ~ma-habaha-*baha*-r** 'keep flying'
2c. rightward reduplication	last or last two syllables except C# of trisyllabic roots	same as 2a			
			$C_1V_1C_2V_2C_3 \rightarrow C_1V_1C_2V_2\text{-}C_2V_2C_3$	**kamalang** 'sharp'	**kamala-mala-ng** 'very sharp'
3. C*a*-reduplication	1st consonant plus /a/	inst. nominalization	$C_1V_1C_2V_2\ V \rightarrow C\textit{a}\text{-}C_1V_1C_2V_2C$	**kuxus** 'shave'	***ka*-kuxus** 'razor'
4. CV-reduplication *not in Lu (2003)*	1st syllable	1. continuous/ repetitive aspect	$C_1V_1C_2V_2(C) \rightarrow C_1V_1\text{-}C_1V_1C_2V_2(C)$	**mu-bizu'** 'write'	***bi*-bizu'** 'be writing'
		2. formation of ordinal		**dusa** 'two'	***du*-dusa** 'the second'
5. CV:-reduplication	1st syllable with vowel lengthening	progressive aspect	$C_1V_1C_2V_2 \rightarrow C_1V_1V_2C_1V_1C_2V_2$	**bazu'** 'wash'	***baa*-bazu'** 'be washing'

2.7 Reduplication in Puyuma

Reduplication in Nanwang Puyuma is discussed in Teng (forthcoming). Following Adelaar (2000), she mentions the following types of reduplication: (i) lexicalized root reduplication, (ii) C*a*- reduplication, (iii) disyllabic reduplication, (iv) first syllable reduplication and (v) rightward reduplication.

Lexicalized root reduplication refers to a monosyllabic "simple" or a "complex" doubled root (either verbs or nouns). Simple doubled roots represent the combination of

the same root occurring twice, e.g., *sipsip* 'to lick'. "Complex" doubled roots are infixed with either <*a*C>, <*a*> or <*e*>, e.g., *g*<*al*>*emgem* 'numbness of the tongue', *gis*<*a*>*gis* 'to shave', *sal*<*e*>*sal* 'thin'.[27] Only simple double roots can undergo CVC-reduplication, e.g, *tu-pes-pespes-ay* [3S.Gen-Red-massage-LF] 'he kept on massaging (him)'. Lexicalized disyllabic root reduplication refers to the copying of a root, with or without the final coda, *kidrukidru* 'armpits', *kelrekelrengan* 'small intestines', *kamangkamang* 'big spider'.

C*a*- reduplication copies the first consonant followed by /*a*/ when the root is disyllabic, but duplicates the second consonant if the root is tri- or quadrisyllabic, e.g., *dalralrekeng* 'will be wet' (< *dalrekeng* 'wet'). If there is no onset, then a vowel /*a*/ is prefixed to the root/stem, whatever the number of syllables in the root. C*a*-reduplication is assigned four different meanings: (i) it forms instrumental nouns from verbs, (ii) it forms ordinal numbers (but its usage seems to be constrained by the occurrence of the prefix *puka*-, e.g., *puka-dra-drua* 'the second'), (iii) it indicates progressive aspect or irrealis mood (future) and (iv) it marks reciprocals.

Disyllabic reduplication refers to the reduplication of two syllables in di-, tri- or quadrisyllabic words, with the final consonant being left out and subsumes three different patterns, cf. full, CVCV- and rightward reduplication. It implies plurality or generality with nouns, repetitive or distributive aspect with dynamic verbs and intensity with stative verbs. Rightward reduplication is rare in Puyuma. It involves the copy of the last along with the final coda and yields intensification in stative verbs.

First syllable reduplication applies mostly (though not consistently) to numerals for counting non-human referents.

[27] While <*a*C> is inserted just after the first consonant, <*a*> and <*e*> occur after the first syllable (CVC). <*a*> may also occur after the first vowel.

Table 7: Reduplication patterns in Puyuma based on Teng (forthcoming)

Patterns of reduplication	Reduplicant domain	Meanings	Subpatterns	Base	Reduplicated form
1a. lexicalized monosyllabic root reduplication	root	--	1. simple	--	**sipsip** 'lick'
		--	2. complex: -*a*C- infixation	--	**g<*al*>emgem** 'numbness of the tongue'
		--	<*a*> infixation	--	**gis<*a*>gis** 'shave'
		--	<*e*> infixation	--	**sal<*e*>sal** 'thin'
1b. lexicalized disyllabic root reduplication	root with or without final C	--	--	--	**kidrukidru** 'armpits'
		--	--	--	**kelrekelrek** 'titillate at the armpit'
		--	--	--	**kamangkamang** 'big spider'
2a. disyllabic reduplication	entire root *or* first two syllables except final C	1. plurality	$C_1V_1C_2V_2C \rightarrow C_1V_1C_2V_2\text{-}C_1V_1C_2V_2C$	**drenan** 'mountain'	***drena*-drenan** 'mountains'
		2. repetitive aspect	$(C_1)V_1C_2V \rightarrow (C_1)V_1C_2V_2\text{-}(C_1)V_1C_2V_2$	**turus** 'follow'	***turu*-turus** 'keep following'
		3. intensity	$C_1V_1C_2V_2C \rightarrow C_1V_1C_2V_2\text{-}C_1V_1C_2V_2C$	**dawil** 'far'	***dawi*-dawil** 'very far'
2b. rightward reduplication	last syllable of di-/trisyllabic roots with final C reduplicated	1. intensification	$C_1V_1C_2V_2C_3V_3C_4 \rightarrow C_1V_1C_2V_2C_3V_3C_4\text{-}C_3V_3C_4$	**talrugang** 'sturdy'	**talrugang-*gang*** 'very sturdy'
3. 1st syllable reduplication	first syllable	counting of non-human referents	$C_1V_1C_2V_2V \rightarrow C_1V_1\text{-}C_1V_1C_2V_2V\text{-}a$	**drua** 'two'	***dru*-drua-a** 'two'
4. C*a*-reduplication	1st consonant plus /a/ or just /a/ if no onset	1. nominalization	$C_1V_1C_2V_2\ C \rightarrow Ca\text{-}C_1V_1C_2V_2C$	**tilru** 'tie'	***ta*-tilru** 'rope'
		2. prog/irrealis		**kasu** 'bring'	***k**a*-kasu** 'is bringing'
					***ka*-kasu** 'will bring'
		3. ordinals		**drua** 'two'	**puka-*dra*-drua** 'the second'
		4. reciprocal		**sulud** 'push'	**ma-*sa*-sulud** 'push each other'
	2nd consonant in tri-/ quadrisyllabic roots	as above	$C_1V_1C_2V_2C_3V_3C \rightarrow C_1V_1Ca C_2V_2C_3V_3C$	**dalrekeng** 'wet'	**da-*lra*-lrekeng** 'will be wet'

2.8 Reduplication in Rukai

Reduplication has been investigated in four of the six dialects that constitute Rukai:[28] Budai (Shelley 1979), Maga (Hsin 2000), Tona (Wang 2005a-b) and Mantauran (Zeitoun in press). In this section, we only document reduplication in Maga and Mantauran Rukai, for two main reasons: (i) reduplicative patterns in Budai overlap in many ways with those found in Mantauran where they are more numerous, (ii) the syllable structure of Maga and Mantauran is different. Maga allows consonant clusters in initial position C(C)V,[29] while Mantauran has a basic CV syllable structure.

According to Hsin (2000:158), there are two types of reduplication in Maga: C*a*- reduplication and stem- reduplication, besides lexicalized reduplication.

C*a*- reduplication must co-occur with a prefix that determines the meaning of the whole component (e.g., 'become X').

Stem reduplication subsumes two subpatterns: CV- and CVC- reduplication. CV- reduplication consists of the reduplication of the first syllable, with the reduplication of the simple or complex onset (thus, CV- or CCV-). CVC- involves the reduplication of the first syllable CVC- , or the first syllable along with the consonant of the second syllable CV.C-. In both cases, and relying on the data at hand, it seems that the onset in CVC- reduplication is always simple. Hsin (2000:163) mentions that "stem reduplication fulfills various semantic functions, depending on the category of the base it applies to […] it intensifies the degree of stative verbs, signals the repetitive/ continuative aspect in dynamic verbs and with nouns, it yields a collective/locative meaning (in co-occurrence with *a-...-an̰* 'a place full of X')

In the Formosan Language Archive,[30] two other types of reduplication were spotted that seem to be rather quite unproductive: full reduplication, e.g., *tkaa* 'elder sibling' → *tka-tka* 'eldest sibling', *u-tbii* 'cry' → *tku-tbu-tbi*[31] 'while crying' (< *tku* 'while'), *ma-broo* 'good, beautiful' → *ma-bro-broo* 'very good, beautiful' and rightward reduplication (only one instance), *k-brathi* 'harvest sweet potatoes' → *k-borthe-the* 'keep on harvesting sweet potatoes'.

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[28] See Li (1977) for details and subsequent work by Zeitoun (1995).

[29] For aspects on Maga phonology (including problems on vowel deletion, vocalic change and stress), the reader is referred to Li (1975) and Hsin (2000).

[30] Texts on Maga Rukai were actually recorded, transcribed and analyzed by Tien-hsin Hsin, under the supervision of E. Zeitoun.

[31] Reduplication yields the change of the back vowels /u/ or /o/ in Maga Rukai and Mantauran Rukai, but this morphophonemic alternation is still unaccounted for.

Table 8: Reduplication patterns in Maga Rukai based on Hsin (2000)

Patterns of reduplication	Reduplicant domain	Meanings	Subpatterns	Base	Reduplicated form
1. lexicalized reduplication	root (CV(C))	--	--	--	**blɨblɨ** 'banana'
2. C*a*- reduplication	1st consonant plus /a/	triggered by a co-occurring prefix	$C_1(C_{1'})V_1C_2V_2 \rightarrow$ C*a*-$C_1(C_{1'})V_1C_2V_2$	**u-pana** 'shoot'	**ma-*pa*-pana** 'shoot at each other'
				u-kɨtɨ 'cut'	**aŋ-*ka*-kɨtɨ** 'cut oneself'
3a. CV- reduplication	1st syllable	1. collective/ locative	$C_1V_1C_2V_2 \rightarrow$ C_1V_1-$C_1V_1C_2V_2$	**bɨkɨ** 'pig'	**a-*bɨ*-bɨk-anɨ** 'place full of pigs'
		2. continuous/ repetitive aspect	$C_1(C_{1'})V_1C_2V_2 \rightarrow$ $C_1(C_{1'})V_1$-$C_1(C_{1'})V_1$ C_2V_2	**o-drngədrngə** 'dry'	**o-*drngə*-drngədrngə** 'keep on drying'
3b. CVC- reduplication	1st syllable with(out) 2nd syllable onset	same as 3a	$C_1V_1C_2C_3V_3 \rightarrow$ $C_1V_1C_2$-$C_1V_1C_2C_3V_3$	**te-s-damraa** 'cook side dishes'	**te-s-*dam*-damraa** 'keep on cooking side dishes'
			$C_1V_1C_2V_2C_3V_3 \rightarrow$ $C_1V_1C_2$-$C_1V_1C_2V_2C_3V_3$	**icoo** 'person'	***ic*-icoo** 'persons'
				ap-baka 'speak'	**ap-*bak*-baka** 'keep on speaking'
3. rightward reduplication	last syllable	repetitive aspect	$C_1(C_{1'})V_1C_2V_2 \rightarrow$ $C_1(C_{1'})V_1C_2V_2$-C_2V_2	**k-brathi** 'harvest sweet potatoes'	**k-borthe-*the*** 'keep on harvesting sweet potatoes'
4. full reduplication	entire root	same as 3a except for 1.	$C_1(C_{1'})V_1C_2V_2 \rightarrow$ $C_1(C_{1'})V_1C_2V_2$-$C_1(C_{1'})V_1C_2V_2$	**tkaa** 'elder sibling'	**tka-tka** 'eldest sibling'

Zeitoun (in press) classifies reduplication in Mantauran Rukai as follows: (i) lexicalized reduplication, (ii) disyllabic reduplication, which further subsumes three subpatterns: CVCV-, CV.V- and rightward reduplication and (iii) partial (or monosyllabic) reduplication, which includes CV- and C*a*- reduplication (in co-occurrence with other prefixes).

Lexicalized reduplicated roots can undergo both CVCV- and C*a*- reduplication, e.g., *vengevenge* 'roll, encircle' → *'ini-va-vengevenge* 'roll oneself (into)', *o-venge-vengevenge* 'keep on rolling/encircling'.

Disyllabic reduplication applies to disyllabic, trisyllabic and quadrisyllabic roots and usually copies the first two syllables of the base. When it applies to disyllabic roots, the whole root is reduplicated, i.e., it undergoes full reduplication. CV.V- applies to disyllabic and trisyllabic roots. It copies the first two syllables but leaves out the second consonant, if any.[32] Rightward reduplication refers to the copy of the last two syllables in disyllabic or trisyllabic roots. The semantic functions carried out by disyllabic reduplication and rightward reduplication are rather quite similar: these two patterns

[32] It is found in only four of the six Rukai dialects, Mantauran, Labuan, Budai and Tanan.

indicate plurality in nouns, usually in co-occurrence with the plural marker *a-* (plural for common human nouns) or *la-* (plural for personal nouns), continuative or repetitive aspect with dynamic verbs and intensity with stative verbs. They can also (i) refer to a plurality of participants in reciprocals (both in co-occurrence with dynamic and stative verbs as well as nouns), and (ii) usually co-occur with two types of nominalizers, *ta-...-an* 'locative nominalizer' and *'a-* 'instrumental nominalizer'. The meanings carried out by CV.V- reduplication are slightly different. It entails a diminutive meaning in nouns, a comparative degree in stative verbs, and habitual or repetitive aspect in dynamic verbs.

CV- reduplication involves the reduplication of the first syllable of a root. It is extremely rare in Mantauran Rukai and its semantic function is rather difficult to define with precision.

As in Maga Rukai, C*a*- reduplication must co-occur with a prefix that determines the meaning of the whole component (e.g., in co-occurrence with *'ini-*, it implies reflexivity).

Table 8': Reduplication patterns in Mantauran Rukai

Patterns of reduplication	Reduplicant domain	Meanings	Subpatterns	Base	Reduplicated Form
1. lexicalized reduplication	root (CV(C))	--	--	--	**o-vengevenge** 'roll, encircle'
2a. disyllabic reduplication	entire root *or* first two syllables	1. collective/ locative	$C_1V_1C_2V_2 \rightarrow C_1V_1C_2V_2\text{-}C_1V_1C_2V_2$	**o-kane** 'eat'	**ta-*kane*-kan-ae** 'restaurant'
		2. plurality	*or*	**savare** 'young man'	**a-*sava*-savare** 'young men'
		3. continuous/ repetitive aspect	$C_1V_1C_2V_2C_3V_3 \rightarrow C_1V_1C_2V_2\text{-}C_1V_1C_2V_2C_3V_3$	**o-lrodho** 'mix'	**o-*lrodho*-lrodho** 'keep on mixing'
				o-'odho 'carry on back'	**o-*'odho*-'odho** 'carry often'
				'o-'ongolo 'drink'	**'o-*'ongo*-'ongolo** 'drink often'
		4. plurality of referents in reciprocals		**ma-pa-pana** 'shoot at each other'	**ma-pa-*pana*-pana** 'shoot at one another'
				ma-dhalame 'like/love'	**ma'a-ka-*dhala*-dhalame** 'like/love one another'
		5. intensification		**ma-poli** 'white'	**ma-*poli*-poli** 'very white'
				ma-dhalame 'like/love'	**ma-*dhala*-dhalame** 'like/love very much'

2c. rightward reduplication	last two syllables	same as 2a	$C_1V_1C_2V_2C_3V_3 \rightarrow C_1V_1C_2V_2\text{-}C_2V_2C_3V_3$	**saosi** 'lock (v.)'	**ta-saosi-*osi*-e** 'lock (n.)'
				topa'ai 'dry in the sun'	**topa'ai-*'ai*** 'often dry in the sun'
				tamako 'smoke'	**tamako-*mako*** 'smoke often'
2d. CV.V-reduplication	first two syllables without C_2	1. diminutive	$C_1V_1C_2V_2 \rightarrow C_1V_1V_2\text{-}C_1V_1C_2V_2$	**dha'ane** 'house'	***dhaa*-dha'ane** 'small house'
		2. continuous/ repetitive aspect		**o-dhodho'o** 'pour water'	**o-*dhoo*-dhodho'o** 'often pour water'
		3. comparative		**ma-dhalame** 'like/love'	**ma-*dhaa*-dhalame** 'like/love more'
3a. C*a*-reduplication	1st C plus /a/	triggered by a co-occurring prefix	$C_1V_1C_2V_2 \rightarrow C\textit{a}\text{-}C_1V_1C_2V_2$	**o-pana** 'shoot'	**ma-*pa*-pana** 'shoot at each other'
				o-ke'ete 'cut'	**'ini-*ka*-ke'ete** 'cut oneself'
3b. CV-reduplication	1st syllable (very rare)	intensification	$C_1V_1C_2V_2 \rightarrow C_1V_1\text{-}C_1V_1C_2V_2$	**ma-loho-nga** 'already grown up'	**ma-a-*lo*-loho-nga** 'all already grown up'

2.9 Reduplication in Saisiyat

Reduplication in Saisiyat has been investigated in detail by M. Yeh (2000a-b and 2003) and by Zeitoun and Wu (2005). The data and the analysis presented in this section are mostly drawn on this latter work.

Five patterns of reduplication in Tungho Saisiyat are attested: (i) lexicalized reduplication, (ii) C*a*- reduplication; (iii) partial reduplication, which subsumes CV-, CVC-, CVV- and -CV- reduplication and (v) full reduplication. Among these five patterns, CVC- is the most productive and -CV- reduplication the rarest.

C*a*- reduplication can apply to verbs and to a lesser extent nouns and serves to (i) form instrument nouns, usually derived from dynamic verbs (and to a lesser extent from) nouns (ii) yield reciprocal verbs, (iii) indicate future tense in (dynamic) verbs marked as B/IF and (iv) mark intensification along with distributivity ('all very') in stative verbs.

There is no sharp semantic contrast between CV- and CVC- reduplication in Saisiyat. Both patterns apply to nouns and verbs which are interpreted as follows when reduplicated: (i) nouns suffixed with the locative nominalization marker *-an* may either indicate increase (cf. "a place full of") or diminution; (ii) stative verbs in co-occurrence with the suffix *-an* are attenuated (e.g., "a little"), (iii) dynamic verbs might either be given a continuous or repetitive interpretation. Certain verbal affixes and the infix <*om*> can undergo reduplication, e.g., *ma-ngowip* 'forget' > *mang-ma-ngowip* 'often forget', *sh*<*om*>*bet* 'beat' > *shom-sh*<*om*>*bet* 'keep on beating'. CVV- reduplication applies to di- and tri-syllabic roots of the type CV.VC(VC) and copies the first two

segments. In the output, the reduplicant consists of one syllable CVV- with a long vowel. It entails at least two meanings 'continuation' and 'attenuation', though we believe that it might semantically overlap with the other two partial reduplication patterns (CV- and CVC-).

-CV- reduplication is a very unproductive pattern found in two verbal bases with two different meanings, cf. "repetition" vs. "continuation".

Full reduplication is usually triggered, either by the suffixation of *-an* (on nouns) or C*a*- reduplication (on dynamic verbs).

Table 9: Reduplication patterns in Saisiyat based on Zeitoun and Wu (2005)

Patterns of reduplication	Reduplicant domain	Meanings	Subpatterns	Base	Reduplicated form
1. lexicalized reduplication	root (CV(C))	--	--	--	**bishbish** 'hurt'
2. C*a*-reduplication	1st consonant plus /a/	1. inst. nominalization	$C_1V_1C_2V_2$ V → C*a*-$C_1V_1C_2V_2$C	**t<om>i.ish** 'wipe'	***ta*-ti.ish** 'cloth'
		2. reciprocal		**k<om>ita'** 'see'	***ka*-kita'** 'see each other'
		3. future (I/BF)		**h<om>(e)lal** 'dance'	***ha*-helal** 'will be used to dance'
		4. intensification & quantification		**hopay** '(be) tired'	***ha*-hopay** '(be) all very tired'
3a. CV-reduplication	1st syllable	1. collective/ locative	$C_1V_1C_2V_2$(C) → C_1V_1-$C_1V_1C_2V_2$(C)	**'iok** 'orange'	***'i*-'iok** 'place full of oranges'
		2. diminuation		**boay** 'fruit'	***bo*-boay** 'small fruit, (has just blossomed)'
		3. attenuation (+*-an*)		**shiae'** '(be) happy'	***shi*-shiae'-an** '(be) a little happy'
		4. continuative/ repetitive aspect		**hiyop** 'blow'	***hi*-hiyop** 'keep on blowing'
3b. CVC-reduplication	1st syllable with(out) final C or 2nd syllable onset	same as 3a	$C_1V_1C_2C_3V_3C_4$ → $C_1V_1C_2$-$C_1V_1C_2C_3V_3C_4$	**bato'** 'stone'	***bat*-bato'-an** 'place full of stones'
				loehong 'mortar'	***loeh*-loehong** 'small mortar'
			$C_1V_1C_2V_2C_3V_3C_4$→ $C_1V_1C_2$-$C_1V_1C_2V_2C_3C_4$	**harai'** '(be) dirty'	***har*-harai'-an** '(be) a little dirty'
				bilith 'touch'	***bil*-bilith** 'keep on touching'
3c. CVV-reduplication	1st syllable with 2nd syllable vowel	1. attenuation (+*-an*)	$C_1V_1.V_2C_3$→ $C_1V_1V_2C_1V_1.V_2C_3$	**bo.ok** '(be) rotten'	***boo*-bo.ok-an** 'a little rotten'
		2. continuative aspect		**k<om>a.at** 'write'	***kaa*-ka.at** 'keep on writing'

4. -CV- reduplication	one syllable within root	continuous/ repetitive aspect	$C_1V_1C_2V_2C_3 \rightarrow C_1V_1C_2V_2\text{-}C_2V_2C_3$	**hayap** 'fly'	**ha*ya*yap** 'fly here and there'
				maariae' 'swell'	**maa*ri*riae'** 'keep on swelling'
5. Full reduplication	entire root	collective/ locative (+*-an*)	$C_1V_1C_2V_2C \rightarrow C_1V_1C_2V_2CC_1V_1C_2V_2C$	**walo'** 'sugar'	***walo'*-walo'-an** 'place full of sugar'
				hangih 'cry'	**ha-*hangih*-hangih** 'cry for one another'

2.10 Reduplication in Seediq

Reduplication in Seediq is reported in Holmer (1996), Y. Chang (2000) and Tsukida (2005). The first two studies concern the Paran dialect, and the third the Taroko dialect. The description in this section is drawn from this latter work, which if not the most complete on this topic, is at least the most detailed.[33]

Tsukida (2005:294) mentions two kinds of reduplication in Taroko Seediq: partial and full.

Partial reduplication (or C*e*- reduplication) consists of the reduplication of the first syllable of di-/tri-syllabic bases. Tsukida (2005) points that for stems beginning with a schwa, two subpatterns are found. The first consists in the reduplication of the glottal stop with the weakening of the reduplicated vowel to schwa, $'VC_1V(C) \rightarrow 'e\text{-}C_1V(C)$, e.g., *'uq-un* 'eat (PF)' > ***'e-'uq-un*** 'will eat (PF)'. The second consists in the reduplication of the initial consonant of the second syllable, $'VC_1V(C) \rightarrow C_1e\text{-}'VC_1V(C)$, e.g., *'usa* 'go' > *me-**se-'usa*** 'go together'. Her analysis is partially incorrect. $'e\text{-}C_1V(C)$ should actually be treated as CV- reduplication while $C_1e\text{-}'VC_1V(C)$ corresponds to C*a*- reduplication. In other words, there is no need to distinguish two subpatterns with stems beginning with a glottal stop. This claim is supported by the meanings given in Tsukida (2005): CV- reduplication applies to verbal and nominal bases and yields an emphatic future in verbs and a plural meaning in nouns. C*a*- reduplication marks reciprocity on verbs.

Full reduplication involves the reduplication of disyllabic roots, with the final consonant excluded. Vowels occurring in the reduplicated portion of the word are also usually weakened to schwa, e.g., *dawras* 'cliff' > ***dere-**dawras* 'cliffs' or assimilated to /i/ if the following consonant is /y/, e.g., *kuyuh* 'woman' → ***kiyi-**kuyuh* 'women'. It is used to form plural nouns

[33] We have added translations not given in the original text.

Table 10: Reduplication patterns in Seediq based on Tsukida (2005)

Patterns of reduplication	Reduplicant domain	Meanings	Subpatterns	Example	Gloss
1. partial reduplication	1st syllable	1. plural	$C_1V_1C_2V_2CVC \rightarrow C_1e\text{-}C_1V_1C_2V_2CVC$	**qehuni** 'tree'	***qe*-qehuni** 'trees'
		2. emphatic future		**'uq-un** 'eat (PF)'	***'e*-'uq-un** 'will eat (PF)'
2. full reduplication	entire root except final C	plural	$C_1V_1C_2V_2C \rightarrow C_1e_1C_2e\text{-}C_1V_1C_2V_2C$	**rudan** 'old man'	***rede*-rudan** 'old men'
3. C*a*- reduplication	1st consonant plus /e/	*Not reported* Corresponds to Tsukida's CV-reciprocal	$C_1V_1C_2V_2C \rightarrow mV\text{-}C_1e\text{-}C_1V_1C_2V_2C$	**sipaq** 'hit'	***me*-se-sipaq** 'hit each other'
			$'V_1C_2V(C)\text{-}mV\text{-}C_2e\text{-}'V_1C_2V(C)$	**'usa** 'go'	**me-*se*-'usa** 'go together'

2.11 Reduplication in Siraya

Adelaar (2000:33) mentions the following types of reduplication in Siraya: (i) monosyllabic-root reduplication, (ii) disyllabic-root reduplication, (iii) rightward reduplication, (iv) first-syllable reduplication, (v) C*a*- reduplication, (vi) pa- reduplication.[34] Most of these include subtypes that are identified and illustrated in his study. However, on the basis of identical semantic functions and/or idiosyncratic properties, Adelaar actually only distinguishes four patterns among these: (i) (fossilized) monosyllabic root reduplication, (ii) diysllabic or trisyllabic root reduplication and rightward reduplication, (iii) first syllable reduplication and (iv) C*a*- reduplication.

Monosyllabic root reduplication (coined *lexicalized* reduplication in this paper) consists of a doubled root syllable, with or without an extra element in the duplicated segment. It includes three subpatterns, (i) simple monosyllabic root reduplication, (ii) monosyllabic root reduplication with *-ar-*/*-al-* infixation, (iii) monosyllabic root reduplication with linking *-i-*.

Disyllabic root reduplication consists of the copying of the entire disyllabic root except the last consonant if there is one. It includes four sub-patterns: (i) CVCV-CVCVC, (ii) (C)VCV-(C)VCV, (iii) VCVC-root > VC-VCVC, (iv) CVC*ey*-root > CVC*a*-CVCey. Semantically, it yields (i) the plurality of nouns, the notion of "plurality" subsuming that of "variety, generality and indefiniteness", (ii) the iterativity of dynamic verbs (distributive or habitual action), and the continuality, repetition or graduality of adverbs.

[34] Adelaar (2000) mentions that there is no distinction between disyllabic root reduplication and rightward reduplication and contends that *pa-* (in the sequence *pa-pa-*) actually represents a "false" reduplication pattern, i.e., it is not an instance of prefix reduplication, but rather a combination of causative *pa-* + transitive *ma-*.

Rightward reduplication applies to disyllabic roots that have an initial vowel, a final vowel or both and to trisyllabic roots but semantically, it does not differ from disyllabic root reduplication.

First syllable reduplication is used in a systematic way to count non-human referents.

C*a*- reduplication applies to nominal, verbal, and numeral bases. It is used to (i) nominalize verbs or nouns, thus yielding agentive, instrumental, patient or locative deverbal nouns as well as abstract nouns, (ii) to render a verb progressive, generic or stative and (iii) to count human referents.[35]

Table 11: Reduplication patterns in Siraya based on Adelaar (2000)

Patterns of reduplication	Reduplicant domain	Meanings	Subpatterns	Base	Reduplicated form
1. mono-syllabic root reduplication	root (CV(C))	--	1. simple	--	**taptap** 'shake off'
		--	2. *-ar-/-al-* infixation	--	**mi-h*ar*afhaf** 'troubled'
		--	3. linking vowel *-i-*	--	**dīl-i-dīl** 'tremble'
2a. disyllabic root reduplication	entire root except final C	1. plurality	$C_1V_1C_2V_2C \rightarrow C_1V_1C_2V_2$-$C_1V_1C_2V_2C$	**ravak** 'grave'	***rava*-ravak** 'graves'
			[VC]V_1C_1-root → V_1C_1-V_1C_1VC	**ayam** 'bird'	***ay*-ayam** 'birds'
		2. repetitive aspect	$(C_1)V_1C_2V \rightarrow (C_1)V_1C_2V_2$-$(C_1)V_1C_2V_2$	**līlu** 'devil'	***līlu*-līlu** 'devils'
		3. Adv: continuality, repetition, graduality	$C_1V_1C_2$*ey*-root → $C_1V_1C_2$*a*-CVC*ey*	**/vuney/**	***vuna*-vuney** 'often'
2b. rightward reduplication	last or last two syllables of di-/trisyllabic roots except C#	same as 2a	$(C_1)V_1C_2V_2C_3 \rightarrow (C_1)V_1C_2V_2$-$C_2V_2C_3$	**vato** 'stone'	**vato-*to*-an** 'stony place'
				avok 'eat'	**avo-*vo*k** 'act of eating'
			$V_1C_1V_2C_2 \rightarrow V_1C_1V_2$-$V_1C_1V_2C_2$	**usĭng** 'little'	**usĭ-*usi*ng** 'least'
			$C_1V_1C_2V_2C_3V_3C_4V_4 \rightarrow C_1V_1C_2V_2C_3V_3C_4V_4$-$C_4V_4$	**makutoku** 'stand'	**makutoku-*ko*** 'standing'
3. 1st syllable reduplication	1st syllable	counting of non-human referents	$C_1V_1C_2V_2C \rightarrow C_1V_1$-$C_1V_1C_2V_2C$	**ruha** 'two'	***ru*-ruha ki rapal** 'two feets'

[35] Adelaar (2000:49) notices that: (i) the unreduplicated *saat* 'one' can also refer to a human referent and (ii) *kuixpa* 'eight' is always unaffixed.

4. C*a*-reduplication	1st consonant plus /a/	1. nominalization	$C_1V_1C_2V_2$ V→ C*a*-$C_1V_1C_2V_2$C	**diri** 'sow'	**na *da*-diri** 'what has been sown'
		2. prog/generic/ stative		**dilux** 'lead'	**ma-*da*-dilux** 'lead (gen.)'
				diri 'sow'	***da*-diri-en** '(when) sowing'
		3. counting of human referents		**turu** 'three'	***ta*-turu ki vual** 'three people'

Adelaar (2000) argues that reduplication operates on two different levels: lexical vs. morphophonemic. Monosyllabic root reduplication and first syllable reduplication apply on the lexical level (i.e., it can generally not undergo further reduplication), while di- and trisyllabic reduplication as well as C*a*- reduplication operate on the morphosyntactic level.

2.12 Reduplication in Thao

Reduplication in Thao has been examined in detail by L. Chang (1998), Blust (2003), Huang (2000) and Lu (2003). The description provided in this section is based on the first two studies, which not only complement each other but are also the most extensive.

L. Chang (1998:279) mentions that there are three productive patterns on reduplication in Thao, (i) full reduplication, (ii) C*a*- reduplication and (iii) rightward reduplication, as well as two less productive patterns, CV- reduplication and triplication. There are also numerous instances of lexicalized reduplication.

Full reduplication applies to monosyllabic and disyllabic verbal bases with a first syllable of the type (C)V (i.e., with no consonant cluster as onset and no coda) and leaves out the final consonant.[36] It includes five sub-patterns: (i) CVCV-CVCVC, (ii) CVV-CVV(C), (iii) VCV-VCV(C), (iv) CCV-CCV(C), (v) CV-CV(C). It fulfills three morpho-semantic functions: (i) it marks repetitive/continuative aspect in verbs and (ii) intensity in adjectives and (iii) it might produce a change in lexical category.

C*a*- reduplication applies to disyllabic nominal, verbal and numeral bases. In trisyllabic bases, Blust (2003:190) mentions that it is not the first consonant that is reduplicated, but rather the second (or the first member of a consonant cluster). C*a*-reduplication carries at least four functions: it serves (i) to form instrumental nouns, (ii)

[36] In that respect, L. Chang's (1998) and Blust's (2003) data differ from Huang's (2000). The latter makes reference to one instance of full reduplication with the coda reduplicated, cf. *cupish* 'count' > *cupish-cupish-an* 'school' (p.65), recorded as *cupi-cupish-an* in Blust (2003:350)

to count human referents, (iii) to mark the meaning of "smell of X" and (iv) to indicate repetitive/continuative aspect in verbs and intensity in adjectives.

Rightward reduplication (coined *suffixal* reduplication in Blust, 2003:194) occurs in verbal bases of two or more syllables with a consonant cluster in initial or medial position. There is a semantic overlap between the semantic function carried out by rightward reduplication and full reduplication, i.e., rightward reduplication conveys the repetitive/continuative aspect of verbs, and is thus treated by Blust (2003:195) as a variant of full reduplication.

CV- reduplication applies mostly to verbal bases with a first light syllable (of the type CV). It conveys a repetitive meaning in motion verbs, but its semantic function in other types of verbs is rather unclear.

Triplication applies to verbal bases to mark repetitive/continuative aspect and might involve partial (e.g., C*a*- or CV- reduplication) or full reduplication. According to L. Chang (1998:285), it also applies to "stems with a historically reduplicated CVC structure".

Table 12: Reduplication patterns in Thao based on Chang (1998) and Blust (2003)

Patterns of reduplication	Reduplicant domain	Meanings	Subpatterns	Base	Reduplicated form
1. lexicalized reduplication	root (CV(C))	--	--	--	**shishi** 'shake'
		--	--	--	**karkar** 'to chew'
2a. full reduplication	entire root except final C with a 1st (C)V syllable	1. intensification	$C_1V_1C_2V_2C \rightarrow C_1V_1C_2V_2$-$C_1V_1C_2V_2C$	***ma*-cakaw** 'greedy'	**ma-*caka*-cakaw** 'very greedy'
		2. continuative/ repetitive aspect	$C_1V_1V_2C_2 \rightarrow C_1V_1V_2$-$C_1V_1V_2C_2$	**m*i*-dauk** 'be still'	**mi-*dau*-dauk** 'keep still'
		3. lexical category change	$V_1C_2V(C_3) \rightarrow V_1C_2V_2(C_3)$-$V_1C_2V_2(C_3)$	**m-acay** 'die'	**an-m-*aca*-acay** 'be on the verb of death'
			$C_1C_1{\cdot}V_1(C_2) \rightarrow C_1C_1{\cdot}V_1$-$C_1C_1{\cdot}(C_2)$	**/braq/**	***bra*-braq** 'peck open'
			$C_1V_1(C_2) \rightarrow C_1V_1$-$C_1V_1(C_2)$	**ian** 'refuge, shelter'	***ia*-ian-an** 'lived in, as a house'
2b. rightward reduplication	last or last two syllables of di-/ trisyllabic roots, except final C	continuative/ repetitive aspect	$C_1C_1{\cdot}V_1C_2V_2 \rightarrow C_1C_1{\cdot}V_1.C_2V_2$-$C_1{\cdot}V_1C_2V_2$	**agqtu** 'think'	**agqtu-*qtu*** 'think about'
			$C_1V_1C_2C_3V_3C_4 \rightarrow C_1V_1C_2C_3V_3$-$C_2C_3V_3$-$C_4$	**ma-lunduz** 'straight, right, correct'	**mia-lundu-*nduz*** 'go in a straight line'

3. C*a*-reduplication	1st consonant plus /a/	1. inst. nominalization	$(C_1)V_1C_2V_2V\rightarrow$ C*a*-$C_1V_1C_2V_2C$	**t<m>iuz** 'to comb'	***ta*-tiuz** 'comb (n.)'
		2. counting of human referents		**turu** 'three'	***ta*-turu** 'three (persons)'
		3. smell of X		**rusaw** 'fish'	**tu-*ra*-rusaw** 'odor of fish'
		4. continuous/ repetitive aspect		**k<m>iskis** 'press down'	***k*<m>*a*-kiskis** 'keep pressing down'
		5. intensification	$C_1V_1C_2C_3V_3V\rightarrow$ C_1V_1-$C_2aC_3V_3V$	**pit'ia** 'cook'	**pi-*ta*-t'ia-an** 'cooking place'
4. CV-reduplication	1st syllable	repetitive aspect	$C_1V_1C_2V_2(C) \rightarrow$ C_1V_1-$C_1V_1C_2V_2(C)$	**mu-*tu*-tusi** 'go often'	**mu-*tu*-tusi** 'go often'
5. triplication	partial or full	repetitive aspect	$C_1(C_2)V_1C \rightarrow$ C_1a-C_1a-$C_1(C_2)V_1C$	**mig-*qa*-*qa*-qca** 'stop & start repeatedly'	**mig-*qa*-*qa*-qca** 'stop & start repeatedly'
			$C_1(C_1\text{'})V_1C \rightarrow$ $C_1C_1\text{'}V_1$-$C_1C_1\text{'}V_1$-$C_1(C_1)V_1C$	**shkash** 'be afraid'	**makit-*shka*-*shka*-shkash** 'be slowly overwhelmed by a sense of apprehension or foreboding'

2.13 Reduplication in Tsou

Tsou is one of the best documented Formosan languages. However, reduplication though mentioned in a number of works (see Tung et al. 1964, Ho 1976, Wright 1996, Zeitoun 2000 and 2005, Wu 2002) has never been examined in detail, except in Szakos (1994). The present account is mostly drawn from Zeitoun (2005).

Tsou exhibits two well-established patterns: CV- reduplication and C*a*- reduplication.

CV- reduplication involves the reduplication of the first syllable of the base regardless of whether the onset is simple (C) or complex (CC), thus yielding two subpatterns: CVCV → CV-CVCV and CCVCV → CCV-CVCV. If the root is vowel-initial, the initial vowel is reduplicated with a glottal stop preceding both the reduplication and the base-initial vowel as in *oko* 'child' → *'o-'oko* 'children'.[37] CV-reduplication marks plurality in nouns, repetition in dynamic verbs and intensification in stative verbs.

C*a*- reduplication seems not to be productive anymore, because (i) in many instances, the base is not retrievable (cf. **hocng~~u~~* > *hahocng~~u~~* 'man', **mespingi* >

[37] Wright *et al.* (1997) propose an alternative analysis and state that the glottal stop is actually present in the non-reduplicated base *'oko*.

mamespingi 'woman'), and (ii) it often involves the obligatory occurrence of further affixes (e.g., *fnguu* 'head' + *doe-* 'big' > *doe-fa-fnguu* 'big head' and *fnguu* 'head' + *-a* 'PV' > *fafngu-a* 'hit on the head (PV)' while **fafnguu* is disallowed).

Tung *et al.* (1964:170) mention two other very rare reduplicative processes: (i) CVC- reduplication *mahafo* 'take' → *mah-mahafo* 'take many times' and (ii) the reduplication of two distinct syllables, e.g., *nat'ohaesa* 'brothers' → *na-na-t'o-t'o-haesa* 'two brothers', that for ease of convenience we label CVX-CVX- in this article, whereby X refers to the two original syllables copied through CV-reduplication.

Table 13: Reduplication patterns in Tsou based on Zeitoun (2005)

Patterns of reduplication	Reduplicant domain	Meanings	Subpatterns	Base	Reduplicated form
1. C*a*-reduplication	1st consonant plus /a/	triggered by a co-occurring prefix	$C_1(C_1')V_1C_2V_2 \rightarrow C_1a\text{-}C_1C_1'V_1C_2V_2$	**fnguu** 'head'	**doe-*fa*-fnguu** 'big head'
					fa-fngu-a 'hit on the head (PF)'
2. CV-reduplication	1st syllable	1. plurality	$C_1V_1C_2V_2CV \rightarrow C_1V_1\text{-}C_1V_1C_2V_2CV$	**zom~~u~~** 'bird'	***zo*-zom~~u~~** 'birds'
			$C_1C_1'V_1C_2V_2CV \rightarrow C_1C_1'V\text{-}C_1V_1C_2V_2CV$	**cmoi** 'bear'	***cmo*-cmoi** 'bears'
			$V_1C_2V_2CV \rightarrow 'V_1\text{-}C_1V_1C_2V_2CV$	**oko** 'child'	***'o-'*oko** 'children'
		2. repetitive aspect	as above	**hucma** 'next day'	***hu*-hucmasi** 'every day'
		3. intensification		**cofkoya** 'white'	***co*-cofkoya** 'very white'
3. CVC-reduplication	1st syllable including coda	repetitive aspect	$C_1V_1C_2V_2CV \rightarrow C_1V_1C_2\text{-}C_1V_1C_2V_2CV$	**mahfo** 'take'	***mah*-mahfo** 'take many times'
4. CVX-CVX-reduplication	two distinct syllables	?	$C_1V_1C_2V_2CV \rightarrow C_1V_1C_1V_1\text{-}C_2V_2C_2V_2\text{-}CV$	**nat'ohaesa** 'brothers'	***na*-na-*t'o*-t'o-haesa** 'two brothers'

2.14 Summary

A short summary is given in a form of a table that provides an overview of (i) the distribution of the thirteen reduplication patterns found in the twelve Formosan languages examined hereby and (ii) the meanings associated with these different reduplication patterns.

Table 14: Patterns of reduplications and their semantic functions

Note: The abbreviations of the Formosan languages follows the code system established by Ethnologue (available on the Internet, cf. http://www.ethnologue.com/web.asp): ALV: Amis, TAY: Atayal, BNN: Bunun, PWN: Paiwan, PZH: Pazeh, PYU: Puyuma, DRU: Rukai (MG:Maga, MN: Mantauran), SAI: Saisiyat, SIR: Siraya, TRV: Teruku (Seediq), SSF: Thao, TSY: Tsou.

Reduplication Patterns	Part of Speech	Meaning	ALV	TAY	BNN	PWN	PZH	PYU	MG DRU	MN DRU	SAI	SIR	TRV	SFF	TSY
1. lexicalized reduplication	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2. C-reduplication	Noun	1. plur/collective	--	✓	--	--	--	--	--	--	--	--	--	--	--
	Verb (Dyn)	2. continuous aspect	--	✓	--	--	--	--	--	--	--	--	--	--	--
		3. future	--	✓	--	--	--	--	--	--	--	--	--	--	--
	Verb (Stat)	4. intensification	--	✓	--	--	--	--	--	--	--	--	--	--	--
	Verb (D/S)	5. reciprocal	--	✓	--	--	--	--	--	--	--	--	--	--	--
3. C*a*-reduplication	Noun	1. nominalization	✓	--	--	✓	✓	✓	--	--	✓	✓	--	✓	--
	Num	2. counting of human referents	✓	--	✓	--	--	--	--	--	--	✓	--	✓	--
	V (Dyn)	3. reciprocal	--	--	--	✓	--	✓	✓	✓	✓	--	✓	--	--
		4. continuous/ repetitive aspect	✓	--	--	--	--	--	--	--	--	✓	--	✓	--
		5. render verbs stative	--	--	--	--	--	--	--	--	--	✓	--	--	--
	V (D/S)	6. progressive aspect[38]	--	--	--	--	--	✓	--	--	--	✓	--	--	--
		7. future/irrealis	--	--	--	--	--	✓	--	--	✓	--	--	--	--
	Stat.V	8. intensification & quantification (+*-an*)	--	--	--	--	--	--	--	--	✓	--	--	--	--
	Denominal	9. smell of X	--	--	--	--	--	--	--	--	--	--	--	✓	--
4. CV-reduplication	Noun	1. plural	--	--	✓	✓	--	--	✓	--	--	--	✓	✓	✓
		2. diminutive	--	--	--	--	--	--	---	--	--	--	--	--	--
		3. collective/ locative	--	--	--	--	--	--	✓	--	✓	--	--	--	--
		4. meaning unknown	--	--	--	--	--	--	--	✓	--	--	--	--	--
	Verb (Dyn)	5. continuous / repetitive aspect	--	--	✓	--	✓	--	✓	--	✓	--	--	✓	✓
		6. emphatic future	--	--	--	--	--	--	--	--	--	--	✓	--	--

[38] The progressive is associated with the notion of "graduality" in stative verbs, e.g., *ma-'idrang* 'old' > *ma-'a-'idrang* 'getting old' in Puyuma.

Reduplication Patterns	Part of Speech	Meaning	ALV	TAY	BNN	PWN	PZH	PYU	MG DRU	MN DRU	SAI	SIR	TRV	SFF	TSY
4. CV-reduplication	Verb (Stat)	7. intensification	--	--	--	--	✓	--	✓	✓	--	--	--	--	✓
		8. attenuation (+*-an*)	--	--	--	--	--	--	--	--	✓	--	--	--	--
		9. collectivity/ quantification	--	--	✓	--	--	--	--	--	--	--	--	--	--
	Num	10. formation of ordinal	--	--	--	--	✓	--	--	--	--	--	--	--	--
		11. counting of non-human ref.	--	--	--	--	--	✓	--	--	--	✓	--	--	--
5. -CV-reduplication	Verb	repetitive aspect	--	--	✓	--	--	--	--	--	--	--	--	--	--
6. CV:-reduplication	Verb	progressive aspect	--	--	--	--	✓	--	--	--	--	--	--	--	--
7. CVV-reduplication	Verb (Dyn)	1. continuous/ repetitive aspect	--	--	--	--	--	--	--	--	✓	--	--	--	--
	Verb (Stat)	2. attenuation	--	--	--	--	--	--	--	--	✓	--	--	--	--
8. CV.V-reduplication	Noun	1. diminutive	--	--	--	--	--	--	--	✓	--	--	--	--	--
	Verb (Dyn)	2. habitual / repetitive aspect	--	--	--	--	--	--	--	✓	--	--	--	--	--
	Verb (Stat)	3. comparative	--	--	--	--	--	--	--	✓	--	--	--	--	--
9. -CV.V-reduplication	Noun	1. plural	--	--	-	--	--	--	--	✓	--	--	-	--	--
	Verb (Dyn)	2. continuous / repetitive aspect	--	--	--	--	--	--	--	✓	--	--	--	--	--
	Verb (Stat)	3. comparative	--	--	--	--	--	--	--	✓	--	--	--	--	--
10. CVC-reduplication	Noun	1. plural	--	--	--	--	--	--	✓	--	--	--	--	--	--
		2. collective/ locative	--	--	--	--	--	--	--	--	✓	--	--	--	--
		3. diminution	--	--	--	--	--	--	--	--	✓	--	--	--	--
	Verb (Dyn)	4. continuous aspect/ repetitive aspect	--	--	--	--	--	--	✓	--	✓	--	--	--	✓
	Verb (Stat)	5. intensification	--	--	--	--	✓	--	✓	--	--	--	--	--	--
		6. attenuation	--	--	--	--	--	--	--	--	✓	--	--	--	--
11. dissyllabic reduplication	Noun	1. intensification	--	--	✓	--	--	--	✓	--	--	--	--	--	--
		2. plural	--	--	✓	--	✓	✓	--	✓	--	✓	✓	✓	--
		3. collective/ locative	--	--	--	--	--	✓	--	✓	✓	--	--	--	--
		4. distributive	✓	--	--	--	--	--	--	--	--	--	--	--	--
		5. diminutive[39]/ fascimile	--	--	--	--	--	--	--	--	--	--	--	--	--

[39] Shaded boxes show that in Paiwan, suffixal reduplication (analyzed as "rightward" reduplication in Lu (2003) and root reduplication in Tseng (2003)) could as well be treated as full reduplication. Cf. footnote 18.

Reduplication Patterns	Part of Speech	Meaning	ALV	TAY	BNN	PWN	PZH	PYU	MG DRU	MN DRU	SAI	SIR	TRV	SFF	TSY
11. dissyllabic reduplication	V→N	6. lexical category change	--	--	✓	--	--	--	--	--	--	✓	--	--	--
	Verb (Dyn)	7. continuous/ repetitive aspect	--	--	✓	--	✓	✓	✓	✓	--	✓	--	--	--
			--	--	✓	--	✓	✓	✓	✓	--	✓	✓	--	--
	Verb (Stat)	8. intensification	--	--	--	--	✓	✓	✓	✓	--	✓	--		--
	Verb (D/S)	9. plurality of ref. in reciprocals	--	--	--	--	✓	✓	--	✓	✓	✓	--	✓	--
12. rightward reduplication	Noun	1. quantification/ collectivity	✓	--	--	--	--	--	--	--	--	--	--	--	--
		2. collective/ locative	--	--	--	--	--	--	--	✓	--	--	--	--	--
		3. plural	--	--	--		✓	--	--	--	--	--	--	--	--
		4. diminutive/ facsimile		--	--	✓	--	--	--	--	--	--	--	--	--
	Verb (Dyn)	5. continuative aspect/ repetitive aspect	--	--	--	✓	✓		✓	✓	--	✓	--	✓	--
	Verb (D/S)	6. plurality of referents (reciprocals)	--	--	--	✓	✓	--	--	--	--	--	--	--	--
	Verb (Stat)	7. collectivity	✓	--	--	--	--	--	--	--	--	--	--	--	--
		8. intensification	✓	--	--	✓	✓	--	--	--	--	--	--	--	--
13. CVX-CVX reduplication		meaning unknown	--	--	--	--	--	--	--	--	--	--	--	--	✓

Among the thirteen patterns of reduplication that are reported in Table 14 (some might be missing, because of gaps in the data at hand), four are productively found in the Formosan languages: 1) C*a*- reduplication, 2) CV- reduplication, 3) dissyllabic reduplication, 4) rightward reduplication. All the others are less prototypical, and found only in very few languages. Certain meanings are more likely to be associated with certain parts of speech (see section 4 for details). The reduplication of nouns favors one of the following meanings: plurality, collectivity/ location, quantification and distributivity. The copying of dynamic verbs is likely to encode aspect (continuous, repetitive, progressive), mood (irrealis) and plurality (of participants). The reduplication of stative verbs usually marks intensification, attenuation, comparison, collectivity but the last two meanings are less prototypical than the two first. The reduplication of numerals is much more restricted. It is principally used to form ordinals or to count non-human/human referents.

3. Towards a unified treatment

In what follows, we first discuss the parts of speech which are prone to undergo reduplication, and those which cannot and then try to provide a unified treatment of reduplication (in terms of "processus") in the Formosan languages.

3.1 Parts of speech

Nouns and verbs, i.e., words that constitute an "open class", are more likely to undergo reduplication. However, certain types of nouns cannot undergo reduplication or if they do, the reduplication patterns they can exhibit are very restricted. These include:

(i) personal nouns (cf. Paiwan *kivi* 'girl's/woman's name) ~ **kivivi*, **kivikivi* but Tsou *pasuya* 'boy's/man's name' ~ *pa-pasuya* 'many boys/men called Pasuya').

(ii) household/family names (cf. Mantauran Rukai *(la)pangolai* 'household name' ~ **(la)pangopangolai* but Ng Puyuma *talawi* 'household name/toponym' ~ *talalawi-mi* 'we (the Talawi) are all together', *talawilawi).

(iii) "true" toponyms (i.e., toponyms that are not based on the natural environment an ethnic group lives in). Compare for instance: Mantauran Rukai *'oponoho* 'self-reference to the group/village' (derived historically from PR *swa-ponogo [from-Ponogo]) as opposed to **'oponoponoho* and Tsou *la-lauya* 'village name (place of maples)' < *lauya* 'maple' (Wright 1996:56).

Some temporal adjuncts (today, tomorrow, yesterday) can undergo reduplication in certain languages, but not in others. Compare Tsou *hucma* 'next day' ~ *huhucma* 'every day' vs. Mantauran Rukai *lo'idha* 'yesterday/tomorrow' ~ **lo'idha'idha*. Temporal adjuncts that cannot be reduplicated can actually be treated as "punctual", i.e., they designate a point in time; thus they behave a little differently from "non-punctual" temporal adjuncts (day, month, year etc.), which can usually be reduplicated, e.g., Puyuma *wari* 'day' ~ *wa-wari-wari* 'every day', Mantauran Rukai *caili* 'year' ~ *caicaili* 'every year'.

Among the closed class, few lexical categories can undergo reduplication: to our knowledge, only numerals (to indicate either a non-human or a human referent), e.g., Puyuma *drua* 'two' ~ *dru-drua-a* 'two (non-human referents)', Thao *tusha* 'two' ~ *ta-tusha* 'two (human referents)' (Blust, 2003:1027) and interrogative wh-words e.g, Central Amis *cima* 'who' ~ *cima-cima* 'anybody', which must then be treated as "polarity items" can.

3.2 Discrepancy in the terminology

There is no real consensus regarding the description of reduplication in the Formosan languages and this is reflected in the various terms used by scholars to account for this process. We propose that different patterns of reduplication group into two main underlying structures.

3.2.1 'Full' vs. 'partial' reduplication

For a majority of scholars (Blust 1999, L. Chang 1998, Yeh 2000b, Li and Tsuchida 2001, Tsukida 2005, Zeitoun and Wu 2005) 'full reduplication' (or more generally disyllabic reduplication) is contrasted with 'partial reduplication'.

Partial reduplication is basically defined as copying only the first syllable or the (first) light syllable of a word. That's the reason why Adelaar (2000) adopts the term 'first syllable reduplication'.

Discrepancies arise when a term is used in a rather different manner: for A. Chang (1998) and Tseng (2003) 'root reduplication' equates 'full reduplication' while Hsin (2000) labels 'partial reduplication' 'stem reduplication'.

3.2.2 'Prefixal', 'suffixal', 'infixal' reduplication vs. leftward/rightward reduplication

Few scholars have described reduplication in terms of the position of the reduplicant within the base (root or stem), whereby reduplication is viewed as "prefixal", "suffixal" or "infixal" – to our knowledge, only Blust (2003:195)[40] has done so – though most agree that reduplication either occurs at the left, the right, and to a lesser extent within a root or a stem. The above tripartite terminology is usually replaced by a C-V- template that enables to capture the reduplication process in question in a noncommittal fashion (as we have done in this paper), e.g., CV-, CVC-, CVV-, -CV- or -CV reduplication, a dichotomy being sometimes made between 'leftward' or 'rightward reduplication' (e.g., A. Chang 1998, Tseng 2003, Lu 2003).

[40] Blust (2003:195) treats suffixal reduplication as a variant (in the terms of Spaelti (1997) an 'alloduple') of full reduplication.

3.2.3 Patterns vs. structures

The relationship between certain types of reduplication, e.g., full reduplication and suffixal reduplication in Thao (Blust 2003), or CVCV- reduplication and CV.V-reduplication in Mantauran Rukai has been mentioned in passing in section 2. It is crucial to recognize that certain patterns of reduplication are actually variants of the same reduplicative process or underlying structure.[41] In our mind, we can divide reduplication into the following bipartite dichotomy: partial (or monosyllabic) vs. disyllabic reduplication, as has long been acknowledged in the literature.

Partial reduplication involves the reduplication of a light or heavy syllable or just the first consonant of a syllable. It can be represented as C-, CV-, CCV-, CGV-, CVC-, CVG-, CVV- (these seven patterns further belong to the same underlying structure, cf. Table 15) and C*a*- (Table 16). In partial reduplication, the reduplication of a particular segment depends on the syllable structure of the language itself. Partial reduplication usually occurs as a prefix, but in some languages (e.g., Bunun, Thao, Saisiyat and Mantauran Rukai), it has been demonstrated that it can also apply as an infix. In C*a*-reduplication, the vowel occurring in the base is usually replaced by the vowel /a/ but the phonology of a particular language might condition the occurrence of this vowel: in section 2, we have shown briefly that (i) in Atayal, C- reduplication is historically derived from CV- on the one hand, and C*a*- on the other, (ii) in Taroko Seediq, C*a*- is actually rendered as C*e*-, (iii) in Saisiyat, the occurrence of /ae/ results from the vocalic assimilation to a glottal sound in the base form.

Table 15: Subpatterns of partial reduplication

A. Di-/trisyllabic roots with no crossing over the syllable boundary				
Language	Root	Gloss	Reduplication	Gloss
a. **CCV.CVC → C-CCV.CVC**				
Atayal	**btunux**	'stone'	***b*-btunux**	'a lot of stones'
b. **CV.V → CV-CV.V**				
Tsou	**pai**	'rice'	***pa*-pai**	'field'
c. **CCV.V → CCV-CCV.V**				
Tsou	**cmoi**	'bear'	***cmo*-cmoi**	'bears'
d. **CGV.CV → CGV-CGV.CV**				
Bd Rukai	**kwange**	'gun'	***kwa*-kwange**	'toy gun'

[41] This is also the position adopted by Lee (2005).

e. **CVC.CVC → CVC-CVC.CVC**				
Tg Saisiyat	**pangrang**	'pineapple'	***pang*-pangrang-an**	'a place full of pineapples'
f. **CVG.CV(C) → CVG-CVG.CV(C)**				
Tg Saisiyat	**'aewpir**	'sweet potato'	***'aew*-'aewpir-an**	'a place full of sweet potatoes'
B. Di-/trisyllabic roots with crossing over the syllable boundary				
a. **CV.CVC → CVC-CV.CVC**				
Tg Saisiyat	**lotor**	'link'	***lot*-lotor**	'keep on linking'
b. **CVC.CVC → CV-CVC.CVC**				
Tg Saisiyat	**taw'an**	'house'	***ta*-taw'an**	'children's house'
c. **(C)VC.CV → (C)VC-C.CV**				
Thao (L. Chang 1998:284)	**agqtu**	'contemplate'	***agqtu*-qtu**	'think about'
d. **CV.VC → CVV-CV.VC**				
Tg Saisiyat	**ra.am**	'know'	***raa*-raam-an**	'know a little'

Table 16: Subpatterns of C*a*- reduplication

A. C*a*-				
Language	Root	Gloss	Reduplication	Gloss
a. **V(C).CVC → *a*-V(C).(C)VC**				
Thao (Blust 1998:54)	**m-iup**	'blow'	***a*-iup**	'tube to blow on fire'
b.**CV(C).CVC → C*a*-CVC.CVC**				
Tg Saisiyat	**botoe'**	'tie'	***ba*-botoe'**	'rope'
c. **CCV(C).CV(C) → C*a*-CCV(C)-CV(C)**				
Mg Rukai (Hsin 2000:213)	**bl̪ibl̪i**	'banana'	***ba*-bl̪ibl̪i**	'turn into a banana'
d. **CV.CV.CVC → CV-C*a*-CV-CVC**				
Puyuma (Teng forthcoming)	**dalrekeng**	'wet'	**da-lra-lrekeng**	'will be wet'
B. C*e*-				
a. **CV.CVC-roots → *me*-C*e*-CV.CVC**				
Seediq	**sipaq**	'hit'	***me-se*-sipaq**	'hit each other'
b. **'V.CV(C)-roots → *me*-C*e*-'V.CV(C)**				
Seediq	**'usa**	'go'	***me-se*-'usa**	'go together'

C. C*æ*-				
a. **C(=h or ʔ)V(C).CVC → C*æ*-CV(C).CVC**				
Tg Saisiyat	**haezaeb**	'stab'	**hae-haezaeb**	'knife'

Disyllabic reduplication subsumes also different patterns, whereby two syllables at most are reduplicated, with or without the inclusion of the coda. Are included within the notion of 'disyllabic reduplication' the following patterns: full reduplication, CVCV-reduplication in tri or quadri-syllabic roots, CV.V- reduplication in di- and tri-syllabic roots and rightward reduplication. The reduplicant might occur in a prefixal, infixal or suffixal position.

Table 17: Subpatterns of disyllabic reduplication

A. Monosyllabic roots—Full reduplication				
a. **CVC → CVC-CVC**				
Language	Root	Gloss	Reduplication	Gloss
Is Bunun	**hud**	'drink'	**hud-hud**	neck
b. **CCVC → CCV-CCVC**				
Thao (L. Chang 1998:280)	**psaq**	'kick forward'	**ma-psa-psaq**	'will kick repeatedly'
	qbit	'share, portion'	**mi-qbi-qbit**	'portion out, divide into shares'
B. Disyllabic roots—Full reduplication				
a. **CV.V → CV.V-CV.V**				
Bd Rukai	**dae**	'soil'	**dae-dae**	'ground, earth'
b. **CV.CV → CV.CV-CVCV**				
Central Amis	**cima**	'who'	**cima-cima**	'anybody'
c. **CV.CVC → CV.CV-CV.CVC**				
Thao (Blust 2003:194)	**fanuz**	'wake up'	**fanu-fanuz**	'wake up someone'
c'. **CV.CVC → CV.CVC-CV.CVC**				
Central Amis	**temok**	'have palpitation'	**temok-temok**	'keep on having palpitation'
d. **V.CVC → V.CV-V.CVC**				
Central Amis	**omah**	'field'	**oma-omah**	'each field'
e. **V.CV → V.CV-V.CV**				
Bd Rukai	**agi**	'younger sibling'	**agi-agi**	'younger siblings'

C. Trisyllabic roots—CVCV- reduplication				
a. **CV.CV.CV → CV.CV-CV.CV.CV**				
Mn Rukai	**o-'ongolo**	'drink'	**o-'ongo-'ongolo**	'drink often'
b. **CV.CV.CVC → CV.CV-CV.CV.CVC**				
Pazeh	**ma-habahar**	'fly'	**ma-haba-habahar**	'keep flying'
D. Di-/Trisyllabic roots—CV.V- reduplication				
CV.CV → CV.V-CV.CV				
Mn Rukai	**kane**	'eat'	**kae-kae-kaane**	'keep on eating'
E. Di-/Trisyllabic roots—Rightward reduplication				
CVC.CVC → CVC-C.CVC				
Amis	**ang.rer**	'bitter'	**ang.re-*ng.rer***	'very bitter'

Three more points need to be made.

First, in a number of languages, cf. Rukai, Bunun, Saisiyat and Thao, prefixes and infixes can undergo reduplication.

Table 18: Reduplication of prefixes and infixes in Rukai, Bunun, Saisiyat and Thao

Root/Stem	**Gloss**	**Reduplication**	**Gloss**
Mn Rukai			
to-dha'ane	'build a house'	**'ini-*ta*-to-dha'ane**	'build a house oneself'
Bunun			
m-a'un	'eat'	***ma*-ma'un**	'keep on eating'
Tg Saisiyat			
ma-ngoip	'forget'	***mang*-mangoip**	'forget often, keep on forgetting'
sh<om>bet	'beat'	***shom*-shombet**	'keep on beating'
Thao (Blust 2003:192)			
mu-apaw	'emerge'	***ma*-mu-apaw**	'emerge repeatedly'

Second, though lexicalized reduplication has usually not received too much attention, it is clear from the data given in section two, that at least in four languages, Puyuma, Rukai, Siraya and Thao, lexicalized reduplicated roots can further undergo certain patterns of reduplication (e.g., CVC-, CVCV- or C*a*- reduplication). The sole language that has been shown not to allow the reduplication of lexicalized reduplicated roots is Pazeh.

Table 19: Reduplication of lexicalized roots in Puyuma, Rukai and Thao

Root/Stem	Gloss	Reduplication	Gloss
Puyuma			
taktak	'carve'	***tak*-taktak**	'keep on carving'
Mn Rukai			
o-vengevenge	'roll'	**o-*venge*-vengevenge**	'keep on rolling'
		'ini-*va*-vengevenge	'roll onto oneself'
Thao			
k<m>iskis	'press down'	***k*<m>*a*-kiskis**	'keep on pressing down'

The third point has to do with the association between form and meaning. L. Chang (1998) labels -- after Spaelti (1997) -- "alloduples" various patterns of reduplication carrying out the same semantic functions. In Saisiyat, for instance, CVC-, CV- reduplication are used to express continuity/repetition in dynamic verbs, e.g., *bilith* 'touch' > ***bil-****bilith* 'keep on touching', *hiyop* 'blow' > ***hi-****hiyop* 'keep on blowing'. She refers to specific patterns of reduplication yielding a unique meaning not expressed by any other pattern as "duplemes". In Saisiyat, C*a*- is used to convey instrumental nominalization, e.g., *ti.ish* 'wipe' > ***ta-****ti.ish* 'cloth'.

While it is true that different patterns of reduplication may overlap in their semantic functions (see Table 14), it seems more difficult to ascertain that a specific pattern of reduplication only conveys a unique meaning in the Formosan languages. In Saisiyat, for instance, the C*a*- reduplication of a verb like *botoe'* 'tie' yields a semantically ambiguous form *ba-botoe'* which, depending on the context, means: (i) 'string' (instrument nominalization)', (ii) 'tie each other' or (iii) 'will be used to tie 'IF''. Why is it so? The meaning of a reduplicant depends on (i) the lexical category of the base it is derived from (e.g., a verb, a noun or a numeral), (ii) the semantic meanings associated with it (i.e., C*a*- reduplication might be used to form instrumental nouns, but it might also be employed to form agentive nouns, instrument and agent being related notions[42]) and (iii) its actual use in context (as shown in the Saisiyat example above). The meaning of a certain reduplication pattern might change in co-occurrence with a particular affix. When C*a*- reduplication co-occurs with the suffix *-an* (as a marker of locative nominalization), C*a*- does not yield nominalization but actually occurs as a substitute for other reduplicative patterns (e.g., CV-, CVC-, CVCV-). It refers to a plurality of referents (what has been referred to in this paper as "collective"). Compare:

[42] In the same vein, Adelaar (2000:47) shows that in Siraya the meaning of verbs nominalized through C*a*- reduplication is unpredictable.

Tg Saisiyat *ra-romish-an* 'a face full of beard' (< *romish* 'beard') and *pang-pangrang-an* 'a place full of pineapples' (< *pangrang* 'pineapple').

4. Meanings associated with reduplication in nouns and verbs

Both Tseng (2003) and Yeh (2003) have given insightful accounts of the semantic webs that relate the meanings carried out by various reduplication patterns in Paiwan and in Saisiyat. Our aim is slightly different in that we want to show which meanings are the most productive and thus the most prototypical.

Kiyomi (1995) distinguishes two processes of reduplication, the first being iconic and the second non-iconic, through a cross-linguistic study based on thirty Malayo-Polynesian languages. The iconic processes involves: (i) a consecutive process and (ii) a cumulative process. Under the consecutive process, plurality in nouns and repetition/continuation in verbs are regarded as the most prototypical meanings. In the cumulative process, intensity is treated as the most frequent meaning in both nouns and verbs. The non-iconic process consists of various meanings, among which diminution is viewed as prototypical.

In this section, we follow Kiyomi's (1995) classification in looking at the meanings associated with different patterns of reduplication in nouns (section 4.1) and verbs (section 4.2). These meanings are generally conveyed by partial reduplication and dissyllabic reduplication, as defined in section 3.2.3.

4.1 Nominal reduplication

4.1.1 Reduplication as a consecutive process

The consecutive process yields plurality in nouns. At least three different notions can be subsumed under this category: quantification, collectivity (generally in association with location) and distributivity. The notion of 'plurality' is the most prototypical as it is present in all the languages except Saisiyat.

Table 20: Reduplication as a consecutive process in nouns

Meaning	**Language**	**Example**	**Gloss**
Plurality	Pazeh	***saw*-saw**	'persons'
Quantification	Atayal	***q*-qmayal**	'all the fields'
Collectivity/location	Saisiyat	***ta*-tawmo'-an**	'a place full of bananas'
Distributivity	Amis	***posi*-posi-an**	'all the cats/those cats'

4.1.2 Reduplication as a cumulative process

The cumulative process yields intensification but this notion is not prototypical in Formosan languages.

Table 21: Reduplication as a cumulative process in nouns

Meaning	Language	Example	Gloss
Intensification	Bunun	***habas*-habas-an**	'a long time ago'
	Maga Rukai	***tka*-tka**	'eldest sibling'

4.1.3 Reduplication as a noniconic process

The noniconic process usually yields diminution or imitation/fakeness. Based on the data at hand, it seems quite rare in the Formosan languages.

Table 22: Reduplication as a noniconic process in nouns

Meaning	Language	Example	Gloss
Diminution	Paiwan	**kamura-*mura*-w**	'very small pomelo'
Imitation/fakeness	Saisiyat	***ta*-taw'an**	'small house'
	Mt Rukai	***dhaa*-dha'ane**	

4.2 Verbal reduplication

4.2.1 Reduplication as a consecutive process

The consecutive process yields repetition/continuation in verbs. Kiyomi (1995:1156) reports other meanings subsumed under this category, other than repetition/continuation: spatial extention, habituative, progressive, imperfective, and locative alternation. Except for habituative (found in few languages, to our knowledge, Rukai and Paiwan), the other meanings are not found in any of the Formosan languages included in this paper.

On the other hand, as pointed out in Kiyomi (1995:1156-1157), cross-linguistically, verbal reduplication usually yields a plural meaning, i.e., referring to a 'plurality' of participants usually involved in a reciprocal action, cf. 'one another'. In stative verbs, reduplication might also produce a collective meaning.

Table 23: Reduplication as a consecutive process in verbs

Meaning	Language	Example	Gloss
Continuation	Tg Saisiyat	***mang*-mangoip**	'forget often'
Repetition		***h(om)i*-hiyop**	'keep on blowing'
Habituative	Mn Rukai	***o-kae-kae*-kaane**	'eat usually'
Plurality of participants		***ma-pa-pana*-pana**	'shoot at one another'

4.2.2 Reduplication as a cumulative process

The cumulative process induces intensification in stative verbs (sometimes in conjunction with a collective meaning). It subsumes another meaning, found only in Mantauran Rukai, cf. comparison.

Table 24: Reduplication as a cumulative process in verbs

Meaning	Language	Example	Gloss
Intensification	Amis	**fuh-tsa-*htsa*-l**	'all very white'
Comparison	Mt Rukai	**ma-*dhaa*-dhalame**	'love more'

4.2.3 Reduplication as a noniconic process

In the noniconic process, reduplication may yield different meanings, none of them prototypical, e.g., attenuation (Saisiyat) and future (Seediq).

Table 25: Reduplication as a noniconic process in verbs

Meaning	Language	Example	Gloss
attenuation	Tg Saisiyat	***shi*-shiae'-an**	'a little happy'
emphatic future	Seediq	***'i*-'iyah**	'will come'

5. Conclusion

We have provided in the present paper an overview of the patterns of reduplication found in twelve Formosan languages (Amis, Atayal, Bunun, Paiwan, Pazeh, Puyuma, Rukai, Saisiyat, Siraya, Seediq, Thao and Tsou) by summarizing and reassessing previous studies that have been carried on these different languages. Such an overview led us to show that four patterns of reduplication are productively found in the Formosan languages: 1) C*a*- reduplication, 2) CV- reduplication, 3) dissyllabic

reduplication, 4) rightward reduplication.

We have re-evaluated certain generalizations that have been made of various Formosan languages and have argued that two patterns of reduplication are found in the Formosan languages, partial (or monosyllabic) vs. dissyllabic, that subsume different sub-patterns.

Finally, we have looked at the meanings associated with different patterns of reduplication in nouns and verbs following Kiyomi's (1995) classification.

We are aware that this paper might not have introduced any new data but we hope that through this overall description, the reader will understand better one aspect of the typology of the Formosan languages.

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