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Reduplication in Maori

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ABSTRACT

This thesis is a study of reduplication in Maori. The aim of the thesis is to make a thorough study of both the formal and semantic properties of reduplication in Maori. This is done by reviewing the relevant literature on reduplication, and collating reduplication data. Most data are from textual sources. Some data have been provided by native-speaker informants.

The first chapter looks at previous attempts to describe reduplication in Maori. It begins with some definitions of the term reduplication. This is followed by a review of the attempts made by previous authors to describe reduplication in Maori. Aspects of reduplication not covered by those attempts are noted.

The second chapter looks at reduplication in Maori within a Generative framework. The units of reduplication in Maori are given in prosodic terms. This is followed by an overview of Marantz (1982), and a critique of two very recent attempts to account for reduplication in Maori within Optimality Theory. Aspects of Maori reduplication that poses difficulties for Optimality Theory are noted.

The third chapter describes the semantics of reduplication in Maori. An illustration is given of some of the common meanings of reduplication attested across languages. The various meanings of reduplication in Maori are described. Also, the semantics of reduplication in Maori are compared to the semantics of reduplication in Malayo-Polynesian (Austronesian) languages within the framework suggested by Kiyomi (1995).

The fourth chapter comments on descriptive aspects of reduplication in Maori not covered by the previous three chapters.

The fifth chapter provides statistics on the reduplication data collated in the appendices. Reduplication data are divided according to the number of mora in the stem (or base) of origin. Statistics are given on the occurrence of various patterns of reduplication in Maori.

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CONVENTIONS

Orthography

Orthography is generally unchanged from the original sources. I have used the macron to mark long vowels (in Maori) in sentences with unmarked vowel length. The use of the macron follows Williams (1971).

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LIST OF ABBREVIATIONS

ā, a:, aa	long vowel (i.e. in this case a long /a/)
acc.	accusative
adj.	adjective
C	consonant
conj.	conjunction
det.	determiner
DO	direct object
Eng	English
EUV	East Uvean
freq.	frequentative
H	heavy syllable
HAW	Hawaiian
intr.	intransitive
L	light syllable
loc	locative
MAO	Maori
n.	noun
nom.	nominalization
pass.	passive
PEP	Proto East Polynesian
PN	Polynesian
PPN	Proto Polynesian
pl.	plural
perf.	perfect
pers	person
PREF	prefix
RAR	Rarotongan
RED	reduplicant
SAM	Samoan
sg.	singular
SUFF	suffix
T/A	tense/aspect marker

TON	Tongan
v, v.	verb
vintr, v.i.	intransitive verb
vtr, v.t.	transitive verb
V	vowel
'	glottal stop
ˈ	primary stress (placed at beginning of stressed syllable)
ˌ	secondary stress (placed at beginning of stressed syllable)
-	morpheme boundary
+	morpheme boundary
μ	mora
σ	syllable
*	unattested, ungrammatical form, proto (reconstructed) form
#	word boundary
→	“becomes” in a synchronic rule

1 Previous approaches to reduplication in Maori

1.1 Introduction

This chapter begins by looking at some current definitions of reduplication. After this early descriptions of reduplication in Maori are considered, followed by more recent approaches to reduplication in Maori.

1.2 What is reduplication?

The term reduplication suggests a repeating phenomenon. In a basic linguistic sense reduplication involves repeating part of a word or the whole word. Jensen (1990:68) notes that reduplication occurs in English to a limited extent, e.g. *goody-goody*, *pooh-pooh*, and *thick-thick*. These are examples of complete reduplication. Here the repeating of the whole word intensifies the meaning of that word.

Sapir's definition of reduplication reflects that either all or part of some element of a word is repeated.

Nothing is more natural than the prevalence of reduplication, in other words, the repetition of all or part of the radical element. The process is generally employed, with self evident symbolism, to indicate such concepts as distribution, plurality, repetition, customary activity, increase of size, added intensity, continuance. (Sapir 1921:76)

Partial reduplication is repeating only part of a word. This type of reduplication occurs in Samoan¹. The reduplicated forms below express plurality of subject.

(1)	<i>nofo</i>	'sit'	<i>nonofo</i>	'sit, pl.'
	<i>moe</i>	'sleep'	<i>momoe</i>	'sleep, pl.'

Other authors, such as the well known linguist Bloomfield, give more restricted definitions of reduplication, e.g.

Reduplication is an affix that consists of repeating part of the underlying form It may differ phonetically in some conventional way from the underlying word. (Bloomfield 1933:218)

¹ Unless stated all Samoan words are from Milner (1966).

Bloomfield's examples of reduplication include *su:sulat* 'will write' from *sulat* 'write' (from Tagalog).

Some authors disagree with Bloomfield's suggestion that reduplication is a form of affixation. Naylor (1986) is one such author, he notes:

Affixation, by definition, is the addition of an *affix* to a root; since *reduplication* is the repetition of part or all of the root - and here we are dealing with root components - how could we possibly say that we are dealing with *affixes* when we are *reduplicating* the root? It would be more accurate to say that with *reduplication* we have extended the root; but we certainly would not have found ourselves an *affix* by reduplicating the root. (Naylor 1986:277)

However, linguists working within the generative framework usually consider reduplication a form of affixation. These linguists include Marantz (1982), McCarthy and Prince (1986, 1990, 1993). I will discuss recent generative approaches to reduplication in chapter two.

Other recent definitions of reduplication include that of Katamba (1993:180) "reduplication, a process whereby an affix is realised by phonological material borrowed from the base". Jensen notes (1990:68) "Reduplication is defined as the repetition of all or part of a morpheme to express a morphological category". Jensen's definition does not allow for forms of reduplication that are lexicalised.

Naylor notes (1986:175) the need for the distinction between the use of reduplication as a rhetorical device and the use of a reduplication as a morphological device.

In this thesis I define *reduplication* as a morphological process that involves repeating all or some part of a word, to express a semantic or syntactic function. Some forms of reduplication may be lexicalised. Forms of reduplication exist with the absence of a simplex form.

1.3 What is not reduplication in Maori

To start I outline what I do not consider reduplication in Maori. I will exclude the use of repetition in Maori as a rhetorical device². An example of this is the repetition of word *ake* ‘ever and ever’, for emphasis, e.g.

Ka whawhai tonu au ki a koe, ake, ake, ake.

‘I shall fight you forever, ever and ever.’ (Cowan 1983:368,369)

I do not consider the use of vowel lengthening in interjections to denote emphasis, to be reduplication, i.e.

ae ~ aeē ‘heck! (expresses astonishment or distress)’ (Moorfield 1988:143)

I do not regard the repetition of units bigger than the word, i.e. phrases, that express distributive and habitual aspects to be reduplication, e.g.

Kāore rātau e pēnei ana me tauriterite katoa te mahi ā tēnā, ā tēnā, ā tēnā.

‘They don’t feel that **each** should be doing the same thing.’ (Karetu 1984:51)

I do not consider long vowel alternants of words which have the same meaning to be reduplication, e.g.

(2) *pohutukawa ~ pōhutukawa* ‘a tree’

There appears to be no difference in the semantics or syntax of the above form. In this case the long vowel alternant does not seem to be the result of a morphological process. Bauer (1993:535) reports that the above form is an example of where native speakers are uncertain about vowel length and both short and long forms are regularly heard.

² This follows Naylor’s (1986:175) distinction between the use of reduplication as a rhetorical device and the use of a reduplication as a morphological device.

1.4 Previous work on Maori

Authors such as Mutu-Grigg (1982), Mutu (1989), and Bauer (1993) provide reasonable outlines of previous work on Maori. All works which provide reduplication data and analysis worthy of note receive comment in the following sections.

1.5 Reduplication in early works

The earliest significant work accessible to me is Maunsell's (1894) *Grammar of the New Zealand Language*³. Reduplication is mentioned three times. First, in relation to nouns:

Sometimes an act *oft repeated* or many things of the *same kind*, are denoted by a reduplication of one or more syllables; e.g.

Kakata	a frequent laughing.
Mamahi	over-work.
Kimokimo	a winking of the eyes. (Maunsell 1894:22)

Secondly, in relation to adjectives:

In common with substantives, adjectives admit often of reduplication to denote *repetition, or many things of the same kind, & c.*

mahi kakata	<i>a frequent laughing.</i>
he rakau kikino kau	<i>they are all bad trees.</i> (Maunsell 1894:23)

Thirdly, in relation to verbs:

That in words, one or more of syllables of which are repeated, the re-duplication will be frequently dropped in the passive.

Kikina	kinitia	Tapatapahi	tapahia (Maunsell 1894:46)
--------	---------	------------	----------------------------

Maunsell adds the following note:

Note - It must, however, be noticed that there are many exceptions to this rule, and that the omitting or retaining of the re-duplication is often left to the option of the speaker. In those instances, however in which he wishes to denote with peculiar emphasis, the *distribution, repetition & c.*, implied by the reduplication, he always, as far as he can, retains it; e.g.

³ This is the fourth edition of this grammar.

Titititia *strike everyone of the nails.*
 Patupatua *strike with many blows, & c. (Maunsell 1894:46)*

Reduplication also is mentioned in Maunsell under verbs forming reduplications:

korerorero, to hold conversation with & c. (Maunsell 1894:34)

Following Maunsell (1894), other authors made brief comments on reduplication. Stowell notes:

Continuity or repetition of action is indicated by partial or whole re-duplication
Oma, to run. Omaoma, a sequence of runs. (Stowell 1911:76)

Kirkham, under a description of the adjective suggests:

Doubling the adjective depreciates the quality.
Wera = hot. Werawera = somewhat hot. (Kirkham 1917:22)

Wills, in a chapter described as the lesson of bits and pieces, gives the following outline:

Effect of doubling both syllables of a verb: -
kimo - wink **kimokimo** - wink frequently.
peke - jump **pekepeke** - jumped and jumped.
patu - strike **patupatu** - strike blow after blow.

Doubling the first syllable shows reciprocal action:-
patu **papatu** - clash (of two things).
kimo **kikimo** - keep eyes closed. (Wills 1960:96)

Reciprocal action usually means either individuals in a plural subject perform the action on each other (e.g. they kissed) or a plural subject and reciprocal anaphor such as 'each other' as object (e.g. they hit each other). It is unclear why Wills (1960) considers *kikimo* 'keep the eyes closed' to be reciprocal action.

W.T. Ngata mentions reduplication in the revised and enlarged edition of the *Complete Manual of Maori Grammar and Conversation with Vocabulary*⁴. He comments on reduplication under the section entitled The Adjective:

⁴ This is the 13th edition (1953) of Williams (1862) *First Lessons in Maori*, revised by W.T. Ngata.

Reduplication in Adjectives. - Doubling the two syllabled root of an adjective has the force of adding *-ish* in English; it depreciates the quality. Thus *wera*, hot; *werawera*, warm ; *pango*, black; *papango*, blackish. Sometimes a plural is formed in agreement with the noun by doubling the first syllable of an adjective, e.g. : - *he whare nui*, a large house ; *he whare nunui*, large houses. (Ngata 1953:10,11)

It appears early grammars of Maori distinguished between partial and full reduplication of Maori words. Early works, however, very briefly cover reduplication and fail to describe some of the meanings associated with reduplication. The semantics of reduplication will be covered in a later chapter.

1.6 Modern approaches to reduplication in Maori

I use the term modern to cover the time following from Biggs's (1958) thesis. The 1960s were a time when Maori and other Polynesian languages were the subject of intensive scrutiny by a number of linguists. My interest is only in those writers who made significant comments about reduplication in Maori.

1.6.1 Krupa 1966

Krupa's *Morpheme and Word in Maori* (1966) is still the only major study that deals specifically with Maori morphology. I begin by commenting on the two aspects of Krupa's first statement concerning reduplication in his study. Secondly, I outline Krupa's approach to stem formation in Maori. Thirdly, I discuss some problems reduplication presents for Krupa's framework. I also comment on Krupa's statement on the semantics of reduplication in Maori. Reduplication is first mentioned by Krupa in the discussion of bi-vocalic morphemes. He notes:

A variety of poly-vocalic words may be subdivided in two ways: (1) as consisting of a reduplicated root morpheme and a prefix, (2) or as consisting of a reduplicated root morpheme and a suffix. For instance, *hokai* 'extended', 'far apart' may be regarded as composed of the prefix *hoo-* ~ *ho-* and the root *kai* (because *hoo-kai-kai* 'extend and retract alternately' occurs), or as composed of the root *hoka* and the suffix *-i* (because *hoka-hoka-i* 'extend' occurs as well). (Krupa 1966:33)

Harlow (1991:121) notes that in the above statement *hokai* is incorrect and should be given as *hōkai*. Harlow also adds "Whether or not it is correct that a language can on a regular basis assign competing analyses to words, it is not in fact necessary to postulate a complex structure for stems of this type". Harlow then outlines an alternative approach for recognising a variety

of patterns for trimoraic stems, without reducing trimoraic stems to extensions of the bimoraic type (this approach will be outlined later in this chapter).

Krupa's footnote requires further comment, he suggests (1966:33) "Only root morphemes may be reduplicated in Maori (Unlike the affixes and particles)". I want to suggest here that this statement needs to be qualified. It appears that affixes, when lexicalised, can be reduplicated. Note the following (cf. Williams 1971):

(3)	Stem	Reduplicated forms	Gloss
	<i>kēwai</i>	<i>kēkēwai</i>	'a fresh water crayfish'
	<i>kūwai</i>	<i>kūwaiwai kūkūwai</i>	'a species of shark'
	<i>māika</i>	<i>māikaika māmāika</i>	'an orchid' (<i>ikaika</i> 'orchid')
	<i>pōhue</i>	<i>pōhuehue pōpōhue</i>	'a name given to several climbing or trailing plants' (<i>hue</i> 'calabash, gourd')
	<i>pūtai</i>	<i>pūpūtai</i>	'sea foam, spray' (<i>pū</i> 'heap, stack') (<i>tai</i> 'sea')
	<i>rōwai</i>	<i>rōrōwai</i>	'a fresh water fish'
	<i>rūwai</i>	<i>rūwaiwai</i>	'foolish, silly'
	<i>tāhau</i>	<i>tātāhau</i>	'leg, shin' (<i>tā</i> 'shin') (<i>hau</i> 'overhang, excess')
	<i>tōkau</i>	<i>tōtōkau</i>	'plain, devoid of ornament' (<i>tō</i> 'stem') (<i>kau</i> 'bare')
	<i>whākou</i>	<i>whāwhākou</i>	'a tree' (<i>kou</i> 'knob, end stump')
	<i>whārua</i>	<i>whāruarua</i>	'hollow, depression' (<i>rua</i> 'pit, hole')
	<i>whārua</i>	<i>whāwhārua</i>	'concave, depressed'

Within Krupa's framework the forms *kē-*, *kū-*, *mā-*, *pō-*, *pū-*, *rō-*, *rū-*, *tā-*, *tō-*, and *whā-*, in the reduplicated forms in (3) are all affixes.

There are at least two ways of accounting for the above examples. The first is to suggest that these stems are the result of compounding two separate morphemes. Examples such as *tātāhau*, *tōtōkau*, and *pūpūtai* are possibly the result of compounds.

The second is to suggest that it is the prefix⁵ rather than the base that undergoes reduplication. This can occur because a word has lexicalised and the prefix is no longer transparent. For example it is possible that *whāwhārua* consists of *rua* and the reduplicated causative prefix *whā*-⁶ deriving from the lexicalised *whārua*.

Other possible examples of affix reduplication in lexicalised forms include the following forms:

(4) Stem	Reduplicated forms	Gloss
<i>pahū</i>	<i>papahū</i>	‘burst, explode’ (<i>hū</i> ‘resound’)
<i>pakū</i>	<i>pakupakū</i>	‘explode, resound’ (<i>kū</i> ‘a low inarticulate sound’)
<i>patō</i>	<i>patopatō</i>	‘crack, snap, knock’ (<i>tō</i> ‘tingle’)
<i>tawē</i>	<i>tawetawē</i>	‘noise, noisy’ (<i>wē</i> ‘squeal, cry’)

Krupa (1966) includes both *pa*- and *ta*-⁷ in his list of derivative⁸ prefixes.

I have only been able to find one example of suffix undergoing reduplication in Maori. In this case it is the nominalising suffix *-Canga*⁹ which is reduplicated, eg.

hāpaingainga ‘lift up’, cf. *hāpai* ‘lift up, raise’ (Reedy 1993:84)

There is evidence of non-root reduplication in Samoan. Mosel and Hovdhaugen (1992) in their description of Samoan reduplication state:

⁵ Krupa includes *kū*-, *mā*-, *pū*-, *rō*-, *rū*-, *tā*-, *tō*-, *whā*- in his list of prefixal elements (Krupa 1966:49).

⁶ *whā*- the apparent equivalent form of the causative prefix *whaka*- (Williams 1971:xxxiv).

⁷ *Ta*- is sometimes used as a causative prefix (Williams 1971:xxxv).

⁸ Krupa’s use of the term derivative for the prefixal elements (1966:49) is potentially confusing. Other prefixes in Maori, such as *whaka*- are also derivative prefixes. I use the term K-derivative prefix to refer to these prefixal elements termed by Krupa ‘derivative’.

⁹ *-inga* is an allomorph of *-Canga*, i.e. *-Canga* is normally used to refer to *-Canga* and all its allomorphs.

In a few marginal cases reduplication is applied across morpheme boundaries. Here it is the stem and not the root that is the domain of reduplication, cf. the following examples:

sao=fa=fa'i pl. of *sao=fa'i* non-erg v.¹⁰ 'sit up, sit still', a derivation of the root *sao* v. = 'collect' by the suffix = (C)a'i

fe=ō=fe=ō=a'i non-erg. v. 'use to go about' from *fe=ō=a'i* (PREF = go pl.-SUFF) 'go about'.
(Mosel and Hovdhaugen 1992:218,219)

Finally, there are some free polyvocalic morphemes in Maori that seem to undergo reduplication. Possible examples include:

(5)	PPN	* <i>manawa</i>	'breath(e)	MAO	<i>mānawanawa</i>	'patient, persistent'
	PPN	* <i>'uhila</i>	'lightning'	MAO	<i>ūiraira</i> ¹¹	(cf. <i>uira</i>) 'glistening'
	PPN	* <i>manuka</i>	'wound, sore'	MAO	<i>mānukanuka</i>	(cf. <i>manuka</i>) 'anxiety, misgiving, apprehension'
	PPN	* <i>karanga</i>	'call'	MAO	<i>kārangaranga</i>	(cf. <i>karanga</i>) 'call freq.'
	PPN	* <i>manako</i>	'desire'	MAO	<i>mānakonako</i>	(cf. <i>manako</i>) 'long for, yearn'
	PPN	* <i>pilau</i>	'rotten'	MAO	<i>pipirau, pirapirau</i>	(cf. <i>pirau</i>) 'rotten, decayed'
	PPN	* <i>sa'ele</i>	'move'	MAO	<i>hāereere</i> ¹²	(cf. <i>haere</i>) 'stroll, wander about'

Some of the above forms such as **karanga*, **manako*, **pilau* and **sa'ele* may derive from a lexicalised stem consisting of a prefix and root. However **manawa* appears to be a polyvocalic morpheme, therefore problematic for Krupa's (1966) approach.

¹⁰ non-erg v is non ergative verb, i.e. an intransitive verb.

¹¹ Te Tautoko 22, page 15 (A journal).

¹² Krupa (1966:55) lists: *ha-ere* 'to go' **ere* *haa-ere-ere* 'to stroll, wander about'.

1.6.1.1 Stem formation according to Krupa

Krupa (1966:47) notes two types of reduplication occurring in what he terms a supra-root forming operation. A supra-root consists of a root (i.e. the basic unit is the root) with an internal marker consisting of the partial or full reduplication of the root. Krupa regards reduplications such as *papaki* ‘slap’ and *pakipaki* ‘slap freq.’ as supra-roots derived from the root *paki* ‘slap’.

Krupa notes that full reduplication occurs more often than partial reduplication. Examples include:

mano ‘thousand’, ‘large number’ - *manomano* ‘innumerable’; *ako* ‘learn’ - *akoako* ‘consult together’. (Krupa 1966:47)

Krupa also gives examples of partially reduplicated forms:

nui ‘big’ - *nunui* ‘big plural’; *tango* ‘take up’, *tatango* ‘take in hand’. (Krupa 1966:47)

Krupa relies on affixation of roots¹³ and compounding to explain stem formation in Maori. This approach requires further attention. Krupa divides affixes into three groups, the first group he terms derivative, the second group involves the three highly productive affixes¹⁴, and the third other affixes occurring with a smaller class of morphemes. The members of the first group are:

prefixal elements - *aa-* ~ *a-*, *haa-* ~ *ha-*, *hii-* ~ *hi-*, *hoo-* ~ *ho-*, *huu-* ~ *hu-*, *ii-* ~ *i-*, *kaa-* ~ *ka-*, *kii-* ~ *ki-*, *koo-* ~ *ko-*, *kuu-* ~ *ku-*, *maa-* ~ *ma-*, *moo-* ~ *mo-*, *ngaa-* ~ *nga-*, *oo-* ~ *o-*, *paa-* ~ *pa-*, *pii-* ~ *pi-*, *poo-* ~ *po-*, *puu-* ~ *pu-*, *raa-* ~ *ra-*, *rii-* ~ *ri-*, *roo-* ~ *ro-*, *ruu-* ~ *ru-*, *taa-* ~ *ta-*, *tii-* ~ *ti-*, *too-* ~ *to-*, *tuu-* ~ *tu-*, *uu-* ~ *u-*, *whaa-* ~ *wha-*, *whee-* ~ *whe-*, *whii-* ~ *whi-*.

suffixal elements - *-aa* ~ *-a*, and *-hi* ~ *-ki* ~ *-mi* ~ *-i*. (Krupa 1966:49)

He notes that all the prefixal elements have roughly the same meaning of state or quality (1966:49), and the suffixal element *-aa* ~ *-a* has similar meaning to the prefixal elements listed above. Krupa adds that the prefixal elements (1) and suffixal elements (2) are unpredictable (in grammatical terms) as to their occurrence.

¹³ Roots here includes supra-roots.

¹⁴ *whaka-*, *-((C)i)a* ~ *-(i)Ca* and *-((C)a)nga* (Krupa 1966:49).

There is a possible phonological rule that may account for the lengthening of some initial vowels in K-derivative¹⁵ prefixes. This rule is given below.

(6) **K-derivative prefixation rule:**

Prefix	Stem
(i) (C)V ₁ -	/ _ root (i.e. bimoraic stem)
(ii) (C)V ₁ V ₁ -	/ _ R root

(R = a complete reduplication of that root)

The above rule suggests that the initial vowel in a particular K-derivative prefix is lengthened when that the prefix is applied to stem which has undergone complete reduplication.

It appears that K-derivative prefixes never occur¹⁶ with a vowel initial base in which the initial vowel is the same as that of the prefix¹⁷. This may simply be due to the low number of vowel initial bases in Maori.

Other similar base-dependent affixation allomorphy rules, based on the moraic length of the base appear in Maori. An example is Blevins's (1994) passive allomorphy rule:

Default passive allomorphy rule (preliminary)

i. PASSIVE	→ /-ia/	/ μμ _	
ii. Elsewhere: PASSIVE	→ /-tia		(Blevins 1994:41)

This rule states that the passive *-ia* is suffixed to bimoraic stems and the passive *-tia* is suffixed to stems of more than two morae.

The moraic length of a base also affects the pronunciation of certain preceding words. One example is in the pronunciation of possessive prepositions, i.e.

¹⁵ I use the term 'K-derivative prefix' throughout this chapter to refer the prefixal elements which Krupa (1966:49) terms 'derivative'.

¹⁶ In Krupa's lists of derivative prefixes (i.e. K-derivatives).

¹⁷ Krupa (1966:63) gives *ro-ora* which would be a possible counter example. However, *ro-ora* is not found in Williams (1971). The correct form probably is *rōrā*.

Before a short syllable (i.e. a syllable containing only one vowel) *na*, *no*, *ma*, *mo* are pronounced short; before a syllable containing more than one vowel they are pronounced long. (Biggs 1969:57)

An example of the K-derivative prefixation rule is:

(7) *pahū* 'burst, explode' *pāhūhū* 'pop, crackle' (cf. *hū* 'resound')

One counter example to this rule is:

(8) *pāura* (cf. *ura*), *pāuraura* 'glow'

Table 1 on the next page attempts to verify the K-derivative prefixation rule (6) using the data supplied by Krupa (1966:55-65). A pair of stems with related meanings as in (7) in (8) were counted as either conforming to the rule, or not conforming to the rule. The table only considers the derivative prefixes (in Krupa's terminology). Other forms were not considered.

Table 1

Count¹⁸ of Krupa's stem forming prefixal elements (K-derivatives) conforming to K-derivative prefixation rule

stem forming derivative prefix	number of pairs conforming to rule	number of pairs not conforming to rule	total observed occurrences of prefix
koo- ~ ko-	8	4	248
taa- ~ ta-		2	146
maa- ~ ma-	2	2	119
kaa- ~ ka-	6		98
puu- ~ pu-	2	1	98
haa- ~ ha-	2		82
aa- ~ a-		1	71
tii- ~ ti-	1		70
tuu- ~ tu-	4	2	60
paa- ~ pa-	2	1	59
moo- ~ mo-		1	55
poo- ~ po-	3		48
pii- ~ pi-			39
hii- ~ hi-	1	1	38
huu- ~ hu-		3	37
too- ~ to-			27
kuu- ~ ku-		1	26
whee- ~ whe-	1		24
ngaa- ~ nga-	1		21
whaa- ~ wha-		1	21
hoo- ~ ho-		2	18
oo- ~ o-			9
raa- ~ ra-	1	1	9
uu- ~ u-			9
roo- ~ ro-			7
rii- ~ ri-			6
ii- ~ i-			5
kii- ~ ki-			6
ruu- ~ ru-			3
whii- ~ whi-			3
total (31)	34	23	1462

Table 1, based on Krupa's data (Krupa 1966:53-65, 66) shows the proposed prefix rule occurs more often than not.

It appears that the rule given in (6) is false. It may not have relevance synchronically, but whether it was applicable diachronically is a question for further research.

¹⁸ Prefixes are listed in order of highest occurring to lowest occurring.

Some of these affixal elements may not be strictly derivative in Krupa's sense. I have mentioned that Williams (1971:xxxiv) lists *whā-* as an apparent equivalent form of *whaka-*. Williams also notes “*Ma* as a prefix will often form an adjective. *Tā* is sometimes used as a causative prefix” (1971:xxv). Sometimes *hā-* appears to be an allomorph of *whā-* (cf. *whaka-*) e.g. *hākorekore* = *whākorekore* = *whakakorekore* ‘cause not to be, deny’.

It is worth noting that Krupa's primary source of data was the sixth edition (1957) of Williams's¹⁹ dictionary. Also some of Krupa's affixal elements appear to be much more productive than others. A more exhaustive investigation²⁰ may shed further light on the meaning, distribution and origin of these affixal elements. An examination as such is beyond the scope of this work. Krupa (1966:48) notes “A derivative affix may be added to an already affixed root in only exceptional cases”. He gives several examples including:

puukauri ‘smoked’ consists of *puu-* ‘derivative prefix’ and *kauri* ‘soot’, which is composed of *ka-* ‘derivative prefix’ and *uri* ‘dark’ (Krupa 1966:48)

Ryan's dictionary of modern Maori (1995:80) has *kakauri* ‘dusk’. Under Krupa's framework this example must be either a compound of *kaka* and *uri*, or the re-application of the K-derivative prefix *ka-*. Krupa does not suggest that a K-derivative prefix may be re-affixed to a root. Such an approach is necessary to account for examples such as:

- (9) *kanapa, kakanapa* ‘bright, gleaming’; *kānapanapa, kākanapa* ‘gleaming’
hoata, hohoata ‘The moon on third day’

According to Harlow (1991) *kakanapa* derives from a reduplication of the first syllable of *kanapa*, and *hohoata* is similarly derived from a reduplication of the first syllable. I will show later that it is not possible to explain *kākanapa* in the framework of Harlow 1991.

¹⁹ The seventh edition of H.W. Williams *A Dictionary of the Maori language* was published in 1971.

²⁰ This would entail using more up to date dictionaries of Maori and comparative Polynesian data.

1.6.1.2 Another problem for Krupa's approach

There is at least one other serious problem in Krupa's framework in accounting for reduplication data. Reduplications of the shape as in the list given below are unaccounted for in Krupa's framework, e.g.

(10) <i>mīmiha</i>	'a black bituminous substance'
<i>mīmiro</i>	'swirl'
<i>nēnene</i>	'jest, be saucy'
<i>pēpeke</i>	'a fish'
<i>tētere</i>	'wind instrument, trumpet'

Neither *mī*, *nē*, *pē*, *rē*, nor *tē* occur in Krupa's list of derivative (i.e. K-derivative) prefixes. These forms do not appear to be compounds. Two of the above forms *nēnene* and *rērere* may possibly derive from deletion of the first reduplicated consonant (due to dissimilation) of an underlying simplex form $C_1V_1C_1V_1$ undergoing full reduplication. Harlow (1991) advocates this approach.

Note that words of the shape $C_1V_1C_1V_1C_1V_1$ never occur in Maori. A base consisting of the shape $C_1V_1C_1V_1$ will either undergo full reduplication or undergo a partial reduplication and appear as $C_1V_1V_1C_1V_1C_1V_1$ (Williams 1971:xxxiv).

1.6.1.3 Krupa's comment on the semantics of reduplication in Maori

Krupa suggests that H.W. Williams's explanation of reduplication (Williams 1957:xix) needs to be supplemented:

A highly productive operation such as reduplication loses its original meaning in several root morphemes which occur in the reduplicated form only (e.g., **nihi* as *ninihi* 'steep', 'move stealthily' and *nihinihi* 'steal past'). (Krupa 1966:48)

Krupa gives examples of two other meanings of reduplication not covered in Williams (1957:xix):

complete reduplication may denote not only plurality of objects, e.g. *mutumutu* 'crop off appendages' but also plurality of subjects e.g. *Kua moemoe raatou* 'They have all fallen asleep'. (Krupa 1966:48)

1.6.2 Hohepa's (1967) comment on reduplication

Hohepa (1967), in his PhD dissertation *A Profile Generative Grammar of Maori*, mentions one example of reduplication. He comments on the lengthening of the antepenultimate vowel in a restricted number of kinship terms²¹ to express plurality. Hohepa considers this to be a reduplicative infixation (1967:13). The preoccupation of Hohepa's thesis is syntax, rather than morphology.

1.6.3 Hohepa's (1969) comments on reduplication

Hohepa (1969) discusses an aspect of reduplication to support his argument for subdividing the stative class in two subcategories (stative verbs and stative adjectives). He notes:

VIII. The occurrence of partial or complete reduplication is discussed fairly extensively in all grammars of Maori. The observation, however, has not been made hitherto that only stative adjectives and a few general verbs do both kinds of reduplication: stative verbs do not unless they are transformed to a derived general verbs by suffixing the causative prefix *whaka*. Stative verbs *qua* stative verbs only tolerate complete reduplication. When stative adjectives are reduplicated the semantic effect is to either to increase or diminish the root meaning, or to indicate plurality, or both. All verbs (including derived general verbs) restrict their semantic range to plurality when reduplication takes place. This plurality expresses either continuous or repetitive action. (Hohepa 1969:15)

Firstly, whilst the occurrence of partial or complete reduplication receives mention in most grammars of Maori, it has not been discussed extensively. In fact the lack of extensive discussion on reduplication in works on Maori is the *raison d'être* of my thesis.

Secondly, Hohepa's point that stative verbs only tolerate complete reduplication may not be correct. One possible counter example to the above statement is *hinga*²² 'fall', which has both '*hihinga*' and '*hingahinga*' as reduplicated forms. The absence of stative verbs undergoing partial reduplication may simply be due to the low number of stative verbs in Maori. Complete reduplication is much more productive than partial reduplication, therefore is not

²¹ These forms are: *matua* 'parent', *mātua* 'parents'; *taina/teina* 'younger sibling of the same sex', *tāina/tēina* 'younger siblings of the same sex'; *tangata* 'person', *tāngata*, 'people'; *tīpuna/tupuna* 'ancestor', *tīpuna/tūpuna* 'ancestors'; *tuahine* 'sister or female cousin of a male', *tuāhine* 'sisters or female cousins of a male'; *tuakana* 'older sibling of the same sex', *tuākana* 'older siblings of the same sex'; *wahine* 'woman', *wāhine* 'women'.

²² Although Hohepa (1969) does not mention whether *hinga* is a stative verb or not, Biggs (1969:137) lists *hinga* is a stative verb, Bauer (1993:413) lists *hinga* as a neuter verb (Bauer 1993 uses the term 'neuter verb' instead of stative verb).

surprising that most stative verbs seem to only tolerate complete reduplication.

Thirdly, Hohepa's comment on the restriction of the semantic range of reduplication of all verbs is false. His example of reduplication of *kore* to show plural agreement is:

I kore-kore aa-na kuumara i te rua.
(past not -not poss-3rd:pers:sg sweet potato loc. the:sg storehouse)

'He had no sweet potatoes in his storehouse.' (Hohepa 1969:21)

Moorfield (1989) gives an example of reduplication of *kore* to show intensification, e.g.

The addition of *rawa* increases the intensity even further while using *korekore* instead of *kore* together with *rawa* makes the strongest future negative of all, e.g.

<u>kore rawa</u> tēnei haerenga whakamiharo e wareware i ngā tamariki.	The children will never ever forget this marvellous trip.
<u>korekore rawa</u> rātou e whakaae ki tēnā tono. (Moorfield 1989:71)	There's absolutely no chance of them ever agreeing to that request.

The use of *kore* in the following sentence is quite acceptable.

(11) *korekore au e whakaae ki tēnā tono.*
(not -not 1st:pers-sg. non-past agree acc. that request)

'There's absolutely no chance of me agreeing to that request.'

The example above shows the reduplication of *kore* may not always indicate plurality.

I will examine the semantics of reduplication in Maori in chapter three.

1.6.4 Biggs's (1969) comments on reduplication

Biggs mentions reduplication in *Let's Learn Maori*. He suggests there are three kinds of reduplication:

full reduplication as in *wera*, *werawera*, partial reduplication as in *pango*, *papango*, and infix reduplication as in *tangata*, *tāngata*. (Biggs 1969:107)

Biggs's outline of reduplication is:

In most cases complete reduplication of a base indicates that the action, or state, is of frequent or continued occurrence.

Mate 'to die', *matemate* 'die in numbers'; *paki* 'pat', *pakipaki* 'pat frequently, clap'; *kimo*, 'wink', *kimokimo* 'wink frequently, blink'.

Sometimes full reduplication of a stative diminishes its intensity.

Wera 'hot', *werawera* 'warm'; *mate* 'sick', *matemate* 'sickly'.

In some cases partial reduplication indicates a single terminal action.

Kikimo 'shut the eyes'; *papaki* 'slap or clap once'.

In other cases partial reduplication indicates diminished intensity.

Mārō 'hard, stiff', *mārōrō* 'somewhat hard, stiff'; *pango* 'black' *papango* 'somewhat black'; *whero* 'red', *whewhero* 'reddish'.

In a few cases an adjective in the qualifying slot of the nucleus is partially reduplicated (optionally), to indicate that the base in the first nucleus slot is plural.

He rākau nunui 'big trees' ; *he rākau roroa* 'tall trees' ; *he rākau papai* 'good trees'. (Biggs 1969:107)

Lengthening the antepenultimate vowel to indicate plurality is not considered infix reduplication by other authors. Mosel and Hovdhaugen (1992) consider this to be vowel lengthening rather than internal reduplication. Reduplication in Maori, to authors as Bauer (1981) consists of reduplicating either one or two morae, sometimes with the addition of vowel lengthening.

Biggs (1969) does not give an explanation for accounting for reduplication data such as:

(12) <i>kapiti</i>	'narrow pass, joined, clenched'	<i>kāpīpiti</i>	'abut, rest against'
<i>manei</i>	'reach out to, waver'	<i>mānenei</i>	'reach out to, waver'
<i>rere</i>	'flee, escape, rush, run etc.'	<i>rērere</i>	'run'
<i>pepe</i>	'moth'	<i>pēpepe</i>	'moth'

It is unclear whether Biggs (1969) would consider examples such as *kāpīpiti* and *mānenei* to be internal reduplication or affixation to a partially reduplicated base.

1.6.5 Williams's (1971) comments on reduplication

It must be noted that the first edition of Williams appeared in 1844. The 1971 edition of Williams is mentioned here (out of chronological order) due to additional comments on reduplication which appeared in this edition. Williams states:

Reduplication may be either partial, affecting the first syllable alone of the root (as *papaki*, from *paki*), or complete (as *pakipaki*). In the latter case a prefixed short syllable will invariably be lengthened, as *ngahere*, *ngāherehere*; *mania*, *mānania*; *pakē*, *pākēkē*. When the two syllables of the root are identical, as *pepe*, complete reduplication may be in the form *pēpepe* or *pepepepe*. In a few cases alternative reduplication occurs, as *tihoihoi* and *tihotihoi*, from *tihoi*; this would appear to indicate that consciousness of the structural history of the word has been lost.

Reduplication generally modifies the meaning of a word. With adjectives complete reduplication has the effect of diminishing the intensity of the meaning, as *mate*, *sick*, *matemate*, *sickly*; *wera*, *hot*, *werawera*, *rather hot*, *warm*; *mārō*, *stiff*, *mārōrō*, *somewhat stiff*. The effect of partial reduplication is in some cases similarly to diminish the intensity of the meaning, as *pango*, *black*, *papango*, *somewhat black*, *dark*; *whero*, *red*, *whewhero*, *reddish*; while in a few cases it forms a plural, as *he rakau pai*, *a good tree*, *he rakau papai*, *good trees*. It must be observed, however, in the latter case that the simple form may be used for either singular or plural, but the reduplicated form for the plural only.

In the case of verbs the effect of the two kinds of reduplication is somewhat different. Partial reduplication denotes either prolongation or continuance of the action with increased intensity, or reciprocal action. Complete reduplication gives a verb frequentative force with, sometimes, diminished intensity; occasionally the frequentative becomes a simple plural, indicating merely that a number of objects are involved in the action of the verb. From *kimo*, *wink* or *blink*, is formed *kikimo*, denoting that the eyes are closed and kept closed, and *kimokimo*, *blink frequently*; so, too, *paki*, *pat*, *papaki*, *clap together*, *pakipaki*, *pat frequently*. (Williams 1971:xxxiv)

The first observation to note is that the quoted form *tihoihoi* is later listed as *tīhoihoi* (Williams 1971:416). The second observation is that two quoted reduplications *whewhero* and *papango*, surprisingly are not cited in the dictionary. This may be due to lack of textual examples or perhaps some other reason. Thirdly, I have not yet found any examples of partial reduplication of verbs denoting prolongation or continuance of an action with increase intensity. My informants suggest the use of partial reduplication to indicate continuance of

action with increased intensity is not a feature of modern Maori.

Some of the examples of reduplication in the above quote appear in Biggs's (1969) account of reduplication. I am unsure whether or not the seventh edition review committee deliberately avoided revising the section on word formation in the introduction. Krupa's comment (1966:48) on two other meanings of reduplication not covered in Williams (1957) should have been added to the revised edition.

Williams's (1971) account of reduplication is similar to Biggs (1969) in that some forms of reduplication cannot be accounted for. As with Biggs (1969), there are a number of other meanings of reduplication not given in this account.

1.6.6 Reedy's (1979) comments on reduplication

Reedy (1979) in his PhD thesis, *Complex Sentence Structure in Maori*, briefly comments on reduplication. He suggests:

This process generally has a modifying effect (intensive, diminutive, distributive, etc.) on the semantics of the verb. Some examples are:

noho	'sit'	(one person)
nohonoho	'sit'	(several persons)

mahara	'think'	maaharahara	'worry'
whero	'red'	wherowhero	'reddish'

kua	noho	<u>te</u>	tangata.
perf.	sit	the	man

'The man has sat.'

Kua	nohonoho	ngaa	taangata.
perf.	sit:sit	the:pl.	men

'The men have sat.'

Kua	nohonoho	<u>te</u>	tangata.
perf.	sit:sit	the:	generic man (people)

'The people have sat.'

*Kua nohonoho a Mere.
 'Mary has sat.'

Kua whata te miiti.
 perf. hang the meat (generic)

'The meat (or carcass) is hanging.'

Kua whatawhata ngaa miiti.
 perf hang :hang the:pl. meat

'The carcasses are hanging.'

*Kua whatawhata te miiti.
 perf hang :hang the meat

'The carcass is hanging.'

The above examples show the verb inflected for number depending on the number indicated by the subject. Incidentally, it has sometimes been assumed that this process occurs only in non East Polynesian Languages, but the above examples clearly illustrates its existence in Maori. (Reedy 1979:29,30)

It is interesting to note that the forms *nohonoho*, *wherowhero*, and *whatawhata* are not listed in Williams (1971). This seems to imply that Williams (1971) may have some gaps of common reduplications that occur in Maori, or certain types of reduplications are entirely productive. Reedy's final comment on verb inflection indicating plurality of subjects in Maori seems valid. However this process in Maori may not be as productive as it is in non East-Polynesian Languages. This brief account of reduplication does not account for much of the attested reduplication data nor the various meanings of reduplication. The preoccupation of Reedy's thesis is with syntax.

1.6.7 Bauer's (1981) comments on reduplication

Bauer (1981) argues that there is an additional phonological word division in Maori other than the syllable that has the shapes (C)V(V). She suggests the need to recognise the shape (C)V as a separate unit, and proposes that the term 'mora' be adopted for this division.

Bauer (1981) notes the requirement of the syllable in order to describe rules of stress for Maori. However, (Bauer 1981:32) the mora, not the syllable, is the division used in rules of word divisions such as reduplication. She suggests that there are two major patterns of productive reduplication in Maori. Bauer terms these final reduplication and initial

reduplication. Final reduplication according to Bauer, is the reduplication of the last two morae of a stem. Bauer notes three cases:

(a) With stems of four or more morae, the rule operates simply, thus:

a.a.hu.a a.a.hu.a.hu.a
 hi.i.ke.i hi.i.ke.i.ke.i
 ma.a.ku.u ma.a.ku.u.ku.u

(b) With stems of three morae, the vowel of the first mora is reduplicated in addition to the reduplication of the last two morae in the majority of instances, e.g.

ha.e.re. ha.a.e.re.re.e.
 ma.ha.ra. ma.a.ha.ra.ha.ra. (Bauer 1981:32,33)

Bauer notes that Williams (1971) lists a few exceptions which do not reduplicate the first vowel, e.g.

ha.ngu.ru. ha.ngu.ru.ngu.ru. (Bauer 1981:33)

Bauer notes that Biggs (personal communication) has suggested to her that such forms may be in error. She further points out that:

The reduplication of the first vowel is inexplicable in terms of the general pattern for final reduplication, but it may serve to retain a stress on the stressed syllable of the simple form, compare

^hha.ngu.ru ha.^hngu.ru,₁ngu.ru ₁ha.a.^hngu.ru,₁ngu.ru
 (Bauer 1981:33)

Bauer's third case is:

(c) with stems of two morae, both are reduplicated, e.g.

hu.i. hu.i.hu.i
 a.ko. a.ko.a.ko
 tu.u. tu.u.tu.u (Bauer 1981:33)

Bauer notes these examples (c), are examples of final reduplication. This is due to the different semantic effect found in initial reduplication. She does not explain the difference in semantic effect between initial and final reduplication. Bauer does not give any evidence to support this claim.

Bauer states initial reduplication involves reduplication of the first mora of a stem, thus:

ra.ka	ra.ra.ka
pi.i	pi.pi.i
ma.e	ma.ma.e

The equivalent for longer stems appears to involve reduplication of the first two morae, e.g.

ka.pe.ta.a ka.pe.ka.pe.ta.a (Bauer 1981:31)

Bauer claims that examples of this kind are not particularly common. My data show this is not correct. The paper succeeds in establishing that the mora rather than the syllable is the division used in rules of reduplication and certain other rules of Maori grammar.

Classifying reduplication into initial and final reduplication does not account for data already mentioned in (12), e.g.

(13) <i>kapiti</i>	‘narrow pass, joined, clenched’	<i>kāpīpiti</i>	‘abut, rest against’
<i>manei</i>	‘reach out to, waver’	<i>mānenei</i>	‘reach out to, waver’

Furthermore, Bauer herself, appears to later abandon the initial, final reduplication classification. She notes (Bauer 1993:525) “this too, (*initial and final reduplication*)²³ falls short of accounting for all the observed patterns”.

1.6.8 Harlow’s (1991) comments on reduplication

Harlow’s (1991) paper ‘Consonant Dissimilation in Maori’ offers some important insights into reduplication in Maori. The main interest of this paper is an optional consonant dissimilation rule. The rule Harlow proposes can occur in compounding, affixation (i.e. prefixation and suffixation) and reduplication. In his paper Harlow concentrates on the reduplication of trimoraic stems. Harlow’s approach to trimoraic stems requires further attention. I noted in section 1.6.1 Harlow’s comment on Krupa’s (1966) suggestion for accounting for reduplication doublets²⁴. Harlow offers an alternative analysis for accounting for these doublets. Harlow proposes that there are four patterns of reduplication available to

²³ Italics are mine.

²⁴ A doublet is where two different reduplication forms exist, both with the same meaning, derived from the same simplex form. An example of a doublet is the frequentative forms *patapatai* and *pātaitai*, both deriving from *pātai* ‘to ask’.

trimoraic stems (excluding the simplex). He claims the form(s) which any particular simplex assumes is a matter for the lexicon. I will, at a later stage, attempt to either verify or qualify this statement by examining forms in my own data. However Harlow also notes further research may reveal regularities (including aspects of reduplication generally) that have escaped him. The patterns outlined by Harlow, are as follows:

Given a basic trimoraic stem of the shape $\sigma_1\sigma_2\sigma_3$, the four reduplications patterns (with a couple of examples each for the mean time) are:

1. reduplication of the first syllable²⁵: $\sigma_1\sigma_1\sigma_2\sigma_3$:

hohoata < *hoata* both meaning ‘the moon on the third day, pale, colourless’;
a-anini < *anini* both meaning ‘giddy, aching (of the head)’.

2. reduplication of the first two syllables: $\sigma_1\sigma_1\sigma_2\sigma_2\sigma_3$ (with the dissimilation of the repeated consonant in $\sigma_1\sigma_1$):

tāweweke ‘slow, dilatory’ < *taweke* ‘linger’; *mānenei* < *manei* ‘reach out to’.

3. reduplication of the first two syllables: $\sigma_1\sigma_2\sigma_1\sigma_2\sigma_3$:

takataakai ‘wind round and round’ < *takai* ‘wrap up’; *riariaki* < *riaki* ‘raise’.

4. reduplication of all three syllables: $\sigma_1\sigma_1\sigma_2\sigma_3\sigma_2\sigma_3$ (with the dissimilation of the repeated consonant in $\sigma_1\sigma_1$):

pākarukaru ‘break in pieces (vtr)’ < *pakaru* ‘broken’; *pāhūhū* ‘pop, crackle’ < *pahū* ‘explode’, i.e. *pa-a-hu-u-hu-u* < *pa-hu-u*. (Harlow 1991:122)

Harlow adds pattern 4 is the most frequently attested, pattern 3 is also fairly common, while pattern 2 is rather rare. He goes on to describe that this process of consonant deletion occurs in some patterns optionally, and in others it is obligatory; in pattern 1 deletion occurs sometimes, in pattern 2 deletion always occurs, and in pattern 4 deletion in $\sigma_1\sigma_1$ always occurs and in the first sequence of $\sigma_2\sigma_3$ optionally if $\sigma_2 = \sigma_3$.

He adds an alternative analysis for accounting for some pattern 4 reduplications, such as *mōnehunehu* ‘distinct’. The word *mōnehunehu* ‘distinct’ has *mōnenehu* as a variant and may be related to *mōnehu* ‘die, expire’. These are patterns 4, 2, and 1 reduplications of the

²⁵ Harlow’s syllable in this description means underlying syllable of the shape

σ
/
(c) μ
v

unattested **monehu*. This is one example of a word of the form $C_1V_1V_1C_2V_2C_3V_3$ (pattern 1), with no corresponding simplex form ($C_1V_1C_2V_2C_3V_3$), nor pattern 3 form ($C_1V_1C_2V_2C_1V_1C_2V_2C_3V_3$). Harlow suggests that this alternative analysis would take $C_1V_1V_1C_2V_2C_3V_3$ (pattern 1) as the simplex, and copy the last 2 morae only. He adds that such a pattern may account for the forms found in words that are unequivocally tetramoraic²⁶ in their simplex forms, e.g. *porotiti* = *porotītiti* ‘disk, revolving’, *karawhai* = *karawhaiwhai* ‘enclose in a net’. In many cases these words derive from prefixation to a stem, which may exist as a free form, e.g. besides *tūpeke* ‘jump’, there is also *peke* ‘jump’ (Harlow 1991:123).

Some of Harlow’s pattern 2 reduplications alternatively may be accounted for by prefixation to a reduplicated stem. Harlow gives *pākikini* ‘pain, smart’ a pattern 2 reduplication of the stem *pakini* ‘nip, pinch’. Both *kini* ‘nip, pinch’ and *kikini* ‘nip, pinch’ exist as free forms.

Harlow’s footnote requires further comment:

Note by the way, that at least some of these patterns are inherited: cf. Fijian (see Arms 1989) *balabalavu* ‘very long < *balavu* ‘long’, *butobutō* < *butō* ‘dark’, Pattern 3: *kakadresudresu* ‘torn to shreds’ < *kadresu* ‘torn’, Pattern 4. (Harlow 1991:122)

My interest is in the form *kakadresudresu* as possibly deriving from a source of origin²⁷ common to both Fijian and Polynesian languages. Lathroum comments on this type of reduplication in standard Fijian. She states verbs in standard Fijian may be modified by an affix indicating frequentative behaviour, e.g.

<i>ta-basu</i>	<i>ta-ta-basu-basu</i>	‘broken (by itself)’
<i>ca-kuvu</i>	<i>ca-ca-kuvu-kuvu</i>	‘explode’
<i>ka-belu</i>	<i>ka-ka-belu-belu</i>	‘bent, folded’
<i>ka-isi</i>	<i>ka-ka-isi-isi</i>	‘torn, split’

(Lathroum 1991:177,178)

Lathroum suggests that the above forms are unlikely to result from a rule of suffixing reduplication (reduplicating the rightmost stem) to a form that has already been reduplicated (i.e. already undergone reduplication of the leftmost affix). According to Lathroum, there is no requirement for final reduplication elsewhere in Fijian and it appears to apply only to a

²⁶ I use the term ‘quadrimoraic’ for ‘tetramoraic’ for consistency of terminology.

²⁷ It is generally accepted that historically both Fijian and Polynesian languages derive from a closed subgroup termed Central Pacific (see Grace 1959, Geraghty 1986).

highly limited set of forms. She adds the best solution is to assume that both rules of reduplication follow *ta-* etc. affixation. Lathroum notes that double reduplication seems uniquely linked to this class of affix.

I have not yet found any examples of double reduplication²⁸ as illustrated above in any Polynesian language. It is possible that Polynesian languages lost this type of double reduplication or this is a local innovation of Fijian.

No examples of double reduplication (as attested in Fijian) are present in modern Maori, or all possible examples have undergone obligatory dissimilation.

The approach suggested by Harlow offers some enlightening explanations in accounting for some previously unexplained reduplication data derived from trimoraic stems. However, there is some attested trimoraic reduplication data not covered by his four patterns. I divide these potential ‘other patterns’ into three groups.

The first group of potential ‘other type’ consists of a pattern 4 reduplication in which the first mora is not reduplicated, or is a simply a reduplication of the last two morae of a word:

(14) Stem	Reduplication	Gloss
<i>*atiu</i>	<i>atiutiu</i>	‘a univalve shellfish’
<i>engari</i>	<i>engaringari</i>	‘It is better, but etc.’
<i>hanguru (nguru)</i>	<i>hangurunguru</i>	‘grumbling’
<i>hunguru (nguru)</i>	<i>hungurunguru</i>	‘?’
<i>*iheu (heu)</i>	<i>iheuheu</i> ²⁹	‘separate’
<i>inohi</i>	<i>inohinohi</i>	‘scalely’ (Ngata 1993:412)
<i>kotau</i>	<i>kotautau</i>	‘slope’
<i>mahere (here)</i>	<i>maherehere</i>	‘advice’ (Ngata 1993:7,181)
<i>*makoā (koa)</i>	<i>makoakoa</i>	‘joy’
<i>*mikoi (koi)</i>	<i>mikoikoi</i>	‘a plant’
<i>*ngahoro (horo)</i>	<i>ngahorohoro?</i>	‘free’ (Ngata 1993:167)

²⁸ Unless a word has undergone obligatory assimilation of $\sigma_1\sigma_1$ as proposed in Harlow’s pattern 4.

²⁹ Ray Harlow (personal communication) reports that the term *iheuheu* is a hapax legomenon in Wohlers’s manuscript and may thus be suspect.

<i>patete</i>	<i>patētete</i>	‘stunted’
<i>piaka (aka)</i>	<i>piakaaka</i>	‘rootlets’
<i>pingawi</i>	<i>pingawingawi</i>	‘bending, sagging’
* <i>pitawi</i>	= / <i>pitawitawi</i>	‘bending, sagging’
* <i>pokini (kinikini)</i>	<i>pokinikini</i>	‘pinch off’
* <i>pungake</i>	<i>pungakengake</i>	‘word used in karakia ?’
* <i>pureu</i>	<i>pureureu</i>	‘a badly executed dive’
<i>tākīkī (kihi)</i>	<i>ta(a)kihikihi</i>	‘stripped bare’
* <i>tarua</i>	<i>taruarua</i>	‘repeated’
* <i>tuwere (were)</i>	<i>tuwerewere</i>	‘variety of eel’
?	<i>whitiwhitianaunau</i>	‘sixth month of the Maori year’

It is possible that some forms (if not all) in this list are mistakes. My informants always pronounce the initial vowel of a pattern 4 as a long vowel. Reduplication of this type is present in other Polynesian languages such as Samoan³⁰, and Hawaiian³¹, e.g.

(15) Stem	Reduplication	Gloss
<i>haele</i>	<i>haeleele</i>	‘to go, come’ (HAW)
<i>masofa</i>	<i>masofasofa</i> <i>māsofasofa</i>	‘collapse’ (SAM)
<i>magoto</i> ‘sunk’	<i>magotogoto</i>	‘boggy, to overturn easily’ (SAM)
<i>pakelo</i>	<i>pakelokelo</i>	‘to slip out’ (HAW)
<i>piele</i>	<i>pieleele</i>	‘mattery interruptions or eczema on the scalp’ (HAW)
<i>piolo</i>	<i>pioloolo</i>	‘medicinal concoction’ (HAW)
<i>ta’oto</i> ‘lie’	<i>ta’oto’oto</i>	‘rest, recline’ (SAM)
<i>uhau</i>	<i>uhauhau</i>	‘to present a chant, to strike’ (HAW)

However, it seems in most cases in both Samoan and Hawaiian the first vowel is lengthened in pattern 4 reduplications. I have not yet found any examples of Harlow’s pattern 4 reduplication without the first vowel lengthened in Buse’s (1995) *Cook Islands Maori*

³⁰ Examples are from Mosel and Hovdhaugen (1992) Chapter 5.

³¹ Pukui and Elbert 1986.

Dictionary.

The second group is as follows:

(16) <i>kapiti</i>	‘narrow pass, joined, clenched’	<i>kāpīpiti</i>	‘abut, rest against’
<i>mōwhiti</i>	‘jump’	<i>mōwhīwhiti</i>	‘jump’
<i>pākaha</i>	‘violent, severe’	<i>pākākaha</i>	‘strenuous’
<i>pūtara</i>	‘shells used as horns’	<i>pūtātara</i>	‘shells used as horns’
<i>tūpaku</i>	‘wasted, weak, listless’	<i>tūpāpaku</i>	‘corpse, invalid’

At least *pūtara* may be a compound, the other forms appear to be valid ‘other type’ trimoraic or quadrimoraic reduplications.

The third group is not a true group in the sense that the reduplications are of the same shape. However, all forms represent potential ‘other type’ reduplications. I have previously mentioned in (9):

(17) <i>kanapa, kakanapa</i>	‘bright, gleaming’; <i>kānapanapa, kākanapa</i>	‘gleaming’
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Harlow’s patterns do not cover *kākanapa*. Another potential example of ‘other types’ is:

(18) <i>koreke</i>	‘New Zealand quail’	<i>kōkōreke</i>	‘New Zealand quail’
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Harlow’s patterns are interesting for several reasons. The first is that both patterns 2 and 4 are non-linear. Both rely on an obligatory dissimilation in the repeated consonant in $\sigma_1\sigma_1$. This deleted consonant is never word initial nor less than three morae from the end of the word (Harlow 1991:123). In other areas of Maori morphology where consonant dissimilation appears to occur (compounding, prefixation and suffixation) the process is never obligatory.

Maori word formation is largely concatenative (i.e. linear). One non-linear process that springs to mind is vowel lengthening of antepenultimate vowels to express plurality in some kinship terms. This example of vowel lengthening (or internal reduplication) does not lengthen the first vowel of all kinship terms. It is unlikely that vowel lengthening in other words occurs in analogy to vowel lengthening in kinship terms.

Pattern 4 is unusual in that it constitutes a reduplication of more than two morae. Most affixation in Maori, productive affixation at least, consists of affixation of only two morae or less. The only examples of an affix of one mora include the passive suffix *-a* (an allomorph of *-Cia*), and the nominalizing suffix *-nga* (an allomorph of *-Canga*) and the prefix *ma-*. Finally, Harlow's approach will not explain certain reduplications that occur in two morae bases, e.g.

- (19) *hau, hāhau* 'seek'
 honu, hōhonu 'deep'

Clearly consonant dissimilation occurs in some reduplications in Maori and can account for certain attested forms previously unaccounted for. Harlow's four patterns do not appear to cover all reduplications attested from trimoraic stems.

1.6.9 Bauer's (1993) comments on reduplication

Bauer (1993) also comments on reduplication in a section entitled Derivational Morphology. She notes that it is one of the major types of word formation in Maori, where there still are many questions to be answered, both in formal and in semantic terms (Bauer 1993:525).

Bauer suggests the classification of reduplication into a partial/complete distinction as advocated by Biggs (1969:107), and others before him, fails to take account of base shape. She also notes her previous classification initial/final reduplication fails to account for all observed patterns of reduplication (Bauer 1993:525).

Bauer notes that for two morae stems, partial-initial and complete reduplication account for most forms, but there are a few forms in Williams (1971) that must be analysed as partial final forms. A possible example of this is:

- (20) *anga* 'face, turn to' *anganga* 'respect'

Williams (1971) gives *anganga* with the definition of 'aspect'. It is possible that is an example of a nominalisation, e.g. *anga -nga* (cf. *-Canga*), rather than a reduplication. One other possible example is:

- (21) *pakaka* (cf. *paka, pakapaka*) 'dried, baked'

However Biggs, in his comparative Proto-Polynesian reconstructions (POLLEX) lists the above as two separate lexical items, i.e.

- | | | | |
|------|-----|----------------|-------------------|
| (22) | PPN | <i>*pakaka</i> | ‘dried, stiff’ |
| | PEP | <i>*paka</i> | ‘dried, scorched’ |

For patterns of three morae stems Bauer follows Harlow’s (1991) four patterns.

In semantic terms, Bauer notes partially reduplicated two morae stems have the following meanings: - distributive plural, diminished intensity, no change, frequentative and other³². She adds (1993:526) with two morae stems, complete reduplication can be found with the same meanings, except for distributive plural. Bauer’s comment on distributive plural turns out to be false. Note the use of complete reduplication of two morae stems to indicate distributive plural in the following examples from Moorfield:

Kua hokihoki ngā tamariki ki ō rātou kāinga.

The children have returned (independently) to their various homes.

Kua taetae mai ngā manuhiri.

The visitors have begun arriving (separately). (Moorfield 1991:68)

Bauer notes that as with two morae stems, three morae stem patterns are not associated with different meanings. Bauer states “Harlow found in Williams’s dictionary the following numbers of forms: pattern 1: 27; pattern 2: 9; pattern 3: 33; pattern 4 :21” (1993:526,527). This turns out to be very misleading. Harlow (1991) states the list in his appendix is not exhaustive for pattern 4. His data simply illustrates examples of his patterns. A quick look at data I have collated shows Williams (1971) lists well over 700 pattern 4 reduplications. The meanings associated with Harlow’s patterns according to Bauer are:

;

³² Other means the reduplicated form appears not closely related in meaning to its simplex.

Pattern 1

(i) transitive, eg.

<i>pa^ka^ru</i> ³³	‘broken’	<i>pa^a^ka^ru</i>	‘break in pieces’
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(ii) nominalization, eg.

<i>ta^ka^i</i>	‘wrap up’	<i>ta^a^ka^i</i>	‘bandage (noun)’ ³⁴
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(iii) no change, eg.

<i>mo^hu^a</i>	‘yellowhead’	<i>mo^mo^hu^a</i>	‘id.’
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(iv) other, eg.

<i>ma^o^a</i>	‘cooked, ripe’	<i>ma^ma^o^a</i>	‘steam’
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Pattern 3

(i) intransitive, eg.

<i>ho^ro^i</i>	‘wash’	<i>ho^ro^ho^ro^i</i>	‘wash, shower (intr.)’
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(ii) adjective, eg.

<i>ta^we^e</i>	‘noise’	<i>ta^we^ta^we^e</i>	‘noisy’
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(iii) no change, eg.

<i>pa^ke^e</i>	‘creak’	<i>pa^ke^pa^ke^e</i>	‘id.’
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(iv) frequentative, eg.

<i>*³⁵ha^pa^i</i>	‘lift up’	<i>ha^pa^ha^pa^i</i>	‘id. freq.’
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(v) other, eg.

<i>*wha^nga^i</i>	‘feed’	<i>wha^nga^wha^nga^i</i>	‘charm’
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Pattern 4

(i) diminished intensity, eg.

<i>ma^ra^ra</i>	‘scattered’	<i>ma^a^ra^a^ra^ra</i>	‘rather scattered’
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(ii) no change, eg.

<i>?ma^to^ru</i>	‘benumbed’	<i>ma^a^to^ru^to^ru</i>	‘benumbed’
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(iii) frequentative, eg.

<i>*pa^ta^i</i>	‘ask’	<i>pa^a^ta^i^ta^i</i>	‘to ask frequently’
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(iv) other, eg.

<i>*wha^nga^i</i>	‘feed’	<i>wha^a^nga^i^nga^i</i>	‘food to send visitors on their way’
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(Bauer 1993:526,527)

³³ ^ indicates a mora boundary.³⁴ Some dialects have only *takai* with both meanings.³⁵ * here means the unattested simplex with attested reduplication patterns.

The first point to note is that my informants claim that *horohoro* can be used as transitive verb implying plurality. The second point is that Bauer (1993) does not comment on Harlow's pattern 2 due to an apparent lack of data. Thirdly, from the description above, one must assume that Bauer does not regard the lengthening of the antepenultimate vowel in a restricted number of kinship terms (re. *tangata* 'man' *tāngata* 'men') to express plurality as an example of reduplication. Authors such as Biggs (1969) and Hohepa (1967) regard such a process as reduplication. Finally, meanings of reduplication lacking in Bauer's description of reduplication are repetitiveness (Moorfield 1989:68), and reciprocal action (Williams 1971:xxxiv).

1.6.9.1 Reduplication in the coining of new words

Bauer (1993:528) also briefly comments on the use of reduplication in the coining of new words³⁶, by organisations such as Te Taura Whiri³⁷. She notes "all reduplications in this material have one form: for two morae bases, complete reduplication; for three mora bases, Harlow's pattern 4" (Bauer 1993:528). However, some two morae bases in Te Taura Whiri's wordlists do not undergo complete reduplication:

(23) <i>nihō</i>	'tooth'	<i>niniho</i>	'dentine of tooth' (Te Matatiki 1992)
		<i>niniho</i>	'toothed' (He Muka 5:3 1992)
<i>roha</i>	'spread out'	<i>roroha</i>	'elastic' (Te Matatiki 1996)
<i>ranu</i>	'mix'	<i>raranu</i>	'mixture' (Te Matatiki 1996)

Some three morae stems have reduplication patterns other than Harlow's pattern 4.

(24) <i>pohū</i>	'explode'	<i>popohū</i>	'bomb' (Te Taura Whiri 1994)
<i>pāho</i>	'be noised abroad'	<i>pāpāho</i>	'broadcast' (Te Matatiki 1996)
<i>pūoru</i>	'sound'	<i>pūpūoru</i>	'xylophone' (Te Matatiki 1992)

She adds, semantically all seem³⁸ to be frequentatives. Bauer states that there are two grammatical classes, those whose outputs are principally verbal, and those whose outputs are principally nominal and she adds all verbal forms are potentially nominal. However,

³⁶ A comprehensive list of new Maori words created by various government agencies can be found at the following Internet address: <http://www.dia.govt.nz/dia/general/dictionary/maori>.

³⁷ Te Taura Whiri i te Reo Māori (Māori Language Commission).

³⁸ I am not sure whether Bauer is referring to coinages from Te Taura Whiri only, or other organisations as well.

reduplication has been used in new coinages to create adjectives (e.g. *niniho* ‘toothed’).

Some recent new coinages have been created by non-native speakers of Maori. In my opinion, the use of reduplication in new coinages is unlikely to shed any light on traditional uses of reduplication in Maori.

1.6.9.2 Further comments on the phonology of reduplications

Bauer (1993) notes two observations on the phonology of reduplicated words which require comment. The first comment relates to syllabification of medial clusters. Bauer gives two examples of reduplications being syllabified, ignoring morphological boundaries:

In the following forms, morphological boundaries are, however ignored:
haaereere ‘dup³⁹ of haere’ *haae.ree.re* cf. *haa.ere.ere*
 and it is not uncommon to hear the /e/ of the first syllable dropped, giving
haa.ree.ree
 Similarly,
Pungaereere ‘name of a stream’ *Puu.ngae.ree.re* cf. *Puungaere.ere*.
 (Bauer 1993:551)

It is also not uncommon to hear the /a/ of the first syllable of *haaereere* shortened giving *hae.ree.re*. The Ngata dictionary (1993) lists *haerēre* ‘go out’, but *hāereere* ‘meander’, ‘stroll’, ‘roam’, ‘rove’, ‘wander’. Either *haerēre* is a mistake, or a phonological illustration of *hāereere*. Another example of morpheme boundaries being ignored is *māeneene* ‘soft, smooth’. My informants pronounce this as *maae.nee.ne*.

The second point made by Bauer is on stress in reduplicated forms:

Partial reduplications appear to follow the stress rules for monomorphemic words:
 'nui ‘big’ 'nunui ‘dup of big’
 'kino ‘bad’ 'kikino ‘dup of bad’

However, some uncertainty exists over this, because the forms most commonly heard (*papai* ‘good’, *nunui* ‘big’) both have final diphthongs, are thus subject to dialectally variable stress, so that one hears *nu'nui*, which could be interpreted as a retention of stress as on the simple base.

Two mora reduplications receive stress on both parts:

'muhu'muhu ‘muttering’

Biggs (1969:133) says that the first stress is heavier than the second, i.e.,

³⁹ ‘dup’ means reduplication.

'muhumuhu 'muttering'

but in my data, that is not clearly the case: there are instances which appear to have stronger stress on the second element, and many cases where the stress appears to be equal.

In the other common pattern of reduplication (Harlow's Pattern 4), all three units receive stress, but various patterns of primary and secondary stress are heard. The commonest pattern seems to be

pa:'tai,tai 'to question repeatedly'

ma:'hara,hara 'remember'

but there are tokens where the initial syllable appears to receive primary stress in addition to the primary stress on the second syllable, and other cases where the first syllable appears to receive primary stress and the remaining elements receive equal secondary stress. (Bauer 1993:575,576)

I agree with Bauer that the most common stress pattern of Harlow's pattern 4 is exemplified by:

(25) ,kaa'rae,rae 'shark'

Where main stress is the second syllable, as above. One example of another stress pattern produced by one of my informants is:

(26) 'maae'nee,ne 'soft, smooth'

The above forms were elicited by informants reading sentences of Maori. There may be a variation in normal speech to the form given in (26). There may be also be variation from individual speakers and across dialects.

Harlow's (1994) paper on syllabification in Maori phonology also mentions stress patterns on some reduplications elicited from one informant. He notes:

heavy syllables arising through resyllabification in reduplicated forms or in word sequences in phrases can be seen to attract stress away from the stress position in simplices or words in isolation. (Harlow 1994:5)

Examples cited include:

e'keeke < 'eke
 i'hiihi < 'ihi
 o'hooho < 'oho
 u'ruuru < 'uru (Harlow 1994:7)

Harlow notes some raising pairs like *oi*, *ou* and probably *ei* show variation in application of stress by his informant. This is exemplified by:

'utouto, u'touto < 'uto (Harlow 1994:7)

However, my informants pronounce a word like *pīataata* 'shine' as *ˌpɪiɑ'tɑɑˌtɑ*, but *kōutuutu* 'ladle' is pronounced as *ˌkoo'utuˌutu*. The variation in how individual speakers apply stress to different reduplications or what variations that exist across dialects are areas that require further investigation.

In conclusion, although modern works have been progressively improving in their descriptions of reduplication in Maori, none of those works has fully covered all the attested data. Lacking also are complete accounts of the semantic functions of reduplication in Maori. Harlow (1991) can be considered as the main analytical study of reduplication and the first attempt to explain the occurrence of some otherwise puzzling aspects of the phonology of reduplications in Maori. Harlow's attempt has prompted analyses of reduplication in Maori within generative frameworks. I will examine these in the next chapter.

2 Recent approaches to reduplication in Maori within a Generative framework

2.1 Introduction

This chapter examines reduplication in Maori within a generative framework. Of particular interest are very recent two attempts to describe and analyse reduplication in Maori using insights gained by ‘Optimality Theory’ defined by McCarthy and Prince (1993, 1994), and Prince and Smolensky (1993).

I begin by defining the units of reduplication in Maori. Then I attempt to explain reduplication in Maori under a template analysis as proposed by Marantz (1982), followed by a critique of the two recent attempts to analyse reduplication in Maori within the framework of Optimality Theory (OT) .

2.2 Units of reduplication in Maori

I have already noted Bauers’s claim (1981) that the mora (C)V, not the syllable (C)V(V) is the unit used in rules of word division such as reduplication. In this section I will attempt to describe in prosodic terminology the units of reduplication in Maori.

2.2.1 *The minimum unit is CV not (C)V*

I propose that the minimum unit of reduplication in Maori is CV, not (C)V as suggested by Bauer (1981).

A number of authors, such as Biggs (1969) and Hohepa (1967) claim that the plural form of certain kinship terms¹ (derived by lengthening the antepenultimate vowel) are examples of internal reduplication. I consider this process vowel lengthening rather than reduplication. The plural forms of kinship terms derived by vowel lengthening are a small and restricted² group. This method of deriving plural forms of kinship terms appears to be lexicalised. The same process does not be apply to Maori kinship terms derived from English, e.g.

¹ I have only found one example of antepenultimate vowel lengthening (to indicate a morphological category) that is not a kinship term “A general engagement is called **kakari**; one between two persons, **kākari**” (Williams 1971:101).

² Restricted in the sense that the kinship term must be polyvocalic.

- (27) *kaihana* **kaīhana* ‘cousin’
 karani **kārani* ‘granny’

Reduplication in Maori is a productive process and readily applies to new words borrowed from English (examples are given in chapter 3).

Williams (1971) lists a number of minimal pairs of words as possible examples of reduplication of (C)V, i.e.

- (28) *mara* ‘term of address, food prepared by steeping in fresh water’
 māra ‘plot of ground under cultivation, farm’
 mahu ‘cicatrised, healed’
 māhu ‘ceremony for removing tapu, steamy’
 anini, ānini ‘giddy, aching’

Minimal pairs, such as above, seem to either derive from different bases or have no difference in meaning. These may be considered examples of reduplication in the broadest sense of the term reduplication. However, I suggest in terms of economy of description there are advantages in using the term reduplication to describe the reduplication of prosodic units as opposed to vowel lengthening as in (28).

On this basis I suggest that the minimum unit of reduplication in Maori is CV. This minimum unit, and other units of reduplication in Maori are based on prosodic criteria. I have not found examples of reduplication in Maori where (C)V rather than CV is the minimum unit of reduplication.

Other evidence that CV rather than (C)V is the minimal unit comes from reduplications of bases of the shape VCV. Bases of the shape VCV undergo complete reduplication VCVVCV. I have not yet found examples of forms such as * V_1V_1CV or * VCV_2-V_2 (deriving from a VCV base) in Maori that I consider to be reduplication.

It is crucial to note that the maximum length (or weight) of any template is only two morae. This excludes vowel lengthening which accompanies certain types of reduplication already noted in chapter 1. The templates in table 2 can cover reduplication data deriving from stems of more than two morae. However there are differing viewpoints⁶ on how these templates are affixed to their associated stems.

Some Polynesian languages⁷ permit reduplication of more than two morae. Note the following examples:

(30)	<i>aūe</i>	<i>aūeūe</i>	‘bitter, lament’ (SAM)
	<i>'aere</i>	<i>'aere'aere</i>	‘go, walk’ (RAR ⁸)
	<i>'āpa</i>	<i>'āpa'āpa</i>	‘be half full divided into halves’ (RAR)
	<i>āngi</i>	<i>āngiāngi</i>	‘very thin, fine’ (RAR)
	<i>fa'amāi</i>	<i>fa'amāimāi</i>	‘too salty’ (SAM)
	<i>ma'ata</i>	<i>ma'atama'ata</i>	‘majority, bulk’ (RAR)
	<i>ūe</i>	<i>ūeūe</i>	‘to cry weep, lament etc.’ (HAW)

Hawaiian and Rarotongan both permit reduplication of four morae in some words. As in the following examples:

(31)	<i>āmū</i>	<i>āmūāmū</i>	‘to trim shear, shave’ (HAW)
	<i>mūmū</i>	<i>mūmūmūmū</i>	‘pile together’ (RAR)
	<i>pīpā</i>	<i>pīpāpīpā</i>	‘alongside, as of a road’ (HAW)
	<i>tūkē</i>	<i>tūkētūkē</i>	‘different, various’ (RAR)

It is clear that Maori reduplication in terms of length or weight of reduplication templates is much more restricted than in other Polynesian languages. A full comparison of reduplication in Polynesian languages is beyond the scope of this thesis.

⁶ These viewpoints will be discussed later in this chapter.

⁷ There is a lack of very recent Polynesian dictionaries with very accurate designation of vowel length.

⁸ All Rarotongan examples are from Buse (1995).

2.3 Segmental templates of reduplication

Linguists such as McCarthy (1981) and Marantz (1982) have proposed a CV template morphology model for accounting for reduplication based on a morphological model used by McCarthy to describe Arabic root morphology. Authors using a CV template model to describe reduplication, consider reduplication simply to be the affixation of a CV template to the stem. Broselow and McCarthy (1983:25) suggest “reduplication is a special case of ordinary affixational morphology, where the affixes are phonologically underspecified, receiving their full phonetic expression by copying adjacent segments”. Reduplication in this definition is a special case because the affix has no phonetic content of its own. The template affix must borrow or realise phonetic content from the adjacent stem.

Marantz (1982) outlines a CV template model to account for reduplication. In this model, a language will specify the shape of the reduplicative affix. The affix will be either an independent template consisting of a string of segmental (CV) elements in the case of partial reduplication, or a whole morpheme in the case of complete reduplication. The empty CV template is either prefixed, infixes or suffixed (to the stem). The CV template slots are filled by first copying the whole base melody and then mapping that base melody on to the CV template. Marantz (1982) terms the association of the copied melody to a CV template a ‘phoneme driven process’. This means phonemes actually fill the CV template in a systematic manner, by attempting to associate to the CV slots in a one to one correspondence. A ‘segmental tier’ joins each associated phoneme to a CV slot. The association takes place from either right to left or left to right. Finally all unassociated elements are discarded.

In the Maori example *nonoke* ‘struggle together, wrestle’ below, the reduplicative affix is prefixed to the stem and association proceeds from left to right:

(32) Left-to-right association

Affixation	Melody Copying	Association	
n o k e	n o k e	n o k e	n o k e
CV + CVCV →	CV + CVCV →	CV + CVCV →	CV + CVCV
			= nonoke

Right-to-left association does not yield the correct forms, e.g.

(33) Right-to-left association

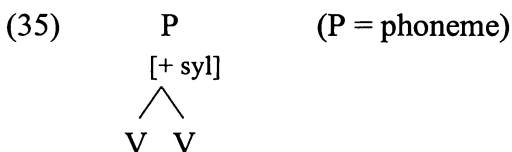
Affixation	Melody Copying	Association	
n o k e	n o k e	n o k e	n o k e
CV + CVCV →	CV + CVCV →	CV + CVCV →	CV + CVCV
			= *kenoke

An example of complete reduplication, under Marantz (1982) is *nokenoke* ‘broken, rough of the surface’:

(34) Left-to-right association

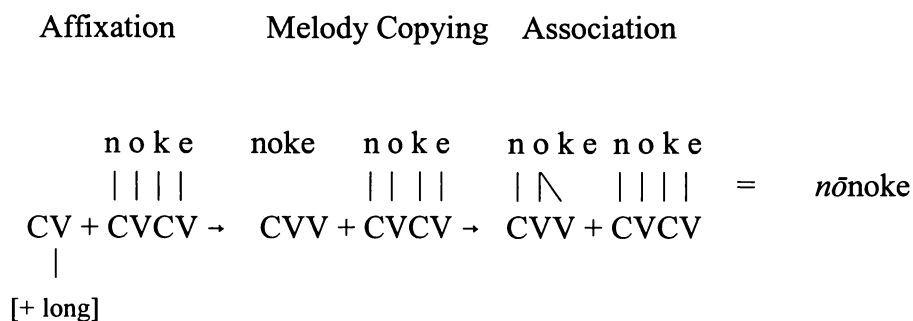
Affixation	Melody Copying	Association	
n o k e	n o k e	n o k e	n o k e
CVCV + CVCV →	CVCV + CVCV →	CVCV + CVCV →	CVCV + CVCV
			= nokenoke

The word *nonoke*, has *nōnoke* as an alternative form. In order to account for this under Marantz’s (1982) model we need to propose a template affix of the shape CV [+long]. Marantz admits (1982:451) that the use of the feature [± long] is somewhat problematic. He adds within the tiered phonology framework (assumed in his model) long vowels may be analysed as a single [+syl] phoneme linked to two V slots at the skeletal tier:



A possible account of *nōnoke* is outlined below:

(36) Left-to-right association



Under Marantz's approach, there must be three distinct processes (i.e., three different CV templates) to account for reduplication patterns attested originating from bimoraic stems of the shape CVCV. Bimoraic stems of the shape VCV, only undergo complete reduplication. This means in the case of VCV stems, the only process available is a full stem copy.

Marantz (1982) suggests his model can also handle internal reduplication. He notes that the details of handling internal reduplication remain to be worked out. Marantz gives an example from Samoan, pointing out that the correct location of the prefix must be specified. The example is as follows:

Samoan plural forms

singular	plural	
----------	--------	--

<i>alofa</i>	<i>alolofa</i>	‘love’
<i>galue</i>	<i>galulue</i>	‘work’
<i>malii</i>	<i>maliliu</i>	‘die’

$\begin{array}{c} \text{a} \\ \\ \text{V} + \text{CV} \end{array} +$	$\begin{array}{c} \text{l o f a} \\ \\ \text{CVCV} \end{array} \rightarrow$	$\begin{array}{c} \text{a} \quad \text{l o f a} \\ \quad \\ \text{V} + \text{CV} \end{array} +$	$\begin{array}{c} \text{l o f a} \\ \\ \text{CVCV} \end{array} =$	<i>alolofa</i>
--	---	---	---	----------------

(Marantz 1982:453)

Unfortunately Marantz's Samoan data⁹ are incorrect. The correct forms are:

⁹ A number of other authors also give incorrect examples of Samoan plural forms, e.g. Broselow and McCarthy 1983, McCarthy and Prince 1990, and Levelt 1991.

(37) singular plural

alofa *ālolofo* ‘love’

galue *gālulue* ‘work’ (Mosel and Hovdhaugen 1992:223)

It is not clear how exactly Marantz’s model would account for forms such as *ālolofo* and *gālulue*. One possibility is to propose a post-reduplicative rule that lengthens the initial vowel in the forms such as the Samoan plurals. The same approach could be used to account for similar data in Maori, e.g. Harlow’s pattern 2 (*mānenei*, cf. *manei*) and pattern 4 (*hāngorongoro*, cf. *hangoro*).

Another problem for Marantz’s model is that one pattern of reduplication in Maori depends on the shape of the base. Words of form VCV always undergo complete reduplication, e.g.

(38) singular plural

uta *utauta* ‘load’

Finally, Polynesian languages permit reduplication of vocalic words, e.g.

(39) *ūe* *ūeūe* ‘to cry weep, lament etc.’ HAW

To account for the above under a CV template analysis requires positing a number of empty C slots.

Marantz’s model has lost support among linguists for a number of reasons. Kenstowicz (1994:624) notes characterising reduplication templates as skeletal C and V slots allows for many more possibilities than seem to occur in languages. McCarthy and Prince (1986) suggest the reduplicative affix is not a series of CV templates, rather the affix is derived from prosodic categories including the mora, the syllable, and the foot. Subsequent work by McCarthy and Prince (1990), Prince and Smolensky (1993), and others has become known as Optimality Theory.

2.4 Optimality Theory

McCarthy and Prince (1994) describe Optimality Theory (Prince and Smolensky 1993) as having five basic tenets:

(40) Principles of Optimality Theory

- a. **Universality** UG provides a set *Con* of constraints that are universal and universally present in all grammars.
- b. **Violability** Constraints are violable; but violation is minimal.
- c. **Ranking** The constraints of *Con* are ranked on a language-specific basis; the notion of minimal violation is defined in terms of ranking. A grammar is a ranking of the constraint set.
- d. **Inclusiveness** The constraint hierarchy evaluates a set of candidate analyses that are admitted by very general considerations of structural well-formedness.
- e. **Parallelism** Best-satisfaction of the constraint hierarchy is computed over the whole hierarchy and the whole candidate set. There is no more serial derivation.

The above principles specify how a grammar is organised. McCarthy and Prince suggest that UG (Universal Grammar) must minimally provide the following:

Con. The set of constraints out of which grammars are constructed.


Gen. A function defining, for each possible input *i*, the range of candidate linguistic analyses available to *i*.

Eval. A function that comparatively evaluates sets of forms with respect to a given constraint hierarchy Γ , a ranking of *Con*. (McCarthy and Prince 1994:4)

The function *Gen* produces forms or candidate sets for evaluation by *Eval*. *Eval* ranks a set of candidates in terms of a constraint hierarchy that is language specific. The candidate which best satisfies or minimally violates the grammars constraint hierarchy is considered the *optimal* candidate. Hence the construction of a grammar in OT is simply a matter of determining the proper ranking of constraints.

OT constraint ranking tableaux are used as a calculation device. A typical tableau based on McCarthy and Prince (1994) is given below:

(41) Constraint Tableau, $A \gg B$,

Candidates	A	B
 cand 1		*
cand 2	*!	

In the above tableau Gen supplies the two candidates cand 2 and cand 1. The constraints A and B disagree on these candidates, A which is obeyed by cand 1 is considered optimal, therefore constraint A must dominate constraint B. This is shown by $A \gg B$. Constraints are shown in domination order (from left to right). A blank cell indicates satisfaction of a constraint. Violation marks are indicated by *. The optimal candidate is indicated by \mathcal{E} and a fatal violation of a constraint is indicated by !. A fatal violation results in a candidate's nonoptimality. It highlights the point where the candidate loses to other more successful candidates. Cells are shaded to indicate their irrelevance.

2.4.1 Correspondence Theory in OT

Correspondence Theory is an example of the application of OT to the analysis of linguistic data, in this case reduplication data. McCarthy and Prince (1994) give examples of constraints that govern the near identity relationship between a reduplicated string and the base it copies. They note these are intended to supplant the copying and association rules in operational theories such as Marantz (1982). They begin by noting that the “*reduplicant*¹⁰ *R* is the actual phonological projection of a reduplicative morpheme RED which has a phonologically-unspecified lexical entry. The *Base B* is the phonological material to which the reduplicant is attached - for reduplicative prefixes the following structure and for reduplicative suffixes the preceding structure” McCarthy and Prince (1994:6). They add, these terms, reduplicant (*R*) and base (*B*) refer specifically to structures present in candidate output forms, i.e. they are not characteristics of input forms. McCarthy and Prince (1994) note each pair (*R*, *B*) comes equipped with a *correspondence* relationship that expresses the dependency between the elements of *R* and *B*. They also note that the correspondence relationship is subject to evaluation by a set of reduplicative constraints. Correspondence need not always be perfect and is often merely a relationship between *R* and *B* rather than a function from one to the other. Sometimes there are elements in either *R* or *B* that do not result from correspondence.

¹⁰ In OT the reduplicated string is usually termed the ‘reduplicant’.

McCarthy and Prince (1994) state that the goal of correspondence theory is to explain what reduplicative structures are possible and rule out those that are not grammatically possible.

They suggest two fundamental (B and R) correspondence constraints reflecting the relationship between B and R. These two constraints must be met and therefore are considered in Gen. The constraints are given below:

(42) **Identity**

Correspondents are identical.

Linearity

R reflects the precedence structure of B, and vice versa.

Identity defines the correspondence relation between R and B, i.e. an element of R must be phonologically identical to a element of B. Linearity ensures distinctiveness of elements between and R and B. Two elements of R cannot correspond to a single element of B and vice versa. Linearity prohibits metathesis.

McCarthy and Prince (1994) note that there are other constraints on the reduplicant and base relationship which may be violated, and therefore are considered to be part of Con. Other constraints are classified into two groups, “those that deal with the structural integrity or *quality* of the reduplicant as a string, and those that deal with the extent of correspondence between base and reduplicant, the *quantity* of the copy” McCarthy and Prince (1994:8).

The pair of constraints which deal with quality are as follows:

(43) **Anchoring**

The left (right) peripheral element of R corresponds to the left (right) peripheral element of B.

Contiguity

Correspondence is a function from a contiguous string B to a contiguous String R.

Anchoring preserves alignment. Contiguity ensures that elements in B are not skipped and it forbids the intrusion of foreign elements inside R. An example of the skipping of elements

in B, is the hypothetical * $p_1a_2t_3u_4-p_1a_2tn_3u_4di$, i.e. **n** is skipped. An example showing the intrusion of a foreign element (**n**) in R, is the hypothetical * $p_1a_2tn_3u_4-p_1a_2t_3u_4di$. McCarthy and Prince (1994) suggest these two aspects of Contiguity constraint can be expressed as:

- (44) a. **No Skipping in B.** Any element of B lying between elements of B with correspondents in R must itself have a correspondent in R.
- b. **No Intrusion in R.** Any element of R lying between elements of R with correspondents in B must itself have a correspondent in B.

The constraints which deal with quantity are given below:

(45) **Max**

Every element of B has a correspondent in R.

Base-Dependence

Every element of R has a correspondent in B.

McCarthy and Prince (1994:9) add that complete satisfaction of Max is attained in complete reduplication. Partial reduplication will necessarily violate Max, and forced violations will prove to be common. Complete satisfaction of Base-Dependence is observed when the reduplicant exactly copies a substring of the base. This constraint is violated when non-base material appears in R. McCarthy and Prince give an example of a Base-Dependence violation form Makassarese, e.g. *manaʔ-manara*.

McCarthy and Prince (1994) note each constraint covers a particular aspect of reduplicant/base identity. They add “all are connected with earlier proposals about reduplication (Marantz 1982, McCarthy and Prince 1986) and with principles of autosegmental phonology generally (Goldsmith 1976, Clements and Ford 1979, McCarthy 1979)”.

Meyerhoff and Reynolds (1996) have attempted to account for reduplication data in Maori using McCarthy and Prince’s (1994) framework outlined above. This account is discussed in the following sections.

2.4.2 Stress in Maori according to Meyerhoff and Reynolds (1996)

Meyerhoff and Reynolds (1996) begin their OT analysis of reduplication in Maori with an account of the stress system in Maori within an OT framework. Their approach suggests stress plays a crucial role in determining the optimal outputs for all types of Maori reduplication. Meyerhoff and Reynolds (1996:2) note that Maori, like the majority of Austronesian languages, parse words into quantity sensitive trochaic feet. However unlike most languages in this family feet in Maori are formed from left to right, rather than from the right edge of the word. They also suggest that main stress falls on the head of the leftmost foot in a word, and secondary stress on the head of each following foot (with degenerate feet being disallowed). The fact that this description does not cover dialects that stress certain sequences of diphthongs rather than the head of the leftmost foot is noted, but ignored in their analysis. An example of this variation is:

(46) *tinei* ‘extinguish’ which may be stressed as both *ˈti.nei* and *ti.ˈnei*.

In OT terms¹¹, Meyerhoff and Reynolds characterize the stress system in Maori as:

RhType=T: Feet are trochaic.

RhHarmony: *(HL).

FtBin(μ): Feet are binary at some level of analysis (here, moraic).

Egdemost(Ft',L): The head of the leftmost foot of a word receives primary stress.

Parse- σ : Syllables are parsed into feet.

(Meyerhoff and Reynolds 1996:3)

Meyerhoff and Reynolds (1996) suggest that the first three of these constraints are unviolated in Maori. Feet are always trochaic and bimoraic (heavy-light syllables may not form feet, *(HL)). The FtBin(μ) constraint ensures feet are binary at some level of analysis. This means feet are bimoraic¹². The constraint Parse- σ bans degenerate feet. The constraint FtBin(μ) must crucially be seen to dominate Parse- σ in order to capture the effect of a general ban on degenerate feet¹³. (as can be seen from trimoraic words such as «*i.na.nga* ‘whitebait’, i.e. this form should be «*i.na.››nga*). Meyerhoff and Reynolds also note outcomes such as *ku.‹‹rii*

¹¹ Based on Prince and Smolensky (1993:38).

¹² Under this analysis a foot (in Maori) may be bisyllabic, but must still be bimoraic.

¹³ Primary-stressed feet are indicated by two sets of doubled angled brackets.

‘dog’ and *a«paa»ra.ngi* ‘group of noble people’ require that RhType=T dominate Edgemost (Ft’,L). Meyerhoff and Reynolds (1996) suggested the ordering of this subset of constraints based on their description of stress can be shown as:

RhType=T, RhHarmony, FtBin(μ) >> Edgemost(Ft’,L), Parse- σ

(Meyerhoff and Reynolds 1996:3)

It must be remembered that this account of stress is ‘idealised’, only sufficient for some dialects of Maori and will not account for stress variations mentioned discussed in section 1.6.9.2.

2.4.3 Maori reduplications patterns according to Meyerhoff and Reynolds (1996)

Meyerhoff and Reynolds (1996) claim reduplication in Maori takes the form of either one- or two morae prefixes or suffixes to the base. This is false. I have not found any clear examples of one mora suffixes to bimoraic bases or trimoraic stems. They only offer one dubious example *tarahaha* ‘hawktrap’ of which I have not yet found any reliable textual samples.

They also state that:

Apparent instances of internal reduplication are few and turn out to be ephemeral; in all cases they can be attributed to right- or left edge reduplication prior to lexical compounding or the affixation of a bound morpheme additional to the reduplicant. (Meyerhoff and Reynolds 1996:3)

This statement is highly questionable. There are a number of examples of apparent internal reduplication, i.e., Harlow’s (1991) pattern 2 which cannot be explained in the above manner. Examples include *tāweweke* ‘slow, dilatory’ (cf. *taweke* ‘linger’) and *pānonoko* ‘a fish’ (cf. *panoko*, ‘a fish’). I do not agree that these are forms are ‘ephemeral’. These examples are well entrenched in the lexicon of Maori.

2.4.4 Maori reduplication in OT according to Meyerhoff and Reynolds (1996)

One of the objectives of Meyerhoff and Reynold’s (1996) paper is to provide an alternative account of vowel lengthening as evident in Harlow’s pattern 4 reduplications of trimoraic stems. Meyerhoff and Reynolds (1996) claim that this type of vowel lengthening is not the result of consonant dissimilation as proposed by Harlow (1991). Rather, vowel lengthening

naturally results from ranking of constraints within an OT framework. In the following sections I outline Meyerhoff and Reynolds (1996) attempt to prove OT can account for the facts of reduplication in Maori.

Meyerhoff and Reynolds (1996) recognise the vast majority of cases of right-edge reduplication in Maori involve two-mora reduplicants; these two morae can, however, be either tauto- or heterosyllabic. They suggest the size and shape of this reduplicant in OT terms by means of two undominated constraints:

R=Sfx: R is suffixed onto the right edge of the B.

R=Ft $\mu\mu$: R is a bimoraic foot.

(Meyerhoff and Reynolds 1996:10)

Meyerhoff and Reynolds (1996) suggest that the constraints Anchoring and Contiguity are never violated. The right edge of the reduplicant always corresponds to the right edge of the base, and copying is always from a contiguous string to a contiguous string. They note that Max is satisfied in bimoraic bases such as *pakupaku*. In other examples such as *āwhiowhio*, trimoraic Max is violated accordingly. Finally, they suggest it appears that Base-Dependence is also unviolated.

Meyerhoff and Reynolds (1996) suggest the following constraint rankings will determine the optimal output for words such as *pakupaku* and *matapihipihi*.

R=Sfx, R=Ft $\mu\mu$, Anchoring, Contiguity, Base-Dependence >> Max

(Meyerhoff and Reynolds 1996:10)

This is demonstrated in the tableau¹⁴ :

¹⁴ The dotted line indicates the ranking between two constraints is not significant.

matapihi

Candidates	R=Sfx	R=Ft $\mu\mu$	Anch	Contig	Base-Dep	Max
☞ matapihi-pihi						*
mata-matapihi	*!					*
matapihi-matapihi		*!				
matapihi-tapi			*!			*
matapihi-pii				*!		*
matapihi-piThi		*!		*!	*!	*

(Meyerhoff and Reynolds 1996:11)

They note that the final candidate, with an epenthetic coda consonant (denoted by \mathbb{T}), is given an exclamation mark as a fatal violation of three different constraints. It is pointed out the final candidate also fails the No-Coda constraint which they claim, is never violated in Maori. At this point the relative ranking of constraints to each other is undetermined.

To rule out the candidate **matapihi-ih*, the constraint Onset¹⁵ must be invoked. Meyerhoff and Reynolds (1996) are aware onsetless syllables are permissible in Maori. They suggest that Onset is not an undominated constraint. The fact that the *āwhiowhio* is the optimal candidate for the reduplication of *āwhio* leads them to suggest that Onset must be ranked lower than Contiguity or Base-Dependence (they are unsure of the relative ranking of Onset to Max).

So far Meyerhoff and Reynold's (1996) analysis seems unproblematic. In order to account for a trimoraic stem, where the first vowel appears to be lengthened, a further constraint, Fill is invoked. The constraint Fill disallows parses with empty positions, i.e. epenthetic structure is prohibited. Fill is crucially dominated by the constraint Edgemost(Ft',L). Meyerhoff and Reynolds (1996) propose that the lengthened vowel is an effect of the reduplicant upon the base. They suggest that the domain in which Base-Dependence applies must be expanded to allow this domain to be sensitive to suprasegmental features such as stress.

¹⁵ Onset as expected, means syllables must begin with consonants.

Under Meyerhoff and Reynold's (1996) description of stress in Maori, a term such as *kohiko*, requires, where possible, that the head of the leftmost foot of a word receive primary stress. The constraint Edgemost(Ft',L) must be satisfied. They suggest the final syllable is not parsed into a foot as their constraint ranking specifies crucially that FtBin dominates Parse-σ. Thus the prosodic representation of *kohiko* is given below:

[[«ko.hi]_{Ft} ko]_{PrWd}¹⁶ (Meyerhoff and Reynold's 1996:12)

The “foot” which is copied as the reduplicant is not *kohi*, but rather *hiko*.

Meyerhoff and Reynolds (1996) claim that the constraint Base-Dependence also requires that the *suprasegmental* or *prosodic* content of the reduplicant be present in the base. If the suprasegmental content of the reduplicant is not present in the base this is a violation of Base-Dependence, but not Contiguity (which ignores the suprasegmental content). Therefore the surface form *kohiko-hiko* (the reduplicant is *hiko* due to the undominated constraints RhType=T and R=Ftμμμ) is in violation of Base-Dependence. They suggest that lengthening of the first vowel in the base will compensate for this violation at the expense of an additional mora in violation of Fill. They claim that Base-Dependence must crucially outrank Fill in the constraint hierarchy of Maori. Their revised constraint hierarchy is given below:

RhType =T, RhHarmony, FtBin(μ), R=Sfx, R=Ftμμμ, Anchoring, Contiguity,
No-Coda, Base-Dependence >> Edgemost(Ft',L), Parse-σ, >> Fill, Onset, Max

(Meyerhoff and Reynolds 1996:12)

Their example *kohiko* is given in tableau form (feet are indicated by angled brackets):

¹⁶ PrWd means prosodic word, which is composed of feet, which contain syllables, which in turn contain morae. Any PrWd must contain at least one foot. In Maori all lexical items consist of at least one PrWd.

kohiko

Candidates	No-Coda	Base-Dep	Edgemost	Fill	Onset
(««ko.hi)ko-(»»hi.ko)		*!			
☞ (««ko○)(»»hi.ko)-(»»hi.ko)				*	
(««ko△)(»»hi.ko)-(»»hi.ko)				*	*!
(««ko⊥)(»»hi.ko)-(»»hi.ko)	*!				
ko(««hi.ko)-(»»hi.ko)			*!		

(Meyerhoff and Reynolds 1996:13)

In the above tableau the ○ in optimal candidate ko○-hiko-hiko marks an epenthetic segment in the output. Thus the △ and ⊥ in the following two output candidates are used to denote the “classic” epenthetic vowel and consonant. The ○ of course does better than △ because, while any epenthesis constitutes a Fill violation, △ creates a new syllable as well.

Meyerhoff and Reynolds (1996) add the point that the undominated constraints RhType=T and R=Ft $\mu\mu$ also rule out any possible outcome in which the reduplicant is made to satisfy Base-Dependence as a result of iambic or non-bimoraic footing of some sort.


The above constraint rankings do not account for all trimoraic stem reduplication data in Maori. For example, accepting their stress analysis as satisfactory, in the case of trimoraic stems of the shapes CV₁V₂V₃ and CV₁V₂V₁ the desired candidate does not always emerge as the most optimal, as in the following examples:

(47) Base	Reduplicated forms	
<i>kaea</i>		<i>kāeaea</i>
<i>maio</i>		<i>māioio</i>
<i>peau</i>	<i>peapeau</i>	* <i>pēauau</i>
<i>riua</i>	<i>riuriua</i>	* <i>rīuaua</i>
<i>weia</i>	<i>weweia</i>	* <i>wēiaia</i>

Another point worth noting is that the appearance of doublets such as *wheawheau*, *whēauau* both stemming from *wheau* may pose problems for the constraint rankings outlined above by Meyerhoff and Reynolds (1996). It is not clear whether doublets as such can appear in the same tableau, and whether one form can be considered more optimal, i.e. violate fewer constraints than the other candidate.

Meyerhoff and Reynolds (1996) note that three morae bases which contain long vowels in the final syllable such as *pahū*, reduplicated as *pāhūhū*, cannot be accounted for by the expanded definition of Base-Dependence. They claim that their constraint ordering will yield the correct result, due to the fact that Fill is dominated by Edgemost(Ft',L), as in tableau below:

pahuu

Candidates	Base-Dep	Edgemost	Fill
pa(««hUU)-(»»hUU)		*!	
 (««paA)(»»hUU)-(»»hUU)			*

(Meyerhoff and Reynolds 1996:15)

Another group of reduplications mentioned in Meyerhoff and Reynolds (1996) are those in which the initial vowel appears to be shortened rather than lengthened:

- (48) *hāpai* 'lift' *hapahapai* 'lift (frequentative)'
hōkai 'far apart' *hokahokai* 'extend'
mōkai 'slave; pet' *mokamokai* 'tame bird/animal'
pātai 'ask' *patapatai* 'ask (frequentative)'
pōkai 'ball' *pokapokai* 'roll up'
pōtae 'encircling' *potapotae* 'roundabout'

It is suggested:

in these forms, we again have an instance of the phonological form of the base being affected by reduplication; this time, however, the initial vowel of the base is shortened rather than lengthened. Although the class itself is small, the words concerned are fairly high-frequency items of vocabulary. (Meyerhoff and Reynolds 1996:14)

It is difficult to determine on what basis they claim these particular items are fairly high frequency items of vocabulary. None of the reduplicated forms above in appear in Benton's (1981) Basic Word List.

It is claimed that these reduplicants are subject to an undominated constraint of the form shown in:


$R=Ft_{\sigma\sigma}$: R is a disyllabic foot.

(The constraints $RhType=T$ and $RhHarmony$ will ensure that this foot is also trochaic as well as bimoraic, i.e., that each syllable contains exactly one mora.)

(Meyerhoff and Reynolds 1996:14)

They note the constraint hierarchy for this reduplicant must be modified from one previously given (see page 52), i.e. the constraint $R=Ft_{\sigma\sigma}$ is given in place of $R=Ft_{\mu\mu}$ ($R=Sfx$ is changed to $R=Pfx$), and also they specify that Fill must dominate the constraint Parse. The results in the following tableau in:

haapai

Candidates	$R=Ft_{\sigma\sigma}$	Base-Dep	Fill	Parse
ha-hapai	*!			
(««haa)-(»»haa)(»»pa.i)	*!			
(««ha.pa)-(»»haa)(»»pa.i)		*!		
 (««ha.pa)-(»»ha< >.pa)i				*
(««ha.pa)-(»»ha.ɾpa)(»»pa.i)			*!	

(Note that here the winning candidate does not violate the constraint Base-Dependence, since stress and footing are the same in both the reduplicant and the base.)

(Meyerhoff and Reynolds 1996:15)

The stress is not the same on the reduplicant and base, i.e. *hāpai*, *hapaha ʔai*. They also fail to note that all members of this group (except *pōkai*) are all doublets. All have an alternative pattern of reduplication, i.e. a two morae suffix as in *pātaimai* (cf. *pātai*). It is unclear whether or not one of these candidates needs to be considered the optimal candidate. It could be

suggested that the two morae candidate is the preferred candidate on the basis that this pattern is much more productive. Another troublesome aspect of this example is there seems to be no obvious reason for claiming that this particular group has a bisyllabic prefix as opposed to a bimoraic prefix as in other examples.

In summary, I disagree with several of the claims made by Meyerhoff and Reynold's (1996) analysis of reduplication in Maori under Correspondence Theory. Their analysis of stress in Maori does not account for dialectal variation or cover all instances of stress application in Maori. I find no evidence to suggest that reduplication in Maori is both a suffixing and a prefixing process with respect to bimoraic bases. My data show prefixing can account for all bimoraic base reduplications. It seems unlikely that an expanded definition of the Base-Dependence allowing a suprasegmental feature transfer of stress to result in a lengthened initial vowel is the best way to account for the long vowels attested in Harlow's (1991) pattern 4 reduplications. To my knowledge, this interpretation of Base-Dependence has not been used to account for vowel lengthening in any other language. Vowel lengthening occurs in Maori outside reduplication and may be motivated from elsewhere in the grammar.

Meyerhoff and Reynold's (1996) attempt does not cover all reduplication data in Maori. This was never the aim of their paper. Their attempt offers an alternative and workable analysis for explaining for some intriguing reduplication patterns in Maori, in particular why apparent vowel shortening illustrated by *hapahapai* (cf. *hāpai*).

2.4.5 Maori reduplication in OT according to de Lacy (1996)

De Lacy (1996) also attempts to account for reduplication data in Maori using some aspects of Correspondence Theory within OT. This attempt differs from Meyerhoff and Reynold (1996) in a number of significant ways despite the fact that de Lacy is attempting to describe the same data within the same framework. De Lacy's attempt is discussed in the following sections.

One of the fundamental differences between the two approaches is the explanation given for the long vowels which appear in Harlow's pattern 4 of reduplication, e.g. *kōhikohiko* (cf. *kohiko*). Meyerhoff and Reynold (1996) claim the long vowel is a result of an expanded definition of the Base-Dependency constraint. De Lacy claims that the long vowel is a result of 'prosodic circumscription' and the realisation of the initial syllable as a stem which

introduces an extra mora. De Lacy notes that prosodic circumscription can explain other apparent vowel lengthening in Maori such as the appearance of initial long vowels in some passivised verbs, as illustrated in Harlow (1991).

Leaving aside de Lacy's formulation of prosodic circumscription for the moment, de Lacy's (1996:10) simplified description of reduplication in Maori is:

(49) Two morae stems

- | | |
|--|---|
| (a) σ_μ + Word/ Rightmost Ft | (e.g. <i>huhuti</i> , cf. <i>huti</i>) |
| (b) Ft + Word/ Rightmost Ft | (e.g. <i>pokipoki</i> , cf. <i>poki</i>) |
| (c) $\sigma_{\mu\mu}$ + Word/ Rightmost Ft | (e.g. <i>kookopu</i> , cf. <i>kopu</i>) |

Three morae stems:

- | | |
|---------------------------------|--|
| (a) σ_μ + Word | (e.g. <i>hohoata</i> , cf. <i>hoata</i>) |
| (b) σ_μ + Rightmost Ft | (e.g. <i>*taweweke</i> , cf. <i>taweke</i>) |
| (c) Ft + Word | (e.g. <i>meramerau</i> , cf. <i>merau</i>) |
| (d) Ft + Rightmost Ft | (e.g. <i>*matakutaku</i> , cf. <i>mataku</i>) |

In the above description reduplication in Maori is considered a prefixing process. The reduplicative prefixes (i.e. prosodic units) are prefixed to a word or the rightmost foot. In some cases above word and rightmost boundaries are the same thing. Two forms **taweweke* and **matakutaku* also have their initial vowel lengthened to *tāweweke* and *mātakutaku* respectively. De Lacy claims such vowel lengthening is due to his definition of 'circumscription' and the realisation of the initial syllable in such forms as a stem under a foot-binary constraint. The description of reduplication in Maori given by de Lacy will cover almost¹⁷ all of the attested reduplicated data.

To account for reduplication in Maori de Lacy draws on some aspects of correspondence theory¹⁸ and his own novel reinterpretation of a process termed 'circumscription'.

¹⁷ This description will not account for forms such as *kōkōreke* (cf. *koreke*).

¹⁸ De Lacy does not make it clear which particular model of correspondence theory is used as the basis for his constraints (see McCarthy and Prince 1995).

A basic outline of correspondence theory based on McCarthy and Prince (1993, 1994) was given in section 2.4.1. That particular model correspondence theory can be represented as:

Basic Model of Correspondence Theory

$$\begin{array}{l} \text{Input:} \quad /A_{\text{RED}} + \text{Stem}/ \\ \quad \quad \quad \updownarrow \text{I-O Faithfulness} \\ \text{Output:} \quad R \rightleftharpoons B \\ \quad \quad \quad \text{B-R Identity} \end{array}$$

(McCarthy and Prince 1995:4)

In the above model, constraints on Base-Reduplicant identity are evaluated in parallel with phonological constraints and with Input-Output faithfulness which demands the output be as close as possible to the input.

De Lacy (1996) suggests under correspondence theory the following constraints apply to Maori. When the reduplicant is a foot it can be considered to be a stem and is subject to the Foot-Binary constraint meaning the foot must be bimoraic. He claims in Maori there is pressure for PrWd and stem boundaries to coincide, hence the reduplicant must be dominated a PrWd, and functions as a template. De Lacy claims stress in Maori is assigned to the leftmost heavy syllable in a stem, otherwise to the leftmost syllable. This he claims can be expressed as an alignment constraint¹⁹ which implies that all feet stand at the edge of a prosodic word.

Other applicable constraints are Parse-Syllable constraint which means syllables are parsed into feet (i.e. degenerate feet are not permitted). He suggests the constraint Max-IO is also invoked to ensure every segment in the input has a correspondent in the output (as in the model above). Another constraint, Max-BR also applies to ensure that the base has correspondents for all elements in the reduplicant. De Lacy (1996) uses the terms Max-BRa and Max-BRb to refer to the one mora and two morae reduplicants respectively. He suggests the following ranking:

Linearity, Adjacent-BR, Affix, No-Coda, Left-Anchor >> Max-BRb >> No-Long-V >> Max-BRa (de Lacy 1996:16)

¹⁹ The notation used by de Lacy in his alignment constraint (1996:16) is not clear.

In the above Max-BRa cannot have a long vowel because it is ranked below the constraint No-Long-V. The constraint No Coda prohibits codas. Adjacent BR ensures the set of elements in the reduplicant and the set of elements in the base are a contiguous subset of the entire form. Linearity requires that the reduplicant precedence is that of the Base. De Lacy claims this prohibits metathesis²⁰. Left Anchor requires the leftmost elements of the reduplicant and base be in correspondence with each other.

De Lacy (1996) does not give any tableaux explaining how the above rankings ensure the optimal candidate surfaces. One obvious problem for the above rankings is that a number of trimoraic stems have reduplications of both one and two morae reduplicants illustrated by *kakanapa*, *kānapanapa* (cf. *kanapa*). The BRa form, *kakanapa* should be ruled out by the dominating constraint BRb.

The above constraint hierarchy will not account for reduplications such as *kōhikohiko*. To get around this problem de Lacy suggests ‘circumscription’ is needed. However, de Lacy’s formulation of circumscription is somewhat different to earlier definition given by McCarthy and Prince (1990).

Circumscription is a device proposed by McCarthy and Prince (1990) to describe certain processes including reduplication. In case of reduplication, phonological representations undergo rules of affixation and phonological change followed by a ‘reconstruction’ of the reduplicant in an output form. An example of this is the Samoan plural forms whereby the reduplicative affix is prefixed to a ‘circumscribed’ stressed foot (a trochee in Samoan). This illustrated below:

(50) <i>alofa</i> ‘love’	<i>ālolofo</i> ‘love, pl.’
<i>lofa</i>	(i) input
<i>lofa</i>	(ii) circumscribe trochee at right edge
σ - <i>lofa</i>	(iii) prefix σ
<i>lolofo</i>	(iv) match template
<i>alolofo</i>	(v) restore residue
<i>alolofo</i>	(vi) output

²⁰ Metathesis is attested in some reduplications in Maori, see chapter 4.

Note the correct form has a long initial vowel. Circumscription is no longer used to describe the above data. McCarthy and Prince (1993: 107,108) now suggest ranked constraints within correspondence theory to explain the same data. The relevant constraints are the Affix to Foot (Afx-to-Ft) constraint (Base is a foot) and Leftmostness. The Afx-to-Ft constraint is a prosodic constraint, however, leftmostness is a morphological constraint that characterises the prefixation of an affix to another morphological category, a stem. The ranking schema²¹ P (Prosody) >> M (Morphology) results in the constraint Afx -to-Ft dominating the constraint Leftmostness. The reduplicant is an Anchored, Contiguous substring of the base. The important point to note is that serial derivation such as circumscription is now redundant and not required to explain such data.

De Lacy (1996) uses the term circumscription in a different way. The full details of how exactly de Lacy's circumscription works is not explained in a clear or convincing manner. He suggests to account for reduplications such as *kōhikohiko* (cf. *kōhiko*), the base *hiko* is circumscribed. De Lacy suggests "as a preliminary approximation, circumscription of the base is a designation of a contiguous string of the base that is or can be part of some morphological or phonological constituent, where that designated substring is in a correspondence relation to some other substring (the reduplicant)" (de Lacy 1996:19). He describes circumscription as being subject to a subset of base constraints within correspondence theory. The circumscribed string is required to be a subset of the base, and vice-versa. There is no correspondence of elements between the subset and base, but Anchoring and Contiguity are still required. The reduplicant under circumscription may be a stem or affix, subject to alignment constraints.

Whether or not circumscription occurs is reliant on lexical choices made by the speaker. To allow circumscription (Cr) to occur it must be included in the input form, i.e. {[RED]_{af}[kōhiko]_s, [Cr]_s}. This means the items in the square brackets must appear as inputs (as in the basic model of Correspondence Theory given on page 65) in order to appear in the output form. If circumscription ([Cr]_s) is not part of the input the constraints relating to it will not apply. De Lacy suggests circumscription can be independent of reduplication. He notes (1996:23) "an input set such as {[pakaru]_s[Cr]_s} should be possible and does occur in Maori". De Lacy suggests that circumscription and a foot-binary constraint results in *pakaru* having

²¹ McCarthy and Prince (1993:138) suggest the role of prosody in morphology (within OT) can be subsumed under the a general relation of constraint ranking, P >> M.

pākaru as an alternative form²².

A foot-binary constraint is used by de Lacy as a possible explanation for vowel lengthening in reduplications. He suggests lengthening is a direct result of reinterpretation of morphological constituency, thus *matukutuku* [ma [Red.]s tuku]s is reinterpreted as [maa]s [Red.]s [tuku]s. Here *ma* is realized as a stem, all stems are subject to the foot binary constraint (must be minimally bimoraic), therefore *ma* is lengthened accordingly. De Lacy claims that a stem (i.e. a reduplicated stem) with a phonological set of elements is in correspondence with a morphological feature stem (i.e. a base) that must be dominated by a PrWd which forces lengthening. This process, he claims accounts for lengthening in the passive.

De Lacy notes that a number of words in Maori have alternative forms with initial long vowels. Examples of words which have alternative forms containing either an initial and final long vowel are given below:

(51) Word	Gloss
<i>aki ~ āki</i>	‘to encourage, urge on’ (Moorfield 1988:142,1989:150)
<i>anō ~ ānō</i>	‘as if, like’ (Moorfield 1989:150)
<i>aro ~ āro</i> ²³	‘know, understand’
<i>anini ~ ānini</i>	‘giddy, aching’
<i>ehara ~ ēhara</i> ²⁴	‘not’ (Moorfield 1992:178)
<i>engari ~ ēngari</i>	‘but on the other hand’ (Moorfield 1988:144)
<i>hāngi ~ hāngī</i>	‘earth oven’
<i>haro ~ hāro</i>	‘scrape’
<i>homai ~ hōmai</i>	‘give, bring’
<i>hou ~ hōu</i>	‘new, recent, fresh’
<i>inanga ~ īnanga</i>	‘whitebait’
<i>kahaki ~ kāwhaki</i>	‘remove by force, carry away’
<i>kakano ~ kākano</i>	‘seed’
<i>katote ~ kātote</i>	‘a tree fern’

²² Note that *pākaru* is a transitive verb and *pakaru* is a neuter verb. Thus, *pākaru* is not an alternative form of *pakaru*.

²³ I am unsure whether or not *aro ~ āro* derive from the same base.

²⁴ It is possible that lengthening of the initial vowel in both *ehara* and *engari* is only used for emphasis.

<i>kopipio</i> ~ <i>kōpipio</i>	‘roundabout, circuitous’
<i>korere</i> ~ <i>kōreere</i>	‘diarrhoea’ (Moorfield 1989:157)
<i>kuaka</i> ~ <i>kūaka</i>	‘godwit’
<i>kuata</i> ~ <i>kūwata</i>	‘long for, yearn, desire, love’
<i>maunu</i> ~ <i>māunu</i>	‘bait’
<i>maringinui</i> ~ <i>māringinui</i>	‘good fortune’
<i>pakeke</i> ~ <i>pākeke</i> ²⁵	‘hard, stiff, adult’ (not in Williams 1971 but does occur in modern Maori)
<i>parera</i> ~ <i>pāreera</i>	‘grey duck, north west wind’
<i>paroro</i> ~ <i>pāroro</i>	‘threatening clouds, bad weather, storm’
<i>parure</i> ~ <i>pārure</i>	‘prey, booty’
<i>pohutukawa</i> ~ <i>pōhutukawa</i>	‘a tree’
<i>rongoa</i> ~ <i>rongoā</i>	‘preserve, take care of, remedy, medicine’
<i>tauhou</i> ~ <i>tauhōu</i>	‘strange, stranger’
<i>tawere</i> ~ <i>tāwere</i>	‘to hang, to be suspended’
<i>tuara</i> ~ <i>tuarā</i>	‘back’
<i>uwhi</i> ~ <i>ūwhi</i>	‘cover’
<i>whekiki</i> ~ <i>whēkiki</i>	‘quarrel, tease, annoy’

It is claimed by de Lacy that these result from lengthening due to circumscription enforcing a binary foot constraint. The problem with this claim is some forms, such as *aro*, *aki*, *haro*, *hou*, and *kopipio* are already fully-footed. The alternative long vowels of these particular words break the binary foot constraint. Circumscription can explain the forms having alternative long vowels finally, e.g. *rongoa*, *rongoā*; *hāngi*, *hāngī*.

De Lacy also claims that circumscription can account for the long vowels which appear in some stems that are passivised, as in the following list:

²⁵ This form only appears in some dialects of Maori.

(52) Stem	Affixed Stem (Passive)	Gloss
<i>aki, āki</i>	~ <i>ākina</i>	‘to encourage, urge on’ (Moorfield 1988:142)
<i>ako</i>	~ <i>ākona</i>	‘learn’ (Moorfield 1988:142)
<i>huti, huhuti</i>	~ <i>hūtia</i>	‘hoist, haul up’
<i>kakahu</i>	~ <i>kāhua</i>	‘bite, South Island Maori’ (cf. Harlow 1987)
<i>kiki</i>	~ <i>kīkia</i>	‘to kick’ (Moorfield 1988:149)
	~ <i>kikia</i>	‘id.’ (Moorfield 1988:149)
<i>kukume, kume</i>	~ <i>kūmea</i>	‘pull, drag’
<i>kukuti, kuti</i>	~ <i>kūtia</i>	‘draw tightly together, contract, pinch’
<i>mimi</i>	~ <i>mīa</i> ²⁶	‘make water’
<i>noho</i>	~ <i>nohoia</i>	‘sit’
	<i>/nōhia</i>	
<i>nonoke</i>		‘struggle’
	~ <i>nōkea</i>	‘pinch, contract’
<i>noti, nonoti</i>	~ <i>nōtia</i>	‘pinch or contract’
<i>nati, nanati</i>	~ <i>nātia</i>	‘id.’ (Karetu 1992:22)
<i>pae, papae</i>	~ <i>pāea</i>	‘cast ashore, wrecked’
<i>paki, papaki</i>	~ <i>pākia</i>	‘to slap’
<i>poki, popoki,</i>	~ <i>pōkia</i>	‘cover over’
<i>pokipoki</i>		
<i>pupuhi</i>	~ <i>pūhia</i>	‘to blow or shoot’
<i>riri</i>	~ <i>rīria</i>	‘be angry, fight’
<i>taki</i>	~ <i>tākina</i>	‘used of rising of the heavenly bodies’
<i>tao, tatao</i>	~ <i>tāona</i>	‘cook’ (Moorfield 1988:160)
<i>tari, tatari</i>	~ <i>tāria</i>	‘wait’
<i>tiki</i>	~ <i>tīkina</i>	‘fetch’ (Moorfield 1988:161)
<i>tiko</i>	~ <i>tīkona</i>	‘evacuate the bowels’ (Moorfield 1989:168)
<i>toro, totoro</i>	~ <i>tōrona</i>	‘to stretch forth, extend’ (Moorfield 1992:208)
<i>tungi, tutungi</i>	~ <i>tūngia</i>	‘kindle, set light to’
<i>wau, wawau</i>		‘foolish’
	~ <i>wāuia</i>	‘be discussed’

²⁶ Williams (1971) lists this as *mia*, this is surely an error.

<i>whai</i>	~ <i>whāia</i>	‘follow, pursue’
<i>whakarere</i>	~ <i>whakarērea</i>	‘to reject, cast away’ (Moorfield 1988:165)

The term *kiki* (cf. Eng kick) has two passive forms, *kikia*, and *kīkia*. However there are a large number of verbs which do not undergo vowel lengthening in the passive form. Examples include:

(53) <i>hiki</i>	~ <i>hikitia</i>	‘lift’
<i>kati</i>	~ <i>katia</i>	‘close’
<i>numi</i>	~ <i>numia</i>	‘pass by’
<i>rapu</i>	~ <i>rapua</i>	‘seek’

It is worth noting long vowels occur in the nominalizations of stems:

(54) Stem	Affixed Stem (nominalization)	Gloss
<i>ako</i>	~ <i>ākonga</i>	‘learner’
<i>rei</i>	~ <i>rēinga</i>	‘leap, rush, run’
<i>tari, tatari</i>	~ <i>tāringa</i>	‘wait’
<i>whai</i>	~ <i>whāinga</i>	‘follow, pursue’
<i>whati</i>	~ <i>whatiānga</i>	‘angle, place where bent or broken’

De Lacy’s notion of circumscription will not explain vowel lengthening in all the above forms.

Vowel lengthening is optional in a small number of words in Maori, obligatory in some cases of passivised and nominalized words, yet crucially it is obligatory in all cases of reduplications such as Harlow’s pattern 4. De Lacy’s notion of circumscription cannot adequately explain why vowel lengthening in Maori is obligatory in the case of certain reduplications and nonobligatory in under areas of affixation in Maori. Finally, initial vowel lengthening occurs in compounding of words, e.g.

(55) Morphemes	Word	Gloss
<i>mata-a-waka</i>	<i>mātāwaka</i>	‘tribe, clan’ (Moorfield 1992:190)
<i>mata-a-mua</i>	<i>mātāmua</i>	‘first’
<i>mata-a-muri</i>	<i>mātāmuri</i>	‘last, latter’
<i>oha-a-kī</i>	<i>ōhākī</i>	‘dying speech’

Often the lengthening of initial vowel of a compound or an affixed stem results in a fully footed word. The interaction of feet and stress requirements in Maori is area that requires further investigation.

In summary, I disagree with a number of claims made by de Lacy (1996). First, as with Meyerhoff and Reynolds (1996) I believe his description of stress in Maori is over simplified and does not take into account dialectal variation. Second, I do not accept his claim that the process of circumscription (as he defines it) needs to be reintroduced to current theories of prosodic morphology, specifically Correspondence Theory on the basis that his definition of circumscription may have some value in interpreting reduplication data in one language. His redefining of circumscription is rather vague and certainly outside the basic tenets of Correspondence Theory as outlined by McCarthy and Prince (1993,1994, and1995). Thirdly, his suggestion that circumscription is responsible for vowel lengthening in certain types of reduplication, some Maori words, and the passive in Maori is certainly untenable. However there is a case for the argument that reduplication in Maori can be seen as prefixing, rather than suffixing. De Lacy has identified the fundamental templates used in reduplication in Maori and a number of relevant constraints. It is difficult to ascertain what definitions he assigns to both prosodic and morphological terminology, this perhaps obscures the majority of his claims.

2.4.6 A modification of Meyerhoff and Reynolds (1996) OT analysis of reduplication in Maori

An alternative possible explanation of vowel lengthening in Harlow’s pattern 4 reduplications is that vowel lengthening is not a result of Base-Dependence as suggested by Meyerhoff and Reynolds (1996). The lengthening of the initial vowel results from a phonological constraint motivated elsewhere in the phonology of Maori. It is not clear how exactly this phonological constraint works. It seems prosodic in nature and in most cases results in words becoming fully footed.

This constraint, however, seems likely to dominate the constraint RED= $\sigma_{\mu\mu}$. The area of vowel lengthening in Maori needs further exploration.

The alternative constraint hierarchy for Harlow's pattern 4 is given below, and exemplified by *kōhikohiko* (cf. *kohiko*) in tableau.

(56) Constraint Hierarchy - Harlow's pattern 4 reduplication in Maori.

Lengthening Constraint \gg RED= $\sigma_{\mu\mu}$ \gg Fill, Max

kohiko

Candidates	Lengthening C	RED= $\sigma_{\mu\mu}$	Fill
☞ koOhikohiko			*
kohikohiko	*!		

2.4.7 Summary of OT analysis of reduplication in Maori

One of the central claims of Prosodic Morphology (within OT) (McCarthy and Prince 1995) is that prosodic criteria dominate morphological criteria in processes such as reduplication. Maori data reduplication supports this claim. Meyerhoff and Reynold's (1996) attempt offers feasible explanations of how some reduplication data in Maori may be accounted for within an OT framework. However, a complete OT analysis of reduplication in Maori will require a comprehensive description of stress system in Maori, taking into account dialectal variation and possible influences from English. Equally important to an OT analysis of Maori are the other aspects of Maori phonology in general which are under described, particularly syllabification and vowel lengthening. Finally there are other factors outside OT which influence reduplicant candidate selection in Maori. The primary factor is semantic criteria, and historical factors. These will be looked at in the following chapters.

In finishing this section it is worth noting that OT is a relative recent theory and to date has not been fully applied to many natural languages. It is likely that OT theory will continue undergoing refinements, particularly in constraint formulation in light of further analysis of natural languages. At time of writing the latest formulation of correspondence theory is McCarthy and Prince (1995). Perhaps future versions of OT may explain more eloquently some of more intriguing aspects of reduplication in Maori as outlined in this thesis.

3 The semantics of reduplication in Maori

3.1 Introduction

In this chapter I attempt to describe the semantics of reduplication of Maori. The first section briefly looks at studies of semantics of reduplication across languages, noting the common meanings found. The second section describes the various meanings reduplication in Maori expresses. The third section looks at a classification of the semantics of reduplication as proposed by Kiyomi (1995). I also outline Maori within Kiyomi's framework.

3.2 Semantics of reduplication across languages

There is a vast amount of literature that deals with formal properties of reduplication in specific languages. However, besides individual grammars, there are few studies which focus on the semantics of the reduplication. Examples of studies focusing on semantics include Lakoff and Johnson (1980) and Naylor (1986). The most recent survey of the semantics of reduplication across languages is Kiyomi (1995). This work is particularly relevant as the languages surveyed are all from the Malayo-Polynesian¹ family of languages of which Maori is also a member. Kiyomi (1995), however, only looks meanings expressed by the reduplication of nouns and verbs. Lindström (1995) presents a summary of responses to a question posted on the Internet e-mail list *Linguist* asking how reduplication is used cross linguistically to display some facet of intensification. Other works dealing meanings across languages include Key (1965) and the influential study undertaken by Moravcsik (1978).

An important aspect of reduplication is that reduplicated forms tend to have more specific meanings than their unreduplicated counterparts (Moravcsik 1978). Lakoff and Johnson (1980) note the same point suggesting the 'more' of physical linguistic 'form' corresponds to 'more' in the content of a reduplicated expression as opposed to a non-reduplicated form. However, these statements reflect tendencies rather than absolute rules. There are examples of reduplication where 'more' of semantic content corresponds to less of physical form. The majority of plural forms of words in Samoan are expressed by partial or full reduplication.

¹ According to Ruhlen (1987) Malayo-Polynesian is one of four branches of the Austronesian language family. The other three branches are Atayalic, Tsouic, and Paiwanic. For an alternative and more recent view of the Austronesian language family, see Tryon (1995).

Examples were noted in (1), repeated below:

- (57) *nofo* ‘sit’ *nonofo* ‘sit, pl.’
 moe ‘sleep’ *momoe* ‘sleep, pl.’

However in some cases in Samoan reduplication is used to mark a singular form in opposition to an unreduplicated plural form:

- (58) *opeopea* ‘float’ *ōpea* ‘float, pl.’

Moravcsik (1978) notes the concept of increased quantity being expressed by reduplication is common across languages. She considers that there are two basic subtypes of increased quantity, quantity of referents (as shown by the Samoan plural forms of verbs given above) and amount of emphasis. Sometimes nouns are reduplicated to indicate quantity of referents, i.e. plural forms as in the following examples from Papango:

- (59) *bana* ‘coyote’ *baabana* ‘coyotes’
 tini ‘mouth’ *tiitini* ‘mouths’ (Langacker 1972)

Sometimes the quantity of referents which reduplicated forms express are more specific in meaning. An example is the distributive plural as in the example² below from Hiligaynon:

- (60) *balay* ‘house’ *balaybalay* ‘every house’ (Wolfenden 1971)

An example given by Moravcsik (1978) of emphasis (illustrating increased quantity) is increased intensiveness. This is displayed in Sudanese:

- (61) *rame* ‘jolly’ *ramerame* ‘very jolly’ (Robins 1959)

Intensity is considered a frequent meaning of reduplication by other authors such as Key (1965), Haiman (1980), and Lindström (1995).

Other common meanings of reduplication across languages are continuation, frequency and repetition. These meanings are usually expressed by reduplication of verbs. Examples of reduplication expressing continuation are found in Ilokano:

² Diacritics are not marked in this example.

- (62) *sáŋit* ‘to cry’ *ʔag-saŋ-sáŋit* ‘is crying’
taráy ‘to run’ *ʔag-tar-taráy* ‘is working’
trabáho ‘to work’ *ʔag-trab-trabáho* ‘is working’
(Hayes and Abad 1989:357)

It is important to note that sometimes the same reduplication can express several different meanings as in the following example from Rotuman:

- (63) *leume* ‘to come’ *leleume* ‘to come repeatedly, frequently, or
habitually’ (Churchward 1940)

Sometimes reduplication is more specific in defining the participants in a particular action. An example of this is the use of reduplication to denote reciprocal action as the examples from Dyirbal:

- (64) *ɥurgay* ‘spear, v.’ *ɥurgayɥurgaybariŋu* ‘spear each other’
ɥunɥal ‘kiss, v.’ *ɥunɥalɥunɥalbariŋu* ‘kiss each other’ (Dixon 1972:92f)

Another common function of reduplication is to express an intensifying meaning. The following examples of intensification are from West Futuna:

- (65) *hleu* ‘ripe’ *leuleu* ‘over ripe’
pai ‘far’ *papai* ‘very far’
riki ‘small’ *rikiriki* ‘very small’ (Dougherty 1977:215)

Reduplication can also express attenuation and diminution. Note the following from Rarotongan:

- (66) *ava* ‘reef-channel’ *avaava* ‘small narrow channel(s) through the reef’
ngaru ‘rough of the sea’ *ngarungaru* ‘roughish of the sea’
vene ‘sweet’ *venevene* ‘rather sweet’

Reduplication seems to be used to change word classes in a number of languages. In the examples below from Motu, reduplication is used to form a noun from a verb:

- (67) *toi-a* ‘to push, v.t.’ *toittoi* ‘a wheel attached to a piece of wire or stick (a toy)’
huni-a ‘to hide, v.t.’ *hunihuni* ‘hiding’ (Taylor 1970:1236)

Sometimes reduplicated forms have the same meaning as their unreduplicated corresponding forms. Examples of other meanings of reduplication found in the literature include:

(68) Facsimile (i.e. imitation) (Tagalog)

<i>bahay</i> ‘house’	<i>bahaybahayan</i> ‘play house’
<i>anak</i> ‘child, offspring’	<i>anakankan</i> ‘foster child’
<i>tao</i> ‘person’	<i>taotauhan</i> ‘figurine, toy man’ (Naylor 1986:180)

(69) Similarity (Toba-Batak)

<i>hóda</i> ‘horse’	<i>hodahóda</i> ‘something resembling a horse’ (Kiyomi 1995)
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(70) Attemptive (Javanese)

<i>neluq</i> ‘to call someone from afar’	<i>neluqneluq</i> ‘to attempt to call someone’
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(Kiyomi 1995)

Further examples of other meanings of reduplication are found in Lindström (1995), and Moravcsik (1978). Individual grammars of languages often list the various meanings of reduplication attested in a particular language. The next section looks at the meanings of reduplication found in Maori.

3.3 Reduplication data (semantics)

The vast majority of data cited in the following sections comes from Williams (1971). One problem with the data listed is that many forms cited and associated meanings are unknown to a large number of speakers of modern Maori. Some examples may be still used in some dialects of Maori, others may have lexicalised or simply be no longer used. It is possible that some forms may in fact still be known, if not used, by older speakers of Maori. A major dialect study of Maori would be necessary to answer these questions. Such a study would be a very time consuming task and is beyond the scope of this thesis.

3.3.1 Plural forms

3.3.1.1 Plural forms of adjectives

Many authors note that the plural form of some adjectives is formed by a partial reduplication of the first syllable. These forms are:

(71) Singular	Plural	Gloss
<i>kino</i>	<i>kikino</i> ³	‘bad’
<i>nui</i>	<i>nunui</i>	‘big’
<i>pai</i>	<i>papai</i>	‘good’
<i>rahi</i>	<i>rarahi</i>	‘big’
<i>rata</i>	<i>rarata</i>	‘tame, quiet’
<i>riki</i>	<i>ririki</i>	‘small’
<i>roa</i>	<i>roroa</i>	‘tall, long’

The above plural forms do not seem to be obligatory in modern Maori. Moorfield (1992) notes:

These words (plural forms) may also be used in the singular to intensify the quality.

e.g. **He kakī roroa tōna.** She has a long neck. (Moorfield 1992:26)

Williams (1971) lists one adjective whose singular form is a full reduplication, and whose plural form is a partial reduplication:

(72) <i>nohinohi</i>	<i>nonohi</i> (pl.)	‘small’
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Sometimes the plural forms of the adjectives mentioned above occur in compounds. When such occur in compounds, they do not seem to indicate plurality:

(73) <i>matarahi</i>	<i>matararahi</i>	‘large’
<i>metarahi</i>	<i>metararahi</i>	‘great’
<i>meroriki</i>	<i>meroririki</i>	‘small’

³ Williams (1971) lists **Kino** (pl. sometimes **kikino**) adj. evil, bad.

Not all adjectives have plural forms (as above). Adjectives that do not appear to have plural forms include *iti* ‘small’, and *poto* ‘short’.

Some adjectives such as *pai* ‘good’ and *tika* ‘correct’ do not undergo full reduplication unless in a derivative form, i.e. having acquired the causative prefix *whaka-*:

- (74) *whakapaipai* (v.t.) ‘adorn’
 whakatikatika (v.t.) ‘make correct’

Other adjectives such as *rite* ‘like, alike, corresponding to’ do not seem to have this restriction:

- (75) *Ā ahakoa tērā kihai ā rātou kōrero i riterite.* (Paipera, Mak 14:59)

‘But not even then did their witness agree.’

3.3.1.2 Plural forms of nouns

I noted in section 1.6.2 that a number of kinship terms form their plural by lengthening the ante-penultimate vowel. At least one kinship term has a plural form resulting from reduplication:

- (76) *kuia* ‘old woman’ *kuikuia* ‘old women’

A few nouns in Maori have plural forms; an examples:

- (77) *pō* ‘night’ *pōpō*⁴ ‘nights’
 ringa ‘hand, arms’ *ringaringa*⁵ ‘hand, arms’

Some reduplicated verbs with plural subjects can be nominalized.

- (78) *wehewehenga* (cf. *wehe*) ‘division, divisions’
 huihuinga (cf. *hui*, gather, gatherings) ‘gathering, gatherings’
 uiuinga (cf. *ui* ‘ask, enquire’) ‘questioning, questions’

⁴ Williams (1971:286) “*pōpō*, n. Apparently a plural form used in special cases. Tena au e haere atu na; ma nga popo nunui o te waru, mana e hoatu.”

⁵ For some speakers *ringaringa* is both plural and singular.

3.3.1.3 Plural forms of verbs

Reduplication expresses the plural form⁶ of a number of verbs in Maori. I have already noted Krupa's remark in section 1.6.1.3 that reduplication in Maori can also express plurality of subject and object.

Some verbs, such as *hui* 'congregate, put or add together', which can be used as both intransitive and transitive verbs, can express plurality of subjects and of objects respectively when reduplicated:

(79) *ka huihui mai ngā iwi ki te matakitaki i tō rātou ito.*
(Williams 1971:66)

T/A gathered (v.i.) loc. the pl. people prep. det. look at (v.t.) DO their enemy (n.)

'The people gathered to look at their enemy.'

(80) *ka huihui i ana whanaunga.* (Jones and Biggs 1995:13)

T/A assemble (v.t.) (he = Ø) DO poss.pl. kinsfolk

'He assembled his kinsfolk.'

A number of verbs are reduplicated to denote plurality of object:

(81) Singular	Gloss	Plural	Gloss
<i>tō</i>	'drag, haul'	<i>tōtō</i>	'drag a number of objects'
<i>unu</i>	'pull off'	<i>unuunu</i>	'pull off a number of things'
<i>uta</i>	'load'	<i>utauta</i>	'frequentative or plural form of <i>uta</i> '

⁶ Verbs which indicate plurality of activity (other than distributive plural) are included in the frequentative section.

Intransitive verbs can be reduplicated to show plurality of subject:

(82) Singular	Gloss	Plural	Gloss
<i>hinga</i>	‘fall’	<i>hihinga/ hingahinga</i>	‘fall in numbers’
<i>noho</i>	‘sit’	<i>nohonoho</i>	‘sit - more than one person’ (Reedy 1969:29,30)
<i>taka</i>	‘fall’	<i>tātaka/ takataka</i>	‘fall frequently or in numbers’

Sometimes verbs are reduplicated to express a distributive plural of activity or subject:

(83) Singular	Gloss	Distributive Plural	Gloss
<i>ako</i>	‘learn’	<i>akoako</i>	‘consult together, give or take counsel’
<i>hopu</i>	‘catch’	<i>hopuhopu</i>	‘catch one after another’
<i>kato</i>	‘pluck’	<i>katokato</i>	‘pluck off leaf by leaf’
<i>maringi</i>	‘be split, flow’	<i>māringiringi</i>	‘be spilt little by little’
<i>moe</i>	‘sleep’	<i>momoe</i>	‘sleep together’
<i>ngahoro</i>	‘drop off, fall’	<i>ngāhorohoro</i>	‘fall off bit by bit’

I have already noted in section 1.6.9 the following examples of distributive plural from Moorfield:

Kua hokihoki ngā tamariki ki ō rātou kāinga. The children have returned
(independently) to their various
homes.

Kua taetae mai ngā manuhiri. The visitors have begun arriving
(separately). (Moorfield 1991:68)

I have not found any examples of reduplication of transitive verbs expressing plurality of subject as opposed to plurality of object. This is an area that requires further investigation.

3.3.2 Intensification

Reduplication in Maori can express intensification. Examples include:

(84)	Word	Gloss	Reduplication	Gloss
	<i>aoake</i>	‘day following, day before’	<i>aoakewake</i>	‘several days off’
	<i>āwake</i>	‘two days hence’	<i>āwakewake</i>	‘four days hence’
	<i>haupa</i>	‘bite, eat’	<i>hāupaupa</i>	‘eat greedily’
	<i>haware</i>	‘saliva’	<i>hāwareware</i>	‘full of saliva, dribbling’
	<i>hītawe</i>	‘long, tall’	<i>hītawetawe</i>	‘very long, very tall’
	<i>hoa</i>	‘friend’	<i>hoahoa</i>	‘spouse’
	<i>kore</i>	‘not, no’	<i>korekore</i>	‘definitely not’ (Moorfield 1992:71)
	<i>kōmingo</i>	‘agitate’	<i>kōmingomingo</i>	‘be violently agitated’
	<i>mahi</i>	‘work’	<i>mamahi</i>	‘hard working’
	<i>mano</i>	‘thousand’	<i>manomano</i>	‘innumerable, horde, swarm, large number’
	<i>rutu</i>	‘jolt, jerk, clash’	<i>hauruturutu</i>	‘shake violently’
	<i>tāwiri</i>	‘tremble, shake’	<i>tāwiriwiri</i>	‘shake exceedingly’
	<i>ui</i>	‘ask, enquire’	<i>uiui</i>	‘enquire for, interrogate’

Williams (1971) lists *koroua* and *korokoroua* as ‘old man’. However, Williams gives the following textual example of *korokoroua*:

(85) *Ko tō te Māori mate kia korokoroua rawa ka mate ai.*

‘To the Maori, death should result from great age.’

The use of reduplication in this example appears to express intensification, i.e. very old.

A number of intensive adverbs are reduplications. In all examples below the intensive adverb only modifies a particular adjective. In each case unreduplicated forms are not intensive adverbs:

(86) *toimaha rukiruki (hārukiruki)* ‘extremely heavy’ (Williams 1971:351)

Other examples include:

(87) <i>hangehange, hengahenga</i>	‘intensive adv. (used with <i>maroke</i>)’
<i>hāwerewere</i>	‘intensive adv. (used with <i>tōtika</i>)’
<i>hoehoe</i>	‘intensive adv. (used with <i>tūmaro</i>)’
<i>ngihangiha</i>	‘intensive adv. (used with <i>pōuri</i>)’

3.3.3 Diminutive

As well intensifying the meaning of word in Maori, reduplication can denote an attenuation or a diminishing in the meaning or force of a word.

(88) Word	Gloss	Reduplication	Gloss
<i>hīrea</i>	‘sound just audible’	<i>hīrearea</i>	‘indistinct sound’
<i>hunga</i>	‘people’	<i>kōhungahunga</i>	‘infant’
<i>kāwai</i> ⁷	‘flock’	<i>kāwaiwai</i>	‘brood of ducklings’
<i>koi</i>	‘sharp’	<i>koikoi</i>	‘somewhat sharp’
<i>mākū</i>	‘wet, moist’	<i>mākūkū</i>	‘somewhat moist’
<i>mārama</i>	‘light’	<i>māramarama</i>	‘somewhat light’
<i>mārō</i>	‘stiff’	<i>mārōrō</i>	‘somewhat stiff’
<i>mātao</i>	‘cold’	<i>mātaotao</i>	‘cool’
<i>mauru</i>	‘quieted, eased’	<i>māuruuru</i>	‘somewhat eased’
<i>neke</i>	‘move’	<i>nekeneke</i>	‘move gradually’
<i>pango</i>	‘black’	<i>papango</i>	‘somewhat black’
<i>pei</i>	‘earth’	<i>peipei</i>	‘lump of earth, clod’
<i>rahi</i>	‘large’	<i>rahirahi</i>	‘thin’
<i>tapī</i>	‘earth oven’	<i>tāpīpī</i>	‘small earth oven’
<i>tuwhera</i>	‘open’	<i>tūwherawhera</i>	‘somewhat exposed’
<i>wera</i>	‘hot’	<i>werawera</i>	‘warm’
<i>whero</i>	‘red’	<i>whewhero</i>	‘somewhat red’

Reduplication of the first three numerals indicates few, i.e. the reduplicated forms are used as adjectives:

⁷ Williams (1971:110) adds that these two words (*kāwai* and *kāwaiwai*) seem to apply only to *parera*, *whio*, and *weweia* (i.e. certain species of ducks).

(89)	<i>kotahi</i>	‘one’	<i>kōtahitahi</i>	‘few’
	<i>rua</i>	‘two’	<i>ruarua</i>	‘few’
	<i>toru</i>	‘three’	<i>torutoru</i>	‘few’

The following full reduplications also indicate few:

(90)	<i>okuoku /ouou/ oruoru/</i>	‘few’
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Alternatively the examples in (89) and (90) may be considered a form of intensification, especially if ‘only few’ is the meaning implied.

Sometimes a reduplicated form whose simplex form means something small can be used to mean ‘small or diminutive’:

(91)	<i>namu</i>	‘sandfly’	<i>namunamu</i>	‘small, diminutive’
	<i>naonao/</i>	‘midge’	<i>naonao/</i>	‘small, diminutive’
	<i>nahonaho</i>		<i>nahonaho</i>	

Other full reduplications can mean ‘diminutive’:

(92)	<i>ngihongiho</i>	‘diminutive’
	<i>ngote, ngotengote</i>	‘anything small, diminutive’

3.3.4 Nominalization

Reduplication can nominalize a base:

(93)	Word	Gloss	Nominalization	Gloss
	<i>awhi</i> (v.t.)	‘embrace’	<i>awhiawhi</i>	‘embrace’
	<i>hengi/</i>	‘blow gently’	<i>hengihengi</i>	‘breeze, breath’
	<i>hehengi</i> (v.i.)			
	<i>kawiri</i> (v.t.)	‘twist’	<i>kāwiriwiri</i>	‘strand of rope etc.’
	<i>mawhiti</i> (v.i.)	‘leap, skip’	<i>māwhitiwhiti</i>	‘grasshopper’
	<i>pako</i> (v.t.)	‘plant, glean’	<i>pakopako</i>	‘gleanings’
	<i>pakiri</i> (v.i.)	‘show the teeth, grin’	<i>pākirikiri</i>	‘lower incisor teeth’

<i>panau</i> (v.i.)	‘slope, descend’	<i>pānaunau</i>	‘gentle slope of hill’
<i>rino</i> (v.i.)	‘swirl, eddy’	<i>ririno</i>	‘eddy, whirlpool’
<i>tahe</i> (v.i.)	‘exude, drop, flow’	<i>tatahe</i>	‘drippings, issue, exudation’
<i>uta</i> (v.t.)	‘load’	<i>utauta</i>	‘property, accoutrements’

3.3.5 Verbal

Reduplicating a noun sometimes produces a verb:

(94) Word	Gloss	Verb	Gloss
<i>hiwa</i> (n.)	‘a stone axe’	<i>āhiwahiwa</i> (v.t.)	‘cut, gash’
<i>matapihi</i> (n.)	‘window’	<i>matapihipihi</i> (v.t.)	‘to open up’
<i>pere</i> (n.)	‘a type of hoe’	<i>perepere</i> (v.t.)	‘to clear weeds etc.’
<i>tūtanga</i>	‘portion, division’	<i>tūtangatanga</i> (v.t.)	‘cut into portions, divide’
<i>wai</i> (n.)	‘water’	<i>waiwai</i> (v.t.)	‘soak, steep’

3.3.6 Adjective

Reduplication can create an adjective:

(95) Word	Gloss	Adjective	Gloss
<i>māpuna</i> (v.i.)	‘ripple, sway’	<i>māpunapuna</i>	‘rippling’
<i>mātai</i> (n.)	‘sea’	<i>mātaitai</i>	‘tasting of salt, brackish’
<i>ngaku</i> (n.)	‘strip, shred’	<i>ngakungaku</i>	‘reduced to shreds’
<i>ngaru</i> (n.)	‘wave (sea)’	<i>ngarungaru</i>	‘rough with waves’
<i>paka</i> (v.i.)	‘quarrel’	<i>pakapaka</i>	‘quarrelsome’
<i>paru</i> (v.t.)	‘plunder, crush’	<i>paparu</i>	‘crushed, smashed’
<i>penu</i> (v.t.)	‘smear’	<i>pepenu</i>	‘smeared, painted’
<i>pirau</i> (n.)	‘decay’	<i>pipirau, pirapirau</i>	‘decayed’
<i>puke</i> (n.)	‘hill’	<i>pukepuke</i>	‘hilly’
<i>wai</i> (n.)	‘water’	<i>waiwai</i>	‘sodden, watery’

3.3.7 Frequentative

Williams (1971) lists reduplications in (96) as frequentative forms of the verb. Often a ‘frequentative’ denotes a repetition of an activity.

(96) Word	Frequentative	Gloss (of frequentative)
<i>haka</i>	<i>hahaka</i>	‘dance freq.’
<i>hangarau</i>	<i>hangahangarau</i>	‘continue to befool’
<i>hāpai</i>	<i>hapahapai</i>	‘lift often’
<i>hoki</i>	<i>hohoki, hokihoki</i>	‘return frequently’
<i>hopu</i>	<i>hopuhopu</i>	‘catch frequently or one after another’
<i>pātai</i>	<i>pātaitai, patapatai</i>	‘question freq.’
<i>patō</i>	<i>pātōtō</i>	‘make a repeated knocking noise, knock repeatedly’
<i>uta</i>	<i>utauta</i>	‘load freq.’
<i>utu</i>	<i>utuutu</i>	‘return for anything, reply, price, freq.’

Other examples of reduplication being used to denote frequentative or repetitive action include:

(97) Word	Gloss	Reduplication	Gloss
<i>epa</i> (v.t.)	‘pelt’	<i>epaepa</i>	‘pelt continuously’
<i>hopu</i>	‘catch’	<i>hopuhopu</i>	‘catch one after another’
<i>kaneke</i>	‘move, progress’	<i>kānekeke</i>	‘move about, or from place to place’
<i>maranga</i>	‘rise up’	<i>mārangaranga</i>	‘bob up and down’
<i>pātuki</i>	‘strike, knock’	<i>pātukituki</i>	‘strike or knock repeatedly or gently’
<i>piki</i> (v.i.)	‘support, assist’	<i>pikipiki</i> (v.i.)	‘be constantly in attendance’
<i>takahuri</i>	‘roll, turn’	<i>takahurihuri</i>	‘keep on turning round, roll over and over’
<i>tapahi</i>	‘cut’	<i>tapatapahi</i>	‘cut to pieces’
<i>tupana</i>	‘spring up, recoil’	<i>tūpanapana</i>	‘vibrate, keep on twitching’

3.3.8 Punctual activity

Reduplication also indicates a punctual activity, i.e. an activity undertaken once:

(98) Word	Gloss	Reduplication	Gloss
<i>kapo</i>	‘catch at, snatch’	<i>kapokapo</i>	‘clutch’
<i>kimo</i>	‘wink, blink’	<i>kikimo</i>	‘keep the eyes firmly closed’
<i>paki</i>	‘slap’	<i>papaki</i>	‘slap together - once’
<i>paki</i>	‘strike’	<i>papatu</i>	‘strike together’

It appears the corresponding ‘frequentative forms’ of *kimo*, *paki*, and *patu* are complete reduplications. In these verbs, and perhaps others, partial and complete reduplication may be used to distinguish between punctual and frequentative activity respectively.

3.3.9 Reciprocal

Reduplication can denote a reciprocal action. Williams notes “Tau prefixed to a reduplicated root has frequently a reciprocal force” (Williams 1971:xxxv).

(99) Word	Gloss	Reduplication	Gloss
<i>huti</i>	‘pull out’	<i>tauhutihuti</i>	‘pull another’s hair’
<i>kume</i>	‘pull, drag’	<i>taukumekume</i>	‘pull against one another’
<i>rumaki</i>	‘immerse’	<i>taurumarumaki</i>	‘duck one another in the water’
<i>tohe, tautohe</i>	‘contend’	<i>tautotohe/ tautohetohe</i>	‘contend with one another, argue’
<i>tito</i>	‘compose’	<i>tautitotito</i>	‘sing songs in response to one another’
<i>tute</i>	‘shove, push’	<i>taututetute</i>	‘jostle one another’

Sometimes reciprocal action is expressed by reduplication only:

(100) Word	Gloss	Reduplication	Gloss
<i>patu</i>	‘strike’	<i>papatu</i>	‘beat one another’
<i>tango</i>	‘take, acquire’	<i>tatango</i>	‘snatch from one another’

3.3.10 *Randomness*

Reduplication can express randomness:

(101) Word	Gloss	Reduplication	Gloss
<i>ākiri</i>	‘throw away, reject’	<i>ākirikiri</i>	‘throw away piecemeal’
<i>haere</i>	‘come, go, depart’	<i>hāereere</i>	‘stroll, wander about’
<i>maero</i>	‘float, drift’	<i>māeroero</i>	‘drift about’
<i>marara</i>	‘scattered, separated’	<i>mārārara</i>	‘rather scattered’
<i>ruke</i>	‘throw’	<i>rukeruke</i>	‘throw about’
<i>whāriki</i>	‘spread out’	<i>whārikiriki</i>	‘strew about’

3.3.11 *Habitual*

Reduplication sometimes denotes something habitual:

(102) Word	Gloss	Reduplication	Gloss
<i>moe</i>	‘sleep’	<i>momoe</i>	‘of a drowsy habit, somnolent’

3.3.12 *Transitivity and de-transitivity*

Reduplication appears to sometimes derive an intransitive verb from a transitive verb, or conversely a transitive verb from an intransitive verb. There are appears to be few examples of both transitivity and de-transitivity, and the examples that exist may be lexicalised. I strongly suspect this use of reduplication is no longer productive in modern Maori.

(103) **Intransitive**

Word	Gloss	Reduplication	Gloss
<i>pona</i> (v.t.)	‘knot, tie in a knot’	<i>popona</i> (v.i.)	‘become knotted’
<i>tāoro</i> (v.t.)	‘cause to crumble down’	<i>tāorooro</i> (v.i.)	‘crumble away’

(104) **Transitive**

<i>hota</i> (v.i.)	‘press on’	<i>hotahota</i> (v.t.)	‘urge on’
<i>raka</i> (v.i.)	‘be entangled’	<i>raraka</i> (v.t.)	‘entangle’
<i>tūrere</i> (v.i.)	‘steal away, flee’	<i>tūrerere</i> (v.t.)	‘diffuse’

3.3.13 *Ideophones*

Some ideophones in Maori are reduplications.

- (105) *koekoea* 'long tailed cuckoo'
riroriro 'grey warbler'

3.2.14 *No change*

A number of reduplications are used as allomorphs of their corresponding simplex forms. There may be prosodic factors which influence the choice of one form over another. Whether or not stylistic reasons influence the choice of a particular form in *karakia* 'incantations' and *waiata* 'songs' is a question for further research. Examples of reduplications used with no apparent change in meaning are given below:

- (106) *amu, amuamu* 'grumble, begrudge'
mene, memene, menemene 'show wrinkles, contort the face'
poki, popoki, pokipoki 'cover over'
popo, pōpopo, popopopo 'rotten'
porehu, pōrehurehu 'misty, dimmed'
taureka, taurereka, taurekareka 'slave'

3.3.15 *Other*

'Other' is used to describe reduplications which do not fit into the categories cited above. Some forms below may be lexicalised from a different stem from that which is listed below. In most cases there appears to be a possible semantic relationship between the simplex and reduplicated form.

3.3.15.1 Noun from noun

- (107) *anga* 'skeleton' *angaanga* 'chief, elder, head'
ate 'liver' *ateate* 'bosom, calf of leg'
ewe 'placenta, mother' *eweewe* 'blood relative'
land of ones birth'
mahau 'porch, verandah, hut, shelter' *māhauhau* 'temporary shelter shed'

3.3.15.2 Verb from verb

(108) *rapu* (v.t.) ‘seek’ *rapurapu* (v.i.) ‘be in doubt’

3.3.15.3 Adverbs/adverbials

Adverbs or adverbial particles⁸ do not appear to be reduplicated in Maori. The common adverbs in Maori are *tino* ‘very’, *āta* ‘carefully’, *mātua* ‘first’, and *āhua* ‘somewhat’. These all precede the verb. However, on occasion reduplicated words can be used as adverbs. Note the following example:

Rua ‘two, both’ can be reduplicated and used as an adverb to mean to both equally:

(109) *E tika rūrua ana rāua.* (Williams 1971:349)

T/A correct (v.i.) both equally (adv.) T/A they (2nd pl.)

‘They are both (equally) correct.’

3.3.16 *Reduplications derived from English*

A number of apparent reduplications in Maori are words borrowed from an English word.

(110) Word	Gloss	Origin	Source
<i>hipohipo</i>	‘hippopotamus’	hippo	Cleave et. al. (1978)
<i>korokoro</i>	‘turkey’	from its cry	Cleave et. al. (1978)
<i>korukoru</i>	‘turkey’	from its cry	Biggs (1990)
<i>makimaki</i>	‘monkey’	monkey	Cleave et. al. (1978)
<i>nanenane</i>	‘goat’	from ‘nanny goat’	
<i>petipeti</i>	‘to bet gamble’	bet	Moorfield (1993:197)
<i>pīkaokao/tīkaokao</i>	‘cock bird’	from its cry	
<i>rinorino</i>	‘rhinoceros’	rhino	Cleave et. al. (1978)
<i>wharewhare</i>	‘housie’	<i>whare</i> ‘house’	Moorfield (1993:21)

⁸ Bauer (1993:92) divides adverbial particles into four groups: (1) manner - *rawa*, *noa*, *tonu*, *kē*, *kau*, *pea*; (2) directional - *mai*, *atu*, *ake*, *iho*; (3) deictic - *nei*, *nā*, *rā*; (4) emphatic - *hoki*, *anō*, *anake*, and perhaps *ana*.

Some words derived from English can be reduplicated. These all come under categories discussed above:

(111) Word	Gloss	Redup. form	Gloss	Source
<i>hopi</i>	‘soap’	<i>hopihopi</i>	‘to soap oneself’	Moorfield (1989:153)
<i>marena</i>	‘marry’	<i>mārenarena</i>	‘marry (plural)’	Paipera (Tiu, 7:3)
<i>riwhi</i>	‘riffle’	<i>riwhiriwhi</i>	‘to riffle cards’	Moorfield (1993:202)
<i>tote</i>	‘salt’	<i>totetote</i>	‘salty’	Moorfield (1993:208)
<i>wepu</i>	‘whip’	<i>wepuwepu</i>	‘to whip, whipping’	Waititi (1985:186)

3.3.17 *The relationship of reduplication pattern and meaning*

It appears that partial reduplication is generally used for plural forms of adjectives and punctual forms of verbs. Reciprocal action seems to be expressed by both partial and complete reduplication. All other meanings of reduplications appear to be usually expressed by either a complete reduplication or a reduplication of the last two syllables (including Harlow’s pattern 4) of a stem that is at least trimoraic. However in most cases counter-examples exist.

Williams’s statement on the meanings expressed by partial reduplication of verbs requires comment:

Partial reduplication denotes either prolongation or continuance of the action with increased intensity, or reciprocal action. (Williams 1971:xxxiv)

I have found more examples of verbs marking prolongation by a complete reduplication or a reduplication of the last two syllables (including Harlow’s pattern 4) of a stem that is at least trimoraic. Reciprocal action is not limited to partial reduplication. I have not yet found any clear examples in Williams (1971) of partial reduplication of verbs marking continuation of an activity with increased intensity.

There may have been regular relationships between pattern and meaning at an earlier stage of the language. If there was, it is now likely to be obscured by lexicalisation, loss of productivity and the existence of relics.

3.3.18 *Conclusions*

The following categories of meanings associated with reduplication in Maori have been found: plurality of adjectives, verbs and nouns, of subject and objects of verbs, distributive plural; intensification; diminutive; nominalization; verbal; adjective; frequentative; punctual; reciprocal; randomness; habitual; and other.

3.4 **Kiyomi's (1995) approach to the semantics of reduplication**

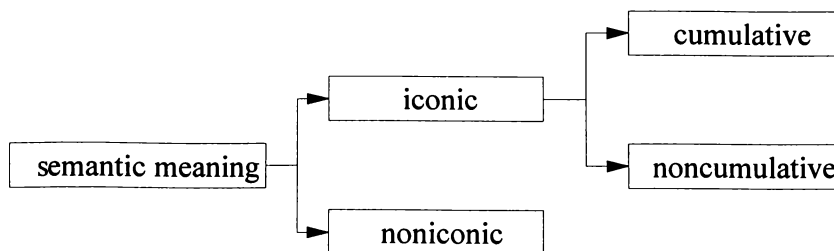
Kiyomi (1995) suggests that claims that reduplications are iconically motivated by authors such as Naylor (1986) do not account for reduplication expressing diminution and other noniconic meanings. Kiyomi outlines an alternative classification of reduplication. This outline is used to account for reduplication of nouns and verbs in 30 Malayo-Polynesian languages.

Kiyomi (1995:1148,1149) proposes that reduplication can function either iconically or noniconically. Iconic reduplication is further divided into reduplication having a meaning which is not cumulative and reduplication having a meaning which is cumulative. A reduplicated form perceived as representing two stems each with an independent meaning is an example of a noncumulative meaning. This meaning (noncumulative) is typically represented by reduplication expressing plurality in nouns and repetition/continuation in verbs. Reduplication expressing semantic reinforcement of the stem is perceived as strengthening the meaning of that stem in a cumulative way. The typical meaning of cumulative reduplication in noun and verb reduplication is intensity.

Reduplication as a noniconic process typically expresses the meaning of diminution. Kiyomi (1995) suggests another example of a noniconic meaning of reduplication is intracategory change, e.g. some languages form intransitives by reduplicating transitive verbs. When reduplication is used for processes such as intracategory change, it can be seen as acting like regular affixation. An extreme example of a noniconic meaning of reduplication is when reduplication does not provide any meaning at all. Noniconic reduplication does not involve any motivation between form and meaning whereas iconic reduplication involves a motivation between form and meaning.

Kiyomi's classification system for the semantics of reduplication is given below in diagrammatic form:

(112) Kiyomi's definition of reduplication is given below:



Reduplication

Given a word with a phonological form X, then reduplication refers to XX, or xX (where x is a part of X and x can appear either just before X, just after X, or inside X)

Conditions:

- (i) XX or xX must be semantically related to X.
- (ii) XX or xX must be productive. (Kiyomi 1995:1146)

Kiyomi does not consider onomatopoeic expressions and ideophones in this paper. Two points to note from this definition of reduplication. The first point is that under this definition of reduplication vowel lengthening is considered reduplication. I have argued in the previous chapter that reduplication in Maori involves prosodic units and that excluding vowel lengthening in Maori allows for a more succinct description. The second point is the term productive is not defined and may be used differently by various authors.

3.4.1 Kiyomi (1995) - nouns

3.4.1.1 Kiyomi (1995) noun reduplication as a consecutive process

Kiyomi (1995:1152) claims that the prototypical meaning of this process which regards reduplication as a sequence of stems without any implication of reinforcement of the stems, in nouns - is plurality. There are six meanings in this category. These are given below in terms of frequency of occurrence across the sample of languages:

- (113)
- (i) plurality - what the stem refers to is plural as opposed to singular.
 - (ii) distribution - each or every individual item of what the stem denotes is referred to.
 - (iii) totality - refers to all instances of what the stem denotes "as a whole".
 - (iv) variety - expresses a variety of what the stem refers to.
 - (v) numerous - expresses that the stem is quite large in number.
 - (vi) repetition - the reduplicated form shows a repetition of what the stem expresses.

(v) imperfective - the action has not been completed.

(vi) locative alternation - the action indicated by the stem is done with directional alternation.

I have classified repetition/continuation and progressive action in Maori under frequentative. In my opinion it is difficult to distinguish between repetitive/continuation and progressive action in Maori. In Maori the reduplication of verbs is used productively to express frequentative and habitative meanings. There is at least one example of reduplication indicating spatial existence *haere*, ‘come, go’ *hāereere* ‘stroll wander about’. It is quite possible that sometimes it may be difficult to distinguish between imperfective and progressive meanings, especially with telic verbs. I have not found any examples of reduplication in Maori expressing imperfective or locative alternation.

Kiyomi notes there are examples of reduplication in which repeated action is considered multiple actions performed by multiple agents. In these cases the meaning plurality is the prototypical meaning. There are three meanings under plurality, plurality itself, distribution and reciprocity. These are defined as:

(118) (vi) plurality - the subject or object of the verb is plural.

(vii) distribution - the action denoted is done to every or each member of the subject or object of the reduplicated verb.

(viii) reciprocity indicates the action takes place to each other.

Examples of these three meanings are present in Maori.

3.4.2.2 Kiyomi (1995) verb reduplication as a cumulative process

In this process the meaning of the stem is strengthened. Hence intensity is considered the prototypical meaning. Kiyomi suggests intensity is:

(119) (ix) intensity - indicates that the action is done a large scale or throughly.

An example of this in Maori is *tāwiri* ‘tremble, shake’ *tāwiriwiri* ‘shake exceedingly’.

3.4.2.3 Kiyomi (1995) verb reduplication as a noniconic process

Kiyomi suggests the most common use of reduplication as a noniconic process involves expressing the meaning diminution. Thus diminution is the prototypical meaning and is classified into three types, diminution itself, aimlessness, and attemptive. These meanings are given below:

- (120) (ix) diminution - indicates the action of the stem is done on a small scale.
 (x) aimlessness - represents the action is done without purpose.
 (xi) attemptive - indicates the action is attempted.

An example of diminution in Maori is *neke* 'move', *nekeneke* 'move gradually'. In section 3.3.11 I suggested that reduplication in Maori can express randomness, e.g. *ākiri* 'throw away, reject' *ākirikiri* 'throw away piecemeal'. In my opinion randomness could cover the meaning aimlessness. The two meanings, diminution and randomness, do not appear to be very productive in Maori. Reduplication meaning attemptive is not attested in Maori.

Kiyomi notes there are other noniconic meanings other than diminution. These are easiness, future and imperative, e.g.

- (121) (xii) easiness - indicates that the action implied by the stem is done easily.
 (xiii) future - indicates the future tense of the stem.
 (xiv) imperative - indicates a direct command.

None of these three meanings are unattested in Maori.

Finally Maori has another meaning of verb reduplication not covered by (i) - (xiv). This meaning I term punctual, meaning an action is only undertaken once, e.g. *paki* 'slap' *papaki* 'slap together - once'. It is unclear whether Kiyomi would classify this as an example of diminution or an extra category under diminution is required to cover such examples.

3.4.3 *Word class changes*

Kiyomi (1995) considers the use of reduplication to change word class to be another example of the noniconic use of reduplication. Twenty-two out of the thirty languages surveyed have word class changes. Reduplication of nouns is used to form adjectives, adverbs, and verbs;

reduplication of verbs is used to form nouns, adjectives, and adverbs.

In Maori, I suspect the reduplication of nouns and verbs to form adjectives is productive. Examples from 3.3.6 include *penu* (v.t.) ‘smear’, *pepenu* ‘smeared, painted’; *ngaru* (n.) ‘wave of the sea’ *ngarungaru* ‘rough with waves’.

There are examples of the reduplication of verbs to form nouns and the reduplication of nouns to form verbs in Maori, e.g. *pako* (v.t.) ‘plant, glean’, *pakopako* ‘gleanings’; *tūtanga* ‘portion, division’, *tūtangatanga* (v.t.) ‘cut into portions, divide’. However I suspect this use of reduplication is no longer productive in modern Maori. In Maori the formation of adverbs through the reduplication of either a noun or verb is not productive.

3.4.4 *Summary of the semantics of reduplication in Maori in Kiyomi’s framework*

The framework proposed by Kiyomi (1995) can adequately account for the meanings attested in the reduplication of nouns and verbs in Maori. It appears the meanings found in Maori are very much typical of those found in other Malayo-Polynesian languages. I noted that the distinction between frequentative/repetition and continuous is not clear in Maori. Kiyomi’s examples also do not provide convincing evidence that such a distinction can be made. Maori has one category of noniconic reduplication (of verbs) not found in the other 30 surveyed languages. This is ‘punctual’ which I assume would be classified under the general heading diminution. I suggested randomness more aptly describes certain reduplication in Maori, Kiyomi (1995) may have classified this as aimlessness. Finally, Kiyomi has drawn data from 30 languages from a group of approximately 1000 languages. This is a small sample of this group and no doubt further research on reduplication in other languages of this group would find meanings not covered by Kiyomi (1995), and provide a clearer picture of what meanings are typical across this language group.

4 Other aspects of reduplication

4.1 Introduction

This section looks at aspects of reduplication in Maori not covered adequately by the first three chapters.

4.2 Reduplication and other affixes

Modern Maori has three productive affixes, the causative prefix *whaka-*, the passive suffix *-Cia*, and the nominalizing suffix *-Canga*. A fourth suffix the agentive prefix *kai-* may be gaining in breadth of distribution perhaps due to its inclusion to a number of new words created by organisations such as the Te Taura Whiri i te Reo Māori. Traditionally, *kai-* was only prefixed to transitive verbs¹ to form nouns denoting agents (Williams 1971). However note the following newly created terms:

- | | | |
|------------------------|----------------|--|
| (122) <i>kaitūtoko</i> | ‘pole vaulter’ | Te Matatiki 1996 (<i>tūtoko</i> ‘pole vault’ Best (1976)) |
| <i>kaiwaewae</i> | ‘pedestrian’ | Te Matatiki 1996 (<i>waewae</i> ‘leg, foot’) |

Three of the above terms involved the use of a reduplicated stem. It appears that reduplicated stems appearing in newly created terms involving the agentive prefix *kai-* tend to use complete reduplication as opposed to partial reduplication. On one occasion partial and complete reduplications of the same stem are used to distinguish between two nouns:

- | | | |
|------------------------|---------------------|--|
| (123) <i>kaititiro</i> | ‘attesting witness’ | Te Matatiki 1994 (<i>titiro</i> ‘look, survey, view’) |
| <i>kaitirotiro</i> | ‘inspector’ | Te Matatiki 1994 (<i>tiro tiro</i> ‘look about, investigate’) |

The highly productive causative prefix *whaka-* can be applied to reduplicated forms (Bauer 1993:516). However the passive suffix *-Cia* and the nominalising suffix *-Canga* have some restrictions. Bauer notes:

If the stem contains an initial reduplication, the passive form is usually not reduplicated:

¹ Williams (1971) gives too few examples of *kai-* being used in this sense to determine whether there are any restrictions on the affixation of *kai-* to particular patterns of reduplicated stems.

titiro	>	tirohia ²	‘look’
tatari	>	taaria	‘wait for’

but note

hoehoe	>	hoehoea	‘ferry’
mukumuku	>	mukumukua	‘wipe’ (Bauer 1993:398)

At least one term *pupuri* ‘hold, retain’ seems to be passivised in modern Maori as *pupuritia* rather than *puritia* as listed in Williams (1971).

The nominalising suffix *-Canga* also is applied more often to unreduplicated stems. This point also is noted by Bauer:

There are a number a forms where, although the base is commonly reduplicated, the nominalization, like the passive is not reduplicated, eg.

titiro	‘look at’	tirohanga	‘looking’
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However, there are nominalizations of the reduplicated forms, eg.

tirotiro	‘look about, investigate’	tirotirohanga	‘a sight’
huihui	‘gather, meet, assembly’ (Bauer 1993:513)	huihuinga	‘gathering’

It appears that completely reduplicated stems are more attested with both the passive and nominalising suffix than partially reduplicated stems. Complete reduplication is far more productive than partial reduplication, and given the wider range of meanings associated with complete reduplication it is expected that completely reduplicated stems will surface more often with forms of affixation.

It is worth mentioning that in at least biblical Maori reduplicated stems in Maori can be used as ‘bases’ to which affixes can be applied:

(124) <i>titari</i> ‘scatter about disperse’	<i>tītaritari</i>	<i>whaka-tītaritari-a</i>
<i>pōkare</i> ‘be agitated’	<i>pōkarekare</i>	<i>whaka-pōkarekare-a</i>
<i>paru</i> ‘dirt’	<i>paruparu</i>	<i>whaka-paruparu-a</i>

² Although ‘tirotirohia’ is not listed in Williams 1971 it does appear in the Maori bible (1952), e.g. 1 Sam 15:35.

4.3 Doublets

One aspect of reduplication in Maori which has received some attention in the literature is the existence of reduplication doublets, i.e. a stem with two reduplicated forms with identical meanings. This section will attempt to offer a possible alternative explanation for the existence of some reduplication doublets.

Some doublets result from the reduplication of either element of a compound. Examples of this include:

(125) Stems

Reduplications

<i>kū</i> ‘liquid’, <i>wai</i> ‘liquid, wet’	<i>kūkūwai</i> , <i>kūwaiwai</i> ‘wet, watery’
<i>pū</i> ‘pipe, tube, flute’, <i>tara</i> ‘conch shells used as wind instrument’	<i>pūpūtara</i> , <i>pūtātara</i> , <i>pūtaratara</i> ‘trumpet, horn’

Another group of reduplication doublets which are not compounds are given below. The reduplications of these forms do not always have the same meaning:

(126) Stems

Reduplications

<i>hōkai</i> ‘far apart’	<i>hokahokai</i> ‘extend’ <i>hōkaikai</i> ‘extend and retract alternately’
<i>mōkai</i> ‘slave; pet’	<i>mokamokai</i> , <i>mōkaikai</i> ‘tame bird/animal’
<i>pātai</i> ‘ask’	<i>patapatai</i> , <i>pātaitai</i> ‘ask (frequentative)’
<i>pōtae</i> ‘encircling’	<i>potapotae</i> ‘roundabout’

I mentioned in section 1.6.1 that Krupa claimed a doublet pair like *hokahokai/hōkaikai* resulted from different parses of simplex stem, i.e. *hoka-i*, and *ho-kai* respectively. Harlow (1991) claimed this pair resulted from a simplex form having alternative reduplication patterns. I would like to suggest that the more likely reason for such pairs is historic. One form of these reduplications reflect an earlier stage in the language when the transitivising suffix could be applied to the simplex stem. Note the following reconstruction for the term *pātai* from the 1995 version of POLLEX. The PN entry shows the reconstructed Proto-Polynesian term and its gloss. The cognate forms from each daughter language are listed below:

(127) PN PAATA(PAATA)³

PN :Loud-mouthed, boastful

EUV Paatapaata. :Impertinent, malhonnête, malin, audacieux, grossier (Rch).

MAO Paatai(tai). :Provoke, challenge, jeer, mock; question, inquire (WMs).

MAO1 Patapata/i. :Freq. of above.

SAM Paata. :Blustering, bullying (when help is near) (Prt).

SAM1 Paatapata. :Redupl. of above (Prt).

TON Paatapata. :Have a lot to say; keep on expressing one's opinion; be jubilant (Cwd).

Thus for a doublet pair such as *patapatai/ pātaitai*, the first form is the original form, the second form *pātaitai* derives from analogy to other trimoraic/quadrimoraic stems under Harlow's pattern 4 reduplication, which is by the far the most productive pattern for trimoraic/quadrimoraic stems. The second form emerged after the transitivity suffix *-i lost productivity in the language and became realised as part of the stem.

This analysis will not account for *potapotae* 'roundabout' (cf. *pōtae* 'encircling') which contains no final -i. The Maori reduplication pattern *patapatai* of PN *paatapaata* has an initial short vowel which is difficult to account for.

4.4 Metathesis and reduplication

There are a number of words in Maori showing metathesis (see Bauer 1993:568,569). I mentioned in section 2.4.5 some reduplications in Maori undergo metathesis. The meaning of reduplications are not altered by metathesis. Examples are:

(128) Reduplications	Gloss
<i>ekieki/ikeike</i>	'tall'
<i>hangehange/hengahenga</i>	'a shrub'
<i>hikuhiku/kihukihu</i>	'fringe, edge of cloak'
<i>honuhonu/nohunohu</i>	'nauseous'
<i>kōhumuhumu/kōmuhumuhu</i>	'whisper'

³ Biggs notes: MAO reflects the transitivity suffix *-i.

<i>kōhungahunga/kōngahungahu</i>	‘infant, crushed’
<i>kōmuramura/kōramuramu</i>	‘eat at odd times’
<i>kongakonga/ngakongako</i>	‘crumbs, chips’
<i>kōngarangara/kōrangaranga</i>	‘colic’
<i>kotokoto/tokotoko</i>	‘a staff’
<i>ngirangira/ringaranga</i>	‘hand’
<i>pāharahara/pāraharaha</i>	‘flat cord’
<i>pōkurukuru/pōrukuruku</i>	‘lumpy, full of lumps’
<i>pūngitangita/pūtangitangi</i>	‘a prickle’
<i>tūngarangara/tūrangaranga</i>	‘fatigued, wearied’

4.5 Assimilation and reduplication

Assimilatory processes in Maori are mentioned in Bauer (1993). Assimilation can also occur within reduplications in Maori, examples are given below:

(129) Reduplications	Gloss
<i>kōramuramu/kāramuramu</i>	‘compress’
<i>mānukanuka/mānakanaka</i>	‘anxiety, misgiving, apprehension’
<i>mārohirohi/mōrohirohi</i>	‘strong’
<i>ngahengahe/ngehengehe</i>	‘forest’
<i>whāterotero/whēterotero</i>	‘protrude’

5 Reduplication data

5.1 Introduction

This section describes the reduplication data cited in the appendices.

5.2 Methodology

The primary source of Maori reduplication data is Williams (1971). Williams was scoured for reduplication data at least three times. However, some reduplications may have been missed. All data were entered into Microsoft Excel spreadsheets. The spreadsheets are listed in the appendices. Maori reduplication data coming from sources other than Williams (1971) are listed in appendix A.

5.3 Caveats

The reduplication data cited should strictly be termed potential reduplication data. A number of forms I have listed as reduplications may in fact not be reduplications, e.g. *ahiahi* (PPN **afiafi* ‘evening’). Other apparent reduplications may result from prefixation rather than reduplication. It is possible that some reduplications I have listed as deriving from a particular base or stem, may derive from different bases or stems.

5.4 Interpretation of tables

Column percentages may not always total to 100 percent due to rounding of percentages to whole numbers.

5.5 Division of reduplication data

Reduplications are classified on the basis of the surface stem or base of origin. This classification is given below:

- (130) 1) Two morae (bimoraic) bases (C)V(C)V
 2) Three morae (trimoraic) stems/ (C)V(C)V(C)V/
 four mora (quadrimoraic) stems (C)V(C)V(C)V(C)V
 3) Five or more mora (multimoraic) stems

5.6 Totals

A total of 2835 reduplications were found, excluding reduplication of words derived from English. A further search of Maori texts would increase the number of reduplications attested. Totals are given in table 3. Light R indicates reduplications of one mora, heavy R means reduplications of more than one mora.

Table 3
Reduplications found

Stem	No. of stems	Light (σ) R		Heavy ($\sigma\sigma$) R		total (light +heavy)
Bimoraic	812	322	28%	829	72%	1151
Tri/Quadrimoraic	952	36	4%	939	96%	975
Multimoraic	32	4	10%	36	90%	40
Frozen		71	10%	615	90%	686
total		434	15%	2418	85%	2852

5.7 Bimoraic bases

There were 812 bimoraic bases which undergo reduplication. Four of those 812 bimoraic bases had no attested simplex forms¹ but more than one reduplication, e.g. **whaki*, *whawhaki*, and *whakiwhaki*.

Words such as *hahohaho* which have no attested base (**haho*), nor any other pattern of reduplication were not included. There were 71 of these words, some of which may historically have been reduplications.

The following table outlines the description of each pattern. Patterns 1 and 2 are partial reduplications. Pattern 3 is complete reduplication.

Table 4
Description of bimoraic patterns

Base	Pattern 1	Pattern 2	Pattern 3	Pattern 4
(C)V(C)V	(C)V-	(C)V1V1-	(C)V1(C)V2-	other
e.g. <i>kama</i>	<i>kakama</i>	<i>kākama</i>	<i>kamakama</i>	other

In the above table ‘other’ include *kākatikati*, *popopono* and *tetēā*. The following are not included in these graphs and tables:

- (131) *aki, āki; haro, hāro; hou, hōu; koe, koē; maha, māha; mahu, māhu; manga, mānga; manu, mānu; mara, māra; mati, māti; piho, pīho; uhi, ūhi; uwhi, ūwhi.*

Many of the above pairs are not related.

The number of occurrences² of reduplications of bimoraic bases is given in figure 1:

¹ These were **maku*, **tike*, **tanga*, and **whaki*.

² These are occurrences I have found examples of. These totals are by no means an exhaustive list of all occurrences of reduplication in Maori.

Figure 1*Number of reduplicated forms deriving from bimoraic bases*

N = 1151

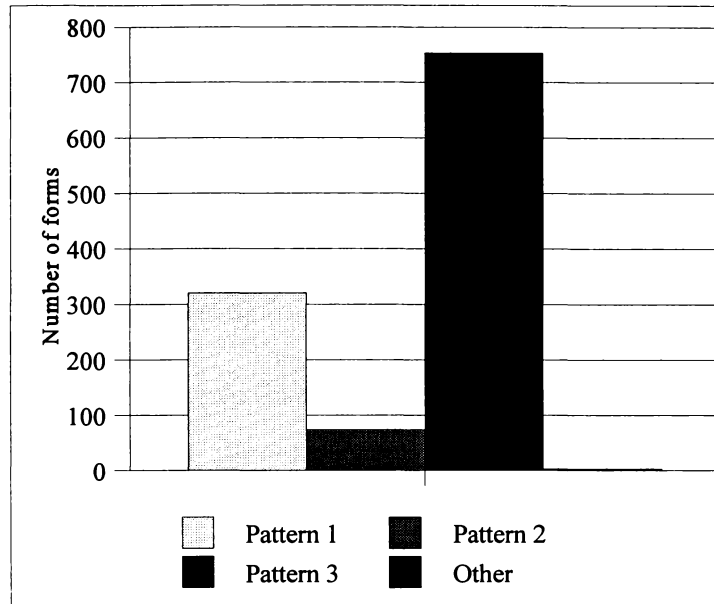


Figure 1 shows pattern 3, complete reduplication, is by far the most attested pattern of reduplication of bimoraic bases accounting for 65 percent (752 of 1150) of the bimoraic base reduplications. Pattern 1 reduplications account for 28 percent (321 of 1150), and pattern 2 accounts for 6 percent (74 of 1150).

5.7.1 Patterns of reduplication attested with each bimoraic base

Table 3 displays the number of patterns occurring with each bimoraic base. For example there were 450 bimoraic bases out of a total of 812 (55%) whose only attested pattern of reduplication was a pattern 3, i.e. a complete reduplication. There were 244 (of 812) bimoraic bases (30%) having both a pattern 1 and pattern 3 reduplication. All reduplications deriving from bimoraic bases are listed in appendix B.

Pattern 3 includes 86 bases of the shapes VCV and V₁V₂ which only undergoes complete reduplication. Ninety-three percent (753 out of 812) of bimoraic bases undergo complete reduplication.

Table 5*Patterns attested with each bimoraic base*

No.of occurrences	Pattern 1	Pattern 2	Pattern 3
450			*
244	*		*
45	*		
32	*	*	*
27		*	*
14		*	
1	*	*	
Totals	321	74	753

Not all two morae bases undergo reduplication. Examples include *hume* ‘bring to a point, taper off’, *hume* ‘abundance’, *kenu* ‘flat-nosed’, and *kepa* ‘thumb cord’.

5.8 Trimoraic and quadrimoraic stems

Reduplications from trimoraic and quadrimoraic stems were listed together based on attested surface stem. Some reduplications listed as deriving from a quadrimoraic stem may derive from a trimoraic stem. An example of this is *pātaitai* which is listed as a reduplication of the stem *pātai*. Harlow (1991) claims that *pātai* is derived from the unattested **patai*. The existence of words having trimoraic and quadrimoraic variants means it is difficult to determine whether or not a particular reduplication derives from a trimoraic or quadrimoraic stem. An example is the form *ānininini* ‘reeling’, which may derive from *anini* or *ānini* ‘giddy, aching of the head’. All reduplications deriving from trimoraic and quadrimoraic are listed in appendix C.

5.8.1 Patterns of trimoraic/quadrimoraic stems

Patterns of trimoraic/quadrimoraic stems are illustrated in table 6 by three non-existent forms **manapa*, **māpata*, and **manapata*.

Table 6*Description of trimoraic/quadrimoraic patterns*

stem		manapa	māpata	manapata
Pattern 1	μ1-	mamanapa	-	mamanapata
Pattern 2	μ1μ2-	manamanapa	māmāpata	manamanapata
Pattern 3 ³	μ2 (&v)	mānanapa	māpapata	-
Pattern 4 ⁴	-μ2μ3 (&v) or -μ3μ4 (&v)	mānapanapa	māpatapata	manapatapata
Pattern 5	other	māmanapa		

Pattern 1 is a unimoraic syllable prefixed to the stem. There are no attested pattern 1 reduplications prefixed to words whose initial syllable is of the shape CV₁V₁.

Pattern 2 is a bimoraic syllable prefixed to the stem.

Pattern 3 is Harlow's (1991) pattern 2, i.e., reduplication of the first two syllables with dissimilation of the repeated consonant in σ1σ1. The alternative analysis is only the second syllable is reduplicated and the first vowel undergoes lengthening only if it is not a long vowel in the simplex. There were no attested pattern 3 reduplications of stems having the shape CVCVCVCV.

Pattern 4 is Harlow's (1991) pattern 4, reduplication of all three syllables σ1σ1σ2σ3σ2σ3 with dissimilation of the repeated consonant in σ1σ1. Alternatively the second and third syllable are repeated (suffixed) and the first vowel is lengthened. Also included were stems in which only the last two syllables were repeated (suffixed).

Pattern 5 where reduplications other than patterns 1 to 4. A large number of these are likely to derive from prefixation to a reduplicated stem. Some forms such as *atiutiu* 'a shellfish' probably should be listed as *ātiutiu*, i.e. the vowel designation in Williams (1971) may not be accurate.

³ The second syllable of the simplex is either infixated or prefixed to the second to last syllable of the reduplicated stem with the first vowel lengthened if it is not already long.

⁴ Harlow's (1991) pattern 4 and reduplication of the last two syllables.

There are small two groups within pattern 5 which require further comment.

- (132) (i) Reduplications including *araarai* (cf. *ārai*), *hapahapai* (cf. *hāpai*), *patapatai* (cf. *pātai*), *pokapokai* (cf. *pōkai*), *potapotae* (cf. *pōtae*), and *taratarai* (cf. *tārai*).

Harlow (1991) claims these forms derive from reduplicating the first two syllables of the unattested trimoraic (underlying) forms. The second group is given below.

- (133) (ii) Reduplications including: *kāpīpiti* ‘abut, rest against’ (cf. *kapiti* ‘narrow pass, joined, clenched’); *mōwhīwhiti* ‘jump’, (cf. *mōwhiti* ‘jump’); *pākākaha* ‘strenuous’ (cf. *pākaha* ‘violent, severe’); *pūtātara* ‘shells used as orns’ (cf. *pūtara* ‘shells used as horns’); *tūpāpaku* ‘corpse, invalid’, (cf. *tūpaku* ‘wasted, weak, listless’).

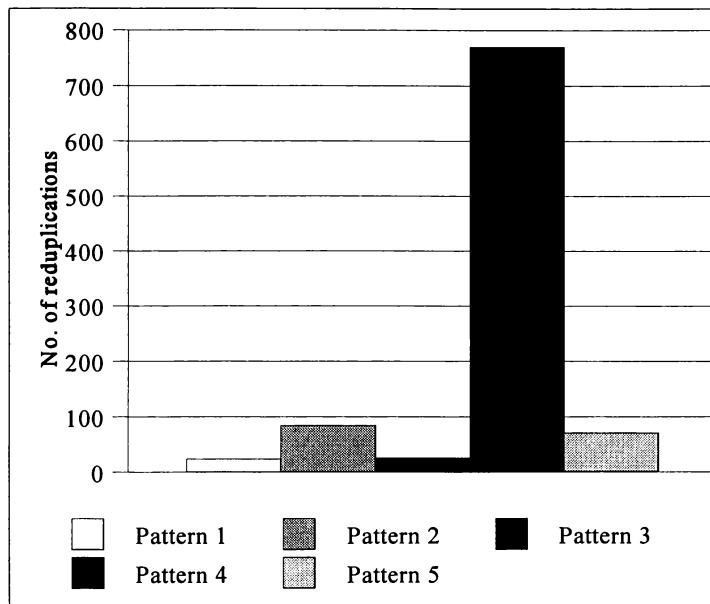
Some forms such as *pūtātara* may derive from compounding or affixation to a reduplicated stem.

The number of attested patterns deriving from trimoraic/quadrिमoraic stems is given in figure 2.

Figure 2

Number of reduplicated forms deriving from trimoraic/quadrimoraic stems

N = 975



5.8.2 Patterns attested with each stem

Pattern 4 is clearly the most productive pattern of reduplication for trimoraic and quadrimoraic stems. Seventy-five percent of trimoraic stems (288 out of 384) only had a pattern 4 reduplication. Seventy percent (395 out of 568) of quadrimoraic stems only had a pattern 4 reduplication. There were thirty eight ‘pairs’ of tri/quadrimoraic stems, e.g. *ānini*, *anini*. Eighty-four percent (770 out of 915) of the stems in this group had a pattern 4 reduplication.

Three trimoraic stems only had pattern 1 reduplications. Eight quadrimoraic stems only had pattern 1 reduplications.

Twenty-four trimoraic stems only had pattern 2 reduplications. Thirty-eight quadrimoraic stems only had pattern 2 reduplications.

Eight trimoraic stems only had pattern 3 reduplications. Fourteen (of 26) of the pattern 3 reduplications also had a pattern 4 reduplications.

No stems had all four patterns of reduplication.

6 Conclusion

The aim of the thesis was to make a thorough study of both the formal and semantic properties of reduplication in Maori.

The first chapter examined previous attempts to describe reduplication in Maori. Some early authors were found to have briefly mentioned reduplication in their descriptions of Maori. While more recent authors such as Krupa (1966) and Biggs (1966) correctly identify many of the formal aspects of reduplication in Maori, they fail to note a number of semantic properties of reduplication in Maori. Harlow (1991) is perhaps the first analytical attempt to explain some of the puzzling formal aspects of reduplication in Maori.

The second chapter looked at reduplication in Maori within a Generative framework. The units of reduplication in Maori were given in prosodic terms. These prosodic units appear to be more restrictive than prosodic units of reduplication in other Polynesian languages. The comparison of the formal aspects of reduplication in Maori to other Polynesian languages requires further research. Two very recent attempts to account for reduplication in Maori within Optimality Theory were critiqued. These attempts were found to be quite different in their respective approaches. Neither attempt provides a convincing account of Maori reduplication data. Several aspects of Maori reduplication were found to be difficult to account for in current versions of Correspondence Theory (within Optimality Theory). These include i) the complex stress system of Maori, ii) initial vowel lengthening in certain patterns of reduplication, and iii) doublets, i.e. words with different reduplication patterns expressing the same meaning. The interaction of stress, footing and vowel lengthening in Maori requires further investigation.

The third chapter described the semantics of reduplication in Maori. The various meanings of reduplication in Maori found are: plurality of adjectives, verbs and nouns, of subject and objects of verbs, distributive plural; intensification; diminutive; nominalization; verbal; adjective; frequentative; punctual; reciprocal; randomness; habitual; other.

The semantics of reduplication in Maori was able to be accommodated within the framework of Kiyomi (1995) which was used to describe the semantics of reduplication in Malayo-Polynesian (Austronesian) languages. However, Kiyomi's distinction between the meanings of repetition/continuation and progressive actions is not convincing.

The comparison of the semantics of reduplication in Maori to the semantics of reduplication in other Polynesian languages is another area that requires further research.

The fourth chapter commented on some descriptive aspects of reduplication in Maori not covered by the previous three chapters. This included the occurrence of reduplication patterns with other affixes and another possible explanation for some reduplication doublets.

The fifth chapter gave statistics on the reduplication data collated in the appendices. Reduplication data were divided according to the number of mora in the stem (or base) of origin. For bimoraic bases the most common attested pattern was complete reduplication, followed by partial reduplication of one mora (prefixed to the base), and then partial reduplication of the shape CV_1V_1 prefixed to the base. For trimoraic/quadrिमoraic stems the most common pattern of reduplication was Harlow's (1991) pattern 4. Other trimoraic/quadrिमoraic patterns appear to be not as productive as pattern 4. Some examples of reduplication of multimoraic stems were found. These usually involved the reduplication of either the right- or left-hand element of a compound. A sizable number of frozen reduplications were found.

Finally, the variation in the use of reduplication across dialects, and other dialectal differences of Maori phonology in general are areas that require further research.

Appendices

Appendix A

Maori Reduplications not in Williams 1971

The following appendix contains a list of reduplications in Maori, not cited in Williams (1971).

Word	Reduplicated form(s)	Gloss	Source
<i>aroha</i>	<i>whakaaroharoha</i> <i>aroharoha</i>	‘to make sad’ ‘to be sad, rousing’ ‘compassion’	Karetu (1987:25,31,70) Moorfield (1993:178)
<i>hao</i>	<i>haohao(-a)</i>	‘to catch in a net’	Moorfield (1993:179)
<i>hapi</i>	<i>hapihapi</i>	‘crooked, pigeon toed’	Moorfield (1989:152)
	<i>hawihawī</i>	‘?’	Broughton (1993:150)
<i>hitako</i>	<i>hitakotako</i>	‘to yawn freq.’	Moorfield (1989:153)
<i>hōkari</i>	<i>hōkarikari</i>	‘to stretch out legs’	Moorfield (1993:181)
<i>hopi</i> (Eng ?)	<i>hopihopi</i>	‘to soap oneself’	Moorfield (1989:153)
<i>horoi</i>	<i>horohoroi</i>	‘wash’	Moorfield (1988:145)
<i>huti</i>	<i>hutihutia</i>	‘pull out’	Broughton (1993:171)
<i>hūpeke</i>	<i>hūpekepeke</i>	‘bend arms or legs, jump up and down’	Moorfield (1993:182)
<i>iti</i>	<i>itiiti</i>	‘small, few’	Karetu (1984:185, 1987:12) Moorfield (1992:183) Ngata (1993:277,488)
<i>inohi</i>	<i>inohinohi</i>	‘scaly’	Ngata (1993:412)
<i>kāpiro</i>	<i>kāpiropiro</i>	‘entrails, ?’	Broughton (1993:98)
<i>kanga</i>	<i>kangakanga</i>	‘to curse, swear freq.’	Moorfield (1989:155)
<i>karawhiu</i>	<i>karawhiuwhiu</i>	‘whirl, swing around’	Broughton (1993:185)
<i>kati</i>	<i>kākatikati</i>	‘chewy’	Moorfield (1992:184)
<i>kite</i>	<i>kitekite</i>		Kaa (1994:127)
<i>kōhine</i>	<i>kōhinehine</i>	‘girl, girlhood’	Broughton (1993:31)
<i>kore</i>	<i>korekore</i>	‘not, a negative’	Karetu (1987:7,8)
<i>maha</i>	<i>mahamaha</i>	‘many’	Broughton (1993:25)
<i>mahana</i>	<i>māhanahana</i>	‘lukewarm’	Paipera (1953:277)
<i>maheni</i>	<i>māheniheni</i>	‘smooth, sleek’	Moorfield (1989:158)
<i>marena</i>	<i>mārenarena</i>	‘marry’	Paipera (1953:204)
<i>māpura</i>	<i>māpurapura</i>	‘flash, fire’	Te Wharekura 8:36
<i>mataku</i>	<i>mātakutaku</i>	‘scared, afraid’	Broughton (1993:18)
<i>*mohina</i>	<i>mōhinahina</i>	‘be grey coloured’	Moorfield (1993:192)
<i>muri</i>	<i>murimuri</i>	‘before’	Broughton (1993:87)
<i>noho</i>	<i>nohonoho</i>	‘to sit down, a number of people’	Moorfield (1988:160)
<i>ngaki</i>	<i>ngakingaki</i>	‘to weed’	Waititi (1985:96)
<i>ngaoko</i>	<i>ngāokooko</i>	‘to itch, tickle’	Moorfield (1993:193)
<i>ngau</i>	<i>ngaungau</i>	‘to chew’	Waititi (1985:96)
<i>ngaweki</i>	<i>ngāwekiweki</i>	‘crowded, crawling with’	Moorfield (1989:161)

<i>ngori</i>	<i>ngoringoria</i>	‘weak, listless’	Broughton (1993:142)
<i>ngotongoto</i>	<i>ngongoto</i>	‘make a clicking noise’	Moorfield (1993:193)
<i>pāhuka</i>	<i>pāhukahuka</i>	‘be frothy, foam’	Moorfield (1993:194)
<i>pakū</i>	<i>pakupakū</i>	‘resound’	Broughton (1993:140)
<i>panga</i>	<i>pangapanga</i>	‘to throw off, freq.’	Moorfield (1993:195)
?	<i>pāarakaraka</i>	‘be orange coloured’	Moorfield (1993:195)
<i>patō</i>	<i>patopatō</i>	‘knock’	Harlow (1991:126)
<i>pei</i>	<i>peipeia</i>	‘drive out, banish’	Paipera (1953:361) Te Wharekura 8:30
	<i>petipeti</i> (Eng)	‘to bet gamble’	Moorfield (1993:197)
<i>pīhau</i>	<i>pīhauhau</i>	‘to break wind’	Moorfield (1989:163)
<i>pōharu</i>	<i>pōharuharu</i>	‘be boggy’	Moorfield (1993:197)
<i>pōrangi</i>	<i>pōrangirangi</i>	‘occupied, distracted mad’	Kaa (1994:19)
<i>pūkana</i>	<i>pūkanakana</i>	‘make contortions’	Broughton (1993:32)
<i>pūkari</i>	<i>pūkarikari</i>	‘dig up’	Broughton (1993:184)
<i>puta</i>	<i>putaputa</i>	‘appear’	Karetu (1987:6)
?	<i>pūwakawaka</i>	‘to undulate, waver’	Moorfield (1993:200)
<i>rango</i>	<i>rangorango</i>	‘buzzing sound, like blowflies’	Moorfield (1993:200)
<i>raweke</i>	<i>rāwekeweke</i>	‘disturb, interfere’	Broughton (1993:30, 130)
<i>riwhi</i> (Eng)	<i>riwhiriwhi</i>	‘to riffle cards’	Moorfield (1993:202)
<i>rite</i>	<i>riterite</i>	‘same, alike’	Te Wharekura 8 :17
<i>rutu</i>	<i>ruturutu</i>	‘jolt, bump’	Waititi (1985:182) Moorfield (1993:203)
<i>tānoa</i>	<i>tānoanoa</i>	‘belittle’	Karetu (1987:68)
<i>pia</i>	<i>tāpiapia</i>	‘sticky’	Ngata (1993:453)
<i>tāroa</i>	<i>tāroaroa</i>	‘be tall, long’	Moorfield (1988:167)
<i>tārutu</i>	<i>tāruturutu</i>	‘jerk violently, stumbling’	Moorfield (1993:205)
<i>takahi</i>	<i>takatakahi</i>	‘to tread, traverse, disobey, violate’	Moorfield (1993:204)
<i>taurite</i>	<i>tauriterite</i>	‘be alike’	Karetu (1984:46)
<i>tāwhai</i>	<i>tāwhaiwhai</i>	‘to stretch, step out, pace, stride’	Moorfield (1993:205)
<i>tāwhio</i>	<i>tāwhiowhio(-tia)</i>	‘to spin’	Moorfield (1993:206)
<i>tawhiti</i>	<i>tāwhitiwhiti</i>	‘be widely separated’	Moorfield (1993:206)
<i>timo</i>	<i>timotimo</i>	‘peck, as a bird’	Moorfield (1993:207)
<i>tini</i>	<i>tinitini</i>	‘many, numerous’	Moorfield (1993:207) Karetu (1984:140)
<i>tioro</i>	<i>tīorooro(-tia)</i>	‘to make a harsh sound’	Moorfield (1993:207)
<i>tōiti ?</i>	<i>tōitiiti</i>	‘be tiny, dainty’	Moorfield (1993:208)
<i>tono</i>	<i>tonotono</i>	‘bossy’	Moorfield (1988:162)
<i>tote</i> (Eng)	<i>totetote</i>	‘salty’	Moorfield (1993:208)
<i>tūpuhi</i>	<i>tūpuhipuhi</i>	‘be slim, slender, thin skinny’	Moorfield (1993:209)
<i>tūtaki</i>	<i>tūtakitaki</i>	‘meet’	Broughton (1993:35) Moorfield (1989:170)
<i>waha</i>	<i>wahawaha</i>	‘carry on back’	Reedy (1993:26)

<i>wepu</i> (Eng)	<i>wepuwepu</i>	‘to whip, whipping’	Waititi (1985:186)
<i>weu</i> ?	<i>weuweu</i>	‘?’	Broughton (1993:55)
<i>whakatika</i>	<i>whakatikatika</i>	‘correct’	Karetu (1987:2)
<i>whata</i>	<i>whatawhata</i>	‘to hang, suspend’	Reedy (1979:29)
<i>whero</i>	<i>wherowhero</i>	‘red’	Reedy (1979:29)

Appendix B

Reduplications resulting from bimoraic bases

Base	Pattern 1	Pattern 2	Pattern 3
aha			ahaaha
ahi			ahiahi
aho			ahoaho
ahu			ahuahu
aka			akaaka
aki			akiaki
ako			akoako
ami			amiami
amu			amuamu
anu			anuanu
anga			anganga
angi			angiangi
apa			apaapa
api			apiapi
apo			apoapo
apu			apuapu
ara			araara
are			areare
ari			ariari
aro			aroaro
aru			aruaru
ata			ataata
ate			ateate
ati			atiati
ato			atoato
au			auau
awa			awaawa
awe			aweawe
awhe			awheawhe
awhi			awhiawhi
ea			eaea
eke			ekeeke
emi			emiemi
ene			eneene
enga			engaenga
epa			epaepa
eti			etieti
ewa			ewaewa
ewe			eweewe
hā			hāhā
hae	hahae		haehae
haka	hahaka		hakahaka
hake	hahake		hakehake
haki			hakahaki
hako			hakohako

hamu			hamuhamu
hana	hahana		hanahana
hane			hanehane
hani	hahani		hanihani
hanga			hangahanga
hango			hangohango
hao	hahao		haohao
hape			hapehape
hapi			hapihapi
hara			harahara
hare			harehare
hari	hahari		harihari
haro			haroharo
hau	hahau	hāhau	hauhau
hawa			hawahawa
hea			heahea
hē			hēhē
hei			heihei
heka			hekaheka
heke			hekeheke
heki	heheki		
hema			hemahema
hengi	hehengi		hengihengi
heru			heruheru
heu	heheu		
hewa			hewahewa
hia			hiahia
hī	hihī		hihī
hihi			hihihihi
hika			hikahika
hiki			hikihiki
hiko	hihiko		hikohiko
hiku			hikuhiku
hina			hinahina
hinu			hinuhinu
hinga	hihinga		hingahinga
hipa	hihipa		hipahipa
hira	hihira		hirahira
hiri	hihiri		hirihiri
hiwa	hihiwa		hiwahiwa
hiwi			hiwihiwi
hoa			hoahoa
hoe			hoehoe
hohe			hohehohe
hoi			hoihoi
hoia	hohoia		
hoka			hokahoka
hoki	hohoki		hokihoki
hoko	hohoko		hokohoko
honi	hohoni		honihoni
honu		hōhonu	honuhonu

hongī			hongihongi
hō	hohō		hōhō
hopi			hopihopi
hopo			hopohopo
hopu	hohopu		hopuhopu
hora			horahora
hore	hohore		horehore
hori			horihori
horo	hohoro		horohoro
hota	hohota		hotahota
hoto			hotohoto
hotu	hohotu		hotuhotu
hou	hohou		houhou
hua	huhua		huahua
hue	huhue		
hui			huihui
huka	huhuka		hukahuka
huke			hukehuke
huki			hukihuki
hunu	huhunu	hūhunu	hunuhunu
hura	huhura		hurahura
huri	huhuri		hurihuri
humu			humuhumu
huna			hunahuna
huru			huruhuru
huti	huhuti		hutihuti
hū	huhū		
ihi			ihiihi
ika			ikaika
ike			ikeike
ina			inaina
ine			ineine
inu			inuinu
ingo			ingoingo
io			ioio
ipu			ipuipu
ira			iraira
iri			iriiri
iro			iroiro
ita			itaita
iti			itiiti
kā	kakā		kākā
kaha	kakaha		kahakaha
kaho	kakaho	kākaho	kahokaho
kahu		kākahu	kahukahu
kai	kakai		
kaka		kākaka	kakakaka
take	kakake		takekake
kaku			kakukaku
kama	kakama		kamakama
kami			kamikami

kamo			kamokamo
kamu	kakamu		kamukamu
kana			kanakana
kani	kakani		kanikani
kano	kakano	kākano	kanokano
kanga	kakanga		kangakanga
kao	kakao		kaokao
kapa	kakapa		kapakapa
kape			kapekape
kapi	kakapi		
kapo			kapokapo
kapu	kakapu		kapukapu
kara	kakara	kākara	
kare	kakare		karekare
kari	kakari	kākari	karikari
karo	kakaro		karokaro
karu	kakaru		karukaru
kata	kakata		katakata
kati	kakati	kākati	katikati
kato	kakato		katokato
kau	kakau		kaukau
kawa	kakawa		kawakawa
kawe			kawekawe
kea			keakea
kē	kekē		kēkē
keha			kehakeha
kehi	kekehi		
keho	kekeho		kehokeho
kehu			kehukehu
keka			kekakeka
keke		kēkeke	kekekeke
keno	kekeno		
keri	kekeri		
keri	kekero		
kemo			kemokemo
kena	kekena		kenakena
keno	kekeno		kenokeno
kengo			kengokengo
keo			keokeo
kere			kerekere
keri	kekeri		kerikeri
keri	kekero		kerokero
kete	kekete		ketekete
ketu	keketu		ketuketu
keu	kekeu		keukeu
kewa			kewakewa
kiha			kihakiha
kihi	kikihi	kīkihi	kihikihi
kī	kikī		kikī
kiki		kīkiki	kikikiki
kiko			kikokiko

kimo	kikimo		kimokimo
kina			kinakina
kini	kikini		kinikini
kino	kikino		kinokino
kipa			kipakipa
kiri	kikiri		kirikiri
kita			kitakita
kite	kikite		kitekite
kiwa	kikiwa		kiwakiwa
kiwi			kiwikiwi
koa			koakoa
koe			koekoe
koha			kohakoha
kohe			kohekohe
kohi			kohikohi
kohu			kohukohu
koi	kokoi		koikoi
koki			kokikoki
komo	kokomo		komokomo
kome			komekome
kona			konakona
koni			konikoni
konga			kongakonga
kō			kōkō
kopa	kokopa		kopakopa
kopi	kokopi		kopikopi
kope			kopekope
kopu		kōkopu	
kora			korakora
kore			korekore
kori	kokori		korikori
koro	kokoro		korokoro
koru	kokoru		korukoru
kota		kōkota	kotakota
kote	kokote		kotekote
koti	kokoti		kotikoti
koto	kokoto		kotokoto
kou			koukou
kū	kūkū		kūkū
kuha			kuhakuha
kui			kuikui
kuka			kukakuka
kuku		kūkuku	
kume	kukume		kumekume
kumi			kumikumi
kumu			kumukumu
kune	kukune		
kupa	kukupu	kūkupa	kupakupa
kupi	kukupi		
kupu			kupukupu
kura			kurakura

kuru			kurukuru
kuta	kukuta	kūkuta	kutakuta
kuti	kukuti		kutikuti
kutu			kutukutu
mā			māmā
mae	mamae		maemae
maha	mamaha		mahamaha
mahi	mamahi		mahimahi
mahu	mamahu		
mai			maimai
maka			makamaka
maki			makimaki
mako			makomako
*maku	mamaku		makumaku
mama			mamamama
manga	mamanga		mangamanga
mangu		māmangu	mangumangu
mana			manamana
mano			manomano
manu			manumanu
mao	mamao		maomao
mara			maramara
mare	mamare		maremare
maru	mamaru		marumaru
mata	mamata		matamata
mate	mamate		matemate
mati			matimati
mato			matomato
mau	mamau		maumau
mea			meamea
meha	memeha		mehameha
meke	memeke		mekemeke
menge	memenge		
mene	memene		menemene
mere			meremere
mero			meromero
meto			metometo
miha	mimiha	mīmiha	mihamiha
mihi			mihimihi
miki	mimiki		mikimiki
miko			mikomiko
mina			minamina
mingo	mimingo		mingomingo
mingi			mingimingi
mira	mimira		miramira
miri			mirimiri
miro		mīmiro	miromiro
miti	mimiti		mitimiti
moa			moamoa
moe	momoe		moemoe
mohe	momohe		mohemohe

mohi			mohimohi
moho	momoho		
moi			moimoi
moka	momoka		mokamoka
moke	momoke		mokemoke
moki			mokimoki
mona		mōmona	
mono	momono		
more	momore		moremore
mori	momori		morimori
mote	momote		
motu	momotu	mōmotu	motumotu
mou			moumou
muhu			muhumu
mui			muimui
muku			mukumuku
mura	mumura		muramura
mure			muremure
muri			murimuri
mutu	mumutu		mutumutu
mū			mūmū
nā			nānā
nae			naenae
naha			nahanaha
nahe			nahenahe
naho			nahonaho
nahu	nanahu		
naka			nakanaka
naki			nakinaki
nako			nakonako
naku	nanaku		nakunaku
namu	nanamu		namunamu
nane			nanenane
nanu			nanunanu
nao	nanao		naonao
nape	nanape		
nati	nanati		natinati
natu	nanatu		
nau	nanau		naunau
nawe	nanawe		nawenawe
nehe			nehenehe
neko			nekoneko
nene		nēnene	
nepi			nepinepi
neti	neneti		
newa			newanewa
newha	nenewha		newhanewha
nihi	ninihi		nihinihi
niho	niniho		nihiniho
niki	niniki		
niko			nikoniko

nipi	ninipi		
niwa	niniwa		niwaniwa
noa			noanoa
nohi	nonohi		nohinohi
noho	nonoho		nohonoho
nohu			nohunohu
noi			noinoi
noke	nonoke	nōnoke	nokenoke
none			nonenone
nope	nonope		nopenope
noti	nonoti		
nou			nounou
nui	nunui		nuinui
nuke	nunuke		nukenuke
nuku			nukunuku
numi	nunumi		numinumi
ngā			ngāngā
ngae			ngaengae
ngaha			ngahangaha
ngahi			ngahingahi
ngahu	ngangahu		ngahungahu
ngai			ngaingai
ngaki			ngakingaki
ngake			ngakengake
ngako			ngakongako
ngaku			ngakungaku
ngana	ngangana		nganangana
ngange			ngangengange
ngao	ngangao		ngaongao
ngara	ngangara		ngarangara
ngare	ngangare		ngarengare
ngari			ngaringari
ngaro			ngarongaro
ngaru			ngarungaru
ngau	ngangau		ngaungau
ngawhi			ngawhingawhi
ngea			ngeangea
ngehe			ngehengehe
ngehi			ngehingehi
ngei			ngeingei
ngeki			ngekingeki
ngene			ngenengene
ngere	ngengere		ngerengere
ngero	ngengero		ngerongero
ngeri	ngengeri		
ngeti	ngengeti		
ngete			ngetengete
ngiha	ngingiha		ngihangiha
ngio	ngingio		
ngita	ngingita		ngitangita
ngohe	ngongohe		ngohengohe

ngoi	ngongoi		ngoingoi
ngora			ngorangora
ngori	ngongori		ngoringori
ngoro	ngongoro		
ngota			ngotangota
ngote			ngotengote
ngoto	ngongoto		ngotongoto
ngotu	ngongotu	ngōngotu	ngotungotu
ngunu			ngunungunu
nguru			ngurunguru
ngutu			ngutungutu
ngū			ngūngū
oha			ohaoha
oho			ohoho
oi			oioi
oka			okaoka
oke			okeoke
one			oneone
oni			onioni
onga			ongaonga
onge			ongeonge
ora			oraora
ore			oreore
ori			oriori
oro			orooro
oru			oruoru
ou			ouou
owha			owhaowha
pā	papā		pāpā
pae	papae		paepae
pahu	papahu		pahupahu
pai	papai		paipai
paka		pāpaka	pakapaka
pake			pakepake
paki	papaki	pāpaki	pakipaki
pako		pāpako	pakopako
paku	papaku	pāpaku	pakupaku
pana			panapana
pane	papane	pāpane	panepane
pani	papani		panipani
panga			pangapanga
pango		pāpango	
pao	papao		paopao
papa		pāpapa	
pape			papepape
papi			papipapi
para	papara	pāpara	parapara
pare	papare		parepare
pari		pāpari	paripari
paro			paroparo
paru	paparu	pāparu	paruparu

pata	papata		patapata
pati	papati		patipati
patu	papatu		
pawa			pawapawa
pē			pēpē
peha	pepeha		pehapeha
peho			pehopeho
pehu			pehupehu
pei			peipeia
peka			pekapeka
peke	pepeke	pēpeke	pekepeke
pena			penapena
penu	pepenu		penupenu
peo		pēpeo	
pere			perepere
pero			peropero
peru	peperu		peruperu
peti			petipeti
pia			piapia
piha	pipiha		pihapiha
pihe			pihepihe
pihi			pihipihi
pī	pipī		pīpī
piki			pikipiki
piko	pipiko		pikopiko
pine	pipine		pinepine
pio			piopio
pipi		pīpipi	pipipipi
piri		pīpiri	piripiri
piro	pipiro		piropiro
pito			pitopito
piu			piupiu
poa	popoa		poapoa
pō	popō		pōpō
pohe	popohe		pohepohe
poi	popoi		poipoi
poka			pokapoka
poke	popoke		pokepoke
poki	popoki		pokipoki
poko	popoko		pokopoko
pona	popona		ponapona
pono	popono		
ponga			pongaponga
popo		pōpopo	popopopo
pora			porapora
pore	popore		porepore
poro	poporo	pōporo	poroporo
pota			potapota
poti	popoti		potipoti
poto	popoto		potopoto
pou			poupou

pua			puapua
puha	pupuha		puhapuha
puhi	pupuhi		puhipuhi
puka			pukapuka
puke	pupuke		pukepuke
puku			pukupuku
puni	pupuni		punipuni
punga			pungapunga
pura			purapura
pure	pupure		purepure
puri	pupuri		puripuri
puru	pupuru		purupuru
puta	puputa	pūputa	putaputa
putu	puputu	pūputu	putuputu
pū	pupū		pūpū
rā	rarā		rārā
rae			whakaraerae
raha			raharaha
rahi	raahi		rahirahi
raho			rahoraho
rahu	raahu	rārahu	rahurahu
rai	rarai		
raka	raraka		rakaraka
rake			rakerake
rako			rakorako
raku	raraku		rakuraku
rama	rarama		ramarama
ramu	raramu		
ranga	raranga		rangaranga
rangi		rārangi	rangirangi
rango			rangorango
rapa	rarapa		raparapa
rapi	rarapi		
rapu			rapurapu
raru	rararu		raruraru
rata	rarata		ratarata
rau	rarau		raurau
rawa	rarawa		whakarawarawa
rawe	rarawe		
rawhi	rarawhi		
rea			rearea
rehe			reherehe
reho	rereho		rehoreho
rehu	rerehu		rehurehu
rei	rerei		
reka			rekareka
reke			rekereke
reko			rekoreko
remu			remuremu
rena	rereana		renarena
renga			rengarenga

reo		reoreo
repe		reperepe
repo		reporepo
rere	rēre	rererere
reu		reureu
rewa		rewarewa
rewha		rewharewha
ria		riaria
riha		rihariha
rika	ririka	rikarika
riki	ririki	rikiriki
riko	ririko	rikoriko
rimu		rimurimu
rino	ririno	rinorino
ringa		ringaringa
ringi	riringi	ringiringi
rio	ririo	riorio
ripi	riripi	ripiripi
ripo		riporipo
rire		rirerire
riri	rīri	
riro		riroriro
rite		riterite
rito		ritorito
riu	ririū	
riwhi		riwhiriwhi
roa	roroa	roaroa
rō		rōrō
roha		roharoha
rohe		roherohe
roi	roroi	roiroi
roke		rokeroke
roki		rokiroki
roko		rokoroko
roku	roroku	rokuroku
romi	roromi	romiromi
rona		ronarona
rongo	rorongo	rongorongo
ropi	roropi	ropiropi
rore		rorerore
rori		rorirori
roro	rōro	
rota		rotarota
rotu	rorotu	
rou		rourou
rua	rūrua	ruarua
rū		rūrū
ruhi	rūruhi	
ruirui		ruirui
ruke		rukeruke
ruki		rukiruki

ruku	ruruku		rukuruku
runa			runaruna
rupe			rupeupe
ruri			ruriruri
ruru		rūruru	rurururu
rutu	rurutu		ruturutu
tā	tatā		tātā
tae			taetae
taha	tataha		tahataha
tahe	tatahe		
tahi		tātahi	tahitahi
tahu			tahutahu
tai			taimai
taka		tātaka	takataka
take			taketake
taki	tataki	tātaki	takitaki
tako			takotako
taku	tataku	tātaku	takutaku
tama			tamatama
tame			tametame
tami			tamitami
tamu			tamutamu
tane			tanetane
*tanga	tatanga		tangatanga
tangi	tatangi		tangitangi
tango	tatango		tangotango
tao	tatao		taotao
tapa			tapatapa
tapi			tapitapi
tapu			taputapu
tara	tatara	tātara	taratara
tare	tatare		taretare
tari	tatari	tātari	taritari
taro			tarotaro
taru			tarutaru
tata		tātata	
tatu			tatutatu
tau	tatau		tautau
tawa			tawatawa
tawhe			tawhetawhe
tawhi			tawhitawhi
tea	tetea		teatea
tē	tetē		tētē
tehe			tehetehe
teho			tehoteho
teka		tēteka	tekateka
teko			tekoteko
tena			tenatena
tene			tenetene
teno			tenoteno
tenga			tengatenga

teo			teoteo
tepe	tetepe		tepetepe
tere	tetere	tētere	teretere
tewe			tewetewe
tewha			tewhatewha
tia			tiatia
tie			tietie
tihi			tihitihi
tī			tītī
tika			whakatikatika
*tike		tītike	tiketike
tiki			tikitiki
tiko			tikotiko
timo			timotimo
timu			timutimu
tini			tinitini
tio			tiotio
tipa		tītipa	tipatipa
tipi		tītipi	tipitipi
tipu			tiputipu
tiri			tiritiri
tiro	titiro		tirotiro
titi		tītiti	
tiwaha	tiwiwaha		tiwhatiwaha
toa	totoa		toatoa
toe	totoe		toetoe
toha			tohatoha
tohe	totohe		tohetohe
tohi	totohi		tohitohi
tohu	totohu		tohotohu
toi	totoi		toitoi
toka	totoka		tokatoka
toke	totoke		
toki			tokitoki
toko	totoko		tokotoko
tomo			tomotomokanga
tona			tonatona
tone			tonetone
tono			tonotono
tonga			tongatonga
tongi			tongitongi
tō	totō		tōtō
topa			topatopa
tope	totope		topetope
topi			topitopi
tore			toretore
tori			toritori
toro	totoro		torotoro
toru		tōtoru	torutoru
tote			totetote
toti			totitoti

tou			toutou
tua			tuatua
tuhi			tuhituhi
tuke			tuketuke
tuki	tutuki	tūtuki	tukituki
tuku		tūtuku	tukutuku
tuma			tumatuma
tuna		tūtuna	
tunu			tunutunu
tunga			tungatunga
tungi	tutungī		tungitungi
tungu			tungutungu
tupa			tupatupa
tupu			tuputupu
tura			turatura
turi		tūturi	turituri
turu	tuturu	tūturu	turuturu
tute			tutetute
tutu			tūtutu
tū	tutū		tūtū
tuwha			tuwhatuwha
ua			uaua
ue			ueue
uhu			uhuhu
ui			uiui
uka			ukauka
uki			ukiuki
uku			ukuuku
unu			unuunu
upa			whakaupaupa
ura			uraura
ure			ureure
uri			uriuri
uru			uruuru
uta			utauta
uto			utouto
utu			utuutu
uwhi			uwhiuwhi
wā	wawā		wāwā
wae	wawae		waewae
waha			wahawaha
wai			waiwai
waka			wakawaka
waku			wakuwaku
wana	wawana		wanawana
wani			waniwani
wao	wawao		waowao
wara	wawara		warawara
ware			wareware
waro	wawaro		warowaro
waru			waruwaru

wata	wawata		watawata
wau	wawau	wāwau	wauwau
wawe			wawewawe
wē			wēwē
wehe			wehewehe
wehi	wewehi		wehiwehi
weku			wekuweku
wene			wenewene
wepu			wepuwepu
wera			werawera
were			werewere
weri			weriweri
wero	wewero		werowero
weru	weweru		weruweru
weteki(n)a	wetewete		
weti			wetiweti
wī	wiwī		wīwī
wini	wiwini		winiwini
wiri			wiriwiri
whā			whāwhā
whai	whawhai	whāwhai	whaiwhai
*whaki	whawhaki		whakiwhaki
whana			whanawhana
whanga			whangawhanga
whango	whawhango		
whao	whawhao		whaowhao
whara			wharawhara
whare			wharewhare
wharo	whawharo		wharowharo
whata			whatawhata
whati	whawhati		whatiwhati
whau	whawhau		whauwhau
whawhe			whawhewhawhe
whē			whēwhē
whei			wheiwhei
wheke			whekewheke
wheko			whekowheko
wheku			whekuwheku
whengo			whengowhengo
whengu			whenguwhengu
wheo			wheowheo
whera	whewhera		wherawhera
where			whaka- wherewhere
whero	whewhero		wherowhero
wheto			whetowheto
whengi	whewhengi		
whio			whiowhio
whiri			whiriwhiri
whiro			whirowhiro
whita	whiwhita		whitawhita

whiti			whitiwhiti
whiu	whiwhiu		whiuwhiu
whiwhi		whiwhiwhi	
(totals) 812	321	74	753

Appendix C

Reduplications resulting from trimoraic and tetramoraic stems

3mora stems	4mora stems	Pattern 1	Pattern 2	Pattern 3	Pattern 4	other
	āhiki				āhikihiki	
	āhua				āhuahua	
	āhuru				āhuruhuru	
	ākiri				ākirikiri	
	āmai				āmaimai	
	āmiku				āmikumiku	
	ānewa				ānewanewa	
	ānina				āninanina	
	ārai					araarai
	ārangi				ārangirangi	
	ārita				āritarita	
	ārohi				ārohirohi	
	aroaha					aroharoaha
	āwake				āwakewake	
	āwhiwhi					āwhiwhiwhi
	angamate		angaangamate			
akahu					ākahukahu	
amio					āmiomio	
anini	ānini				ānininini	
aniwa					āniwaniwa	
aroaha					aroharoaha	
atiu					ātiutiu	atiutiu
	hākere				hākerekere	
	hāpai					hapahapai
	hāpara				hāparapara	
	hāpuka				hāpukupuku	
	hārangi				hārangirangi	
	hārau				hāraurau	
	hāroto				hārotoroto	
	hāware				hāwareware	
haere					hāereere	
hakeka					hākekekakeka	
hakeke					hākēkeke	
hakiri					hākirikiri	
hamama					hāmamamama	
hamore					hāmomore	
hamumu					hāmumumumu	
	hangarau		hangahangarau			
hangoro					hāngorongoro	
hanguru					hangurunguru	
haraki					hārakiraki	
	harangote				harangotengote	
harore					hārorerore	
	hauā		hauhauā			
haunga					hāungaunga	
hawai			hawahawai			
	hīkei				hīkeikei	
	hīnohi				hīnohinohi	

	hīrau		hīraurau	
	hīrea		hīrearea	
	hītako		hītakotako	
	hītari		hītaritari	
	hītawe		hītawetawe	
	hīteki		hītekiteki	
	hītengi		hītengitengi	
	hītoki		hītokitoki	
	hīwera		hīwerawera	
hirori	hinamoki		hinamokimoki	
			hīrorirori	
hoata	hoia	hohoia hohoata		
	hōkai		hōkaikai	hokahokai
	hōkari		hōkarikari	
	hōngoi		hōngoi	
	hōpuru		hōpurupuru	
	hōripi		hōripiripi	
hopū			hōpūpū	
hopī			hōpīpī	
horoi		horohoroi		
	houpara		houparapara	
huaki		huahuaki		
huangi			hūangiangi	
hurori			hūrorirori	
hutoi	hūtoi	hūtotoi	hūtoitoi	
	hūkeri		hūkerikeri	
	hūmeke		hūmekemeke	
	hūmenge		hūmengemenge	
	hūngutu		hūngutungutu	
	hūpeke		hūpekepeke	
	hūware		hūwareware	
inohi			inohinohi	
	kāi	kākāi		
	kānewha		kānewhanewha	
	kāniwha		kāniwhawha	
	kāpiro		kāpiropiro	
	kāpui		kāpuiwai	
	kāraha		kāraharaha	
	kārangi		kārangirangi	
	kārawa		kārawarawa	
	kāreti		kāretireti	
	kāretu		kāreturetu	
	kāwai		kāwaiwai	
kaea			kāeaea	
kaewa			kāewaewa	
kahaki	kāwhaki		kāhakahaki	
kaheko			kāhekoheko	
kahika			kāhikahika	
	kaiā	kaikaiā		
	kaiora		kaioraora	
	kairapu		kairapurapu	
	kairau	kaikairau		
	kairere			kairerere
kanae			kānae	

kanapa		kakanapa		kānapanapa		kākanapa
kaneke				kānekeneke		
				kānihinihi		kaninihi
kanono			kānonono			
	kapatū		kapakapatū			
	kapetā		kapekapetā			
	kapetau		kapekapetau			
kapiti						kāpīpiti
kaponga		kakaponga				
	kapowai	kakapowai	kapokapowai			
karae				kāraearae		
	karaepa			karaepaepa		
	karamū					kākaramū
	karamea					kākaramea
karamu				kāramuramu		
	karamui			karamuimui		
karanga				kārangaranga		
karapa				kāraparapa		
	karapiti					karapipiti
	karawai			karawaiwhai		
	karawhiti			karawhitiwhiti		
	karawhiu			karawhiuwhiu		
	kareao	kakareao				
karango				kārengorengo		
karera				kārererera		
	karewao	kakarewao				
karipi				kāripiripi		
karohi				kārohirohi		
	karuwai	kakaruwai				
katea				kāteatea		
katoa				kātoatoa		
katoha				kātohatoha		
katore				kātoretore		
	kauanu			kauanuanu		
	kauawhi			kauawhiawhi		kauāwhiwhiwhi
	kauhoe			kauhoehoe		
	kauhua			kauhuahua		
	kauhure			kauureure		
	kaupeka			kaupekapeka		
	kaurehu					kaurerehu
	kawariki					kākawariki
	kaweau		kawekaweau			
kaweka				kāwekaweka		
kawiri				kāwiriwiri		
kawiti				kāwitiwiti		
	kēwai		kēkēwai			
kerepo						
	kerewai		kerekerewai			kēkerewai
	kīnaki			kīnakinaki		
	kiriweti			kiriwetiweti		
koare				kōareare		
koata				kōataata		
koau	kōau			kōauau		
koehu				kōehuehu		
kohaē				kōhaehae		

kohapa			kōhapahapa	
koheri			kōheriheri	
kohiko			kōhikohiko	
	kohurangi	kohukohurangi		kōkohurangi
koia		koikoia		
koio			kōioio	
koira			kōiraira	
koiri			kōirfri	
komeke			kōmekemeke	
komeme			kōmemememe	
komiti			kōmitimiti	
komutu			kōmutumutu	
konae			kōnaeae	
konaki			kōnakinaki	
konanu			kōnanunanu	
konapu			kōnapunapu	
konatu			kōnatunatu	
koneke	kōneke		kōnekeneke	
konewha			kōnewhanewha	
kongange			kōngangengange	
kongene			kōngenengene	
konuke			kōnukenuke	
	kōaka		kōakaaka	
	kōangi		kōangiangi	
	kōhari		kōharihari	
	kōhengi		kōhengihengi	
	kōhine		kōhinehine	
	kōhiwi		kōhiwihwi	
	kōhue		kōhuehue	
	kōhuki		kōhukihuki	
	kōhure		kōhurehure	
	kōhuri		kōhurihuri	
	kōhuru		kōhuruhuru	
	kōihi		kōihiihi	
	kōingo		kōingoingo	
	kōkiri		kōkirikiri	
	kōmahi		kōmahimahi	
	kōmingo		kōmingomingo	
	kōmiro		kōmiromiro	
	kōmore		kōmoremore	
	kōmuhu		kōmuhumu	
	kōmuku		kōmukumuku	
	kōmuri		kōmurimuri	
	kōnehu	kōnenehu	kōnehunehu	
	kōngū		kōngūngū	
	kōngehe		kōngehegehe	
	kōngunu		kōngunungunu	
	kōnohi	kōnonohi	kōnohinohi	
	kōpē		kōpēpē	
	kōpae		kōpaepae	
	kōpaki		kōpakopako	
	kōpara		kōparapara	
	kōpare		kōparepare	
	kōparu		kōparuparu	
	kōpata		kōpatapata	

kōpikō		kōpikopiko	
kōpio		kōpipio	
kōpiri		kōpipiri	
kōpua		kōpuapua	
kōpuku		kōpukupuku	
kōpure		kōpurepure	
kōpuru		kōpurupuru	
kōputa		kōputaputa	
kōputu		kōputuputu	
kōranga		kōrangaranga	
kōrapa		kōraparapa	
kōrawa		kōrawarawa	
kōrehu		kōrehurehu	
kōreko		kōrekoreko	
kōrepo		kōreporepo	
kōrero		kōrerorero	
kōrino		kōrinorino	
kōripo		kōriporipo	
kōrire		kōrirerire	
kōriro		kōriroriro	
kōrito		kōritorito	
kōruki		kōruruki	
kōruku		kōruruku	
kōrure		kōrurerure	
kōtara		kōtaratara	
kōtare		kōtaretare	
kōtihe		kōtihetihe	
kōtihi		kōtihitihi	
kōtiti		kōtitititi	kōtftiti
kōtiu		kōtiutiu	
kōtore		kōtoretore	
kōtuku		kōtukutuku	
kōumu		kōumuumu	
kōura		kōuraura	
kōwā		kōwāwā	
kōwae		kōwaewae	
kōwao		kōwaowao	
kōwari		kōwariwari	
kōwhā		kōwhāwhā	
kōwhaki		kōwhakiwhaki	
kōwhao		kōwhaowhao	
kōwhiti		kōwhitiwhiti	
kopī		kōpīpī	
kopū		kōpūpū	
kopenu		kōpenupenu	
korū		kōrūrū	
korae	kōrae	kōraerae	
korahi		kōrahirahi	
korako		korakorako	
korehe		kōreherehe	
koreke			kōkōreke
korepa		kōreparepa	
korepe		kōreperepe	
korewha		kōrewharewha	
korihī		kōrihirihī	
	kokopū		

korio	korimako		kōriorio	kōkorimako
	korohū			korohuhū
	korohiko		korohikohiko	
	koroingo		koroingoingo	
	korokī			korokīkī
	koromahu			kōkoromahu
	koromiko			kōkoromiko
	koropae		koropaepae	
	koropeke	korokoropeke		
	koroputa		koroputaputa	
korori			kōrorirori	
	korotiwaha		korotiwahatiwaha	
	korotuke		koretuketuke	
	koroua	korokoroua		
	korowai	korokorowai		
korua			kōruarua	
kotē			kōtētē	
kotahi			kōtahitahi	
kotao			kōtaotao	
kotau			kōtautau	
kotawa			kōtawatawa	
kotete			kōtetetete	
	kotiate	kokotiate		
	kotipū	kokotipū		
kotiri			kōtiritiri	
koture			kōtureture	
koua	kōua		kōuaua	
kouka			kōukauka	
kowaka			kōwakawaka	
kowata			kōwatawata	
kowheka			kōwhekawheka	
kowhete			kōwhetewhete	
kowhio			kōwhiowhio	
kowhiu			kōwhiuwhiu	
kuia		kuikuia		
kungongi			kūngongingongi	
kurepe			kūreperepe	kurupōpopo
kurupo				kurupopo
	kurutē			kurutētete
	kurutai		kurutaitai	
	kūai	kūkūai		
	kūpapa		kūpapapapa	
	kūparu		kūparuparu	
	kūtai		kūtaitai	
	kūtere		kūteretere	
	kūwai	kūkūwai	kūwaiwai	
	kūwata		kūwatawata	
kuwharu			kūwharuwharu	
mahana			māhanahana	
	māhina		māhinahina	
	māhunga		māhungahunga	
	māika	māmāika	māikaika	
	mākū		mākūkū	
	mākara		mākarakara	

māngai		māngaingai	
mānuka		mānukanuka	
māori		māoriori	
māpuna		māpunapuna	
māpura		māpurapura	
mārō		mārōrō	
mārū		mārūrū	
mārehe		māreherehe	
māroha		māroharoha	
mātā		mātātā	
mātai		mātaitai	
mātaki		mātakitaki	
mātao		mātaotao	
mātenga		mātengatenga	
mātia		mātiatia	
mātini		mātinitini	
mātoru	mātotoru	mātorutoru	
mātuhi		mātuhituhi	
māturu		māturuturu	
māwhai		māwhaiwhai	
maea		māeaea	
maene		māeneene	
mahara		māharahara	
mahau		māhauhau	
mahea		māheahea	
maheni		māheniheni	
mahere		maherehere	
maheu		māheuheu	
mahiti		māhitihiti	
mahora		māhorahora	
mahore		māhorehore	
mahua		māhuahua	
mahuki		māhukihuki	
mahuru		māhuruhuru	
maihi		māihiihi	
maina		māinaina	
maio		māioio	
	maiori	maioriori	
maire		māireire	
maiti		māitiiti	
makai		mākaikai	
makaka	mākaka	mākakakaka	mākākaka
makaro		mākarokaro	
makere	mākere	mākerekere	
makoha	mākoha	mākohakoha	
makura	mākura	mākurakura	
manaha		mānahanaha	
	manahau		
		manamanahau	
manaka		mānakanaka	
manako		mānakonako	
manana		mānananana	
manatu		mānatunatu	
manawa	mānawa	mānawanawa	
manea			
manei		manemanea	
		mānenei	

mangenge				māngēngenge	
mangeo				māngeonge	
mangungu				māngūngungu	
mania	mānia			māniania	
	manuā		manumanuā		
maoa		mamaoa	maomaoa		
marake				māraakerake	
marama	mārama			māramarama	
maranga				mārangaranga	
marara				mārārara	
marea				mārearea	
mariko				mārikoriko	
maringi				māringiringi	
marino				mārinorino	
marohi				mārohirohi	
	matakā				matakakā
mataku				mātakutaku	
	matapihi			matapihipihi	
matara				mātaratara	
	matarahi				matararahi
	matarua				
matau	mātau			mataruarua	
matihe				mātautau	matatau
matike				mātihetihe	
matira				mātiketike	
matire				mātiratira	
matiti	mātiti			mātiretire	mātititi
matoe				mātoetoe	
matoha				mātohatoha	
matore				mātoretore	
matoru	mātoru		mātotoru	mātorutoru	
matua	mātua			mātuatua	
matuku				mātukutuku	
maue				māueue	
mauku				māukuuku	
mauru				māuruuru	
mawhiti	māwhiti			māwhitiwhiti	
merau			meramerau		
	meroiti		meromeroiti		
	meroriki				meroririki
	metarahi				metararahi
moani				mōaniani	
moari				mōariari	
	moeone			moeoneone	
mohani				mōhanihani	
mohua		momohua		mōhuahua	
mohunga				mōhungahunga	
moihi				mōihiihi	
	mokorea		mokomokorea		
		momoutu		mōutuutu	
monia				mōniani	
	mōiri			mōirfri	
	mōkai			mōkaikai	mokamokai
	mōnehu		mōnenehu	mōnehunehu	
	mōrea			mōrearea	

	mōruru mōtī mōtea mōwai mōwhaki mōwhiti		mōrururu mōtīī mōteatea mōwaiwai mōwhakiwhaki	mōrūruru mōwhīwhiti
moruka moteko motengi motoro			mōrukaruka mōtekoteko mōtengitengi mōtorotoro	
	ngātahi ngātata		ngātatatata ngācheche ngāekieki ngāhachae ngāhauhau ngāhauhau ngāherehere ngāhoahoa ngāhorohoro ngāokooko ngāoraora ngāruerue ngāueue ngāwekiweki ngōioio	ngātātahi ngātātata
ngaehē ngaeki ngahae ngahau ngahau ngahere ngahoa ngahoro ngaoko ngaora ngarue ngaue ngaweki ngoio	ngāue		pāhokahoka pāhuahua pāhukahuka pāikeike pāinaina pākākā pākanikani pākatokato pākaukau pākehokeho pākekakeka pākirakira pākurakura pākurukuru	pākākaha
	pāhoka pāhua pāhuka pāike pāina pākā pākaha pākani pākato pākau pākeho pākeka pākira pākura pākuru pānaki pāneke pāpuni pārū pārae pārahi pārohe pātai pātanga pātari pātehe pāteke pātengi pātito	pānanaki	pānekeneke pāpunipuni pārūrū pāraerae pārahirahi pāroherohe pātaitai pātangatanga pātāritari pātehetehe pāteketeke pātengitengi pātītōtītō	patapatai

	pīrangi			pīrangirangi	
	pītau			pītautau	
	pītonga			pītongatonga	
	pīwai			pīwaiwai	
pingawi				pīngawingawi	
pioi	pīoi			pīoioi	
pioke				pīokeoke	
piori				pīoriori	
pirau		pipirau	pirapirau		
	pitoiti		pitopitoiti		
poare				pōareare	
poau				pōauau	
pohane				w h a k a - pōhanehane	
poharu				pōharuharu	
pohau				pōhauhau	
poia		popoia			
pokara				pōkarakara	
	pokorua		pokopokorua		pōpokorua
pokuru				pōkurukuru	
pongare				pōngarengare	
pongere				pōngerengere	
	pōharu			pōharuharu	
	pōhue		pōpōhue	pōhuehue	
	pōhutu			pōhutuhutu	
	pōito			pōitoito	
	pōkē			pōkēkē	
	pōkai				pōkapokai
	pōkare			pōkarekare	
	pōniti			pōnitiniti	
	pōrahu			pōraharahu	
	pōrangi			pōrangirangi	
	pōruku			pōrukuruku	
	pōtae			pōtaetae	pōtapotae
	pōtango			pōtangotango	
	pōtatu			pōtatutatu	
	pōtehe			pōtehetehe	
	pōtete			pōtētete	
	pōtiki			pōtikitiki	
	pōuri			pōuriuri	
	pōuto			pōutouto	
	pōwhiri			pōwhiriwhiri	
porara				pōrararara	
porea				pōrearea	
porehu				pōrehurehu	
porete				pōreterete	
	porihewa		poriporihewa		
	poroaki		poroporoaki		
	porotaka				porotātaka
	porotiti				porotītiti
	pourangi		poupourangi		
powhiwhi	pōwhiwhi			pōwhiwhiwhiwhi	
puaki				pūakiaki	
puare				pūareare	
puata				pūataata	
puawe				pūaweawe	

puea			pūeaea	
puehu			pūehuehu	
puene			pūeneene	
puhake			pūhakehake	
puhina	pūhina		pūhinahina	
puhunga			pūhungahunga	
	puiaki	puipuiaki		
pukahu			pūkakahuhu	
pukaru			pūkarukaru	
pukohu			pūkohukohu	
pukoru			pūkorukoru	
pungata			pūngatangata	
	pūaha		pūahaaha	
	pūaho		pūahoaho	
	pūangi		pūangiangi	
	pūeto		pūetoeto	
	pūhana	pūhahana		
	pūhihi		pūhihihihi	
	pūihi		pūihīhi	
	pūkana		pūkanakana	
	pūkani		pūkanikani	
	pūkeri		pūkerikeri	
	pūkoro		pūkorokoro	
	pūnehu	pūnenehu	pūnehunehu	
	pūrangi		pūrangirangi	
	pūrau		pūraurau	
	pūrehe		pūreherehe	
	pūrehu	pūrerehu	pūrehurehu	
	pūrei		pūreirei	
	pūreke		pūrekereke	
	pūroto		pūrotoroto	
	pūrou		pūrourou	
	pūtai	pūpūtai	pūtaitai	pūtātara
	pūtara		pūtaratara	pūtētete
	pūtete		pūtetetete	
	pūtoi		pūtoittoi	
	pūtoki		pūtokitoki	
	pūweto		pūwetoweto	
	pūwhara		pūwharawhara	
	pūwhata		pūwhatawhata	
	pūwhero	pūwhewhero		
ramene		rāmemene		
rangai	rāngai		rāngaingai	
	raparuru	raparaparuru		raununui
	raunui			
raweke			rāwekeweke	
riaki		riariaki		
	rīrapa		rīraparapa	
riroi		riroriroi		
riua		riuriua		
	rōwai	rōrōwai		
rueke		ruerueke		
ruwai	rūwai		rūwaiwai	
	tāepa		tāepaepa	
	tāhau	tātāhau		

	tāhei		tāheihei	
	tāheke		tāhekeheke	
	tāhinga		tāhingahinga	
	tāhoka		tāhokahoka	
	tāingo		tāingoingo	
	tākaha		tākahakaha	
	tākaro		tākarakaro	
tāki		tātāki		
	tāmata		tāmatamata	
tāmi		tātāmi		
	tāmore		tāmoremore	
	tāngare		tāngarengare	
	tāngutu		tāngutungutu	
	tāniko		tānikoniko	
	tāniwha		tāniwhaniwha	
	tānoa		tānoanoa	
	tāoro		tāorooro	
	tāoru		tāoruoru	
	tāpā		tāpāpā	
	tāpatu		tāpatupatu	
	tāpiri		tāpiripiri	
	tāpohe		tāpohepohe	
	tāpuru		tāpurupuru	
	tārū		tārūrū	
	tārai			taratarai
	tārehu		tārehurehu	
	tārera		tārerarera	
	tāroa		tāroaroa	
	tārore		tārorerore	
	tārure		tārurerure	
	tāruru		tārurururu	
	tārutu		tāruturutu	
tāu		tātāu		
	tāwē		tāwēwē	
	tāwae		tāwae wae	
	tāwere		tāwerewere	
	tāwhai		tāwhaiwhai	
	tāwhana		tāwhanawhana	
	tāwhanga		tāwhangawhanga	
	tāwhao		tāwhaowhao	
	tāwharu		tāwharuwharu	
tāwhi		tātāwhi		
	tāwhio		tāwhiowhio	
	tāwhiro		tāwhirowhiro	
	tāwhiu		tāwhiuwhiu	
	tāwiri		tāwiriwiri	
taeka			tāekaeka	
tahō			tāhōhō	
tahiwi			tāhiwihiwi	
tahua			tāhuahua	
tahuri			tāhurihuri	
	taiā	taitaiā		
	taiore		taioreore	
	tairanga		tairangaranga	
takō			tākōkō	

takahi		takatakahi	tākahikahi	
	takahuri		takahurihuri	
takai	tākai	takatakai	tākaikai	
	takaore		takaoreore	
takapo		takatakapo		
	takarita		takaritarita	
	takawheta		takawhetawheta	
	takawhiti		takawhitiwhiti	
takere			tākerekere	
takiri	tākiri		tākirikiri	
	takitū	takitakitū		
takohe			tākohekohe	
takoto			tākotokoto	
takunga			takutakunga	
takuru			tākurukuru	
tamō			tāmōmō	
tangara			tāngarangara	
tangoro			tāngorongoro	
tapī			tāpīpī	
tapahi	tāpahi	tapatapahi		
tapoko			tāpokopoko	
tapore			tāporepore	
tapotu			tāpotupotu	
tapua			tāpuapua	
tapuhi			tāpuhipuhi	
tapuke	tāpuke		tāpukepuke	
taraha(-nga)			tārahahaha	
	taraheke			tātaraheke
	tarakihi			tātarakihi
	tarakina		tarakinakina	
	taramoa			tārarāmoa
	taraonga		taraongaonga	
	tarapō			tātarapō
	tarapeke		tarapekepeke	
	taratī			taratītī
tarepa			tāreparepa	
taroma			tāromaroma	
	taruwai			tātaruwai
tatū			whakatātūtū	
	tauawhi		tauawhiawhi	
tauhi			tāuhiuhi	
	taumarū		taumarumarū	
	taunaha		taunahanaha	
	taupae		taupaepae	
	taupiri		taupiripiri	
	taupoki		taupokipoki	taupopoki
	taupuhi		taupuhipuhi	
	taupuru		taupurupuru	
	taureka		taurekareka	taurereka
	taurewa		taurewarewa	
	taurite		tauriterite	
	tautapa		tautapatapa	
taute			tāuteute	
	tautito		tautitotito	
	tautohe		tautohetohe	tautotohe

	tautoro		tautorotoro	
	tauware		whaka- tauwareware	
	tauweru			whaka- tauweweru
	tauwhare		tauwharewhare	
	tāuwhi		tāuwhiuwhi	
	tauwhiro		tauwhirowhiro	
tawē		tawetawē		
tawai	tāwai		tāwaiwai	
tawaka	tāwaka		tāwakawaka	
tawari	tāwari		tāwariwari	
tawau			tāwauwau	
taweke		tāweweke		
tawheo			tāwheowheo	
tawhiti	tāwhiti		tāwhitiwhiti	
tiango			tīangoango	
tiemi			tīemiemi	
tihoi		tihotihoi	tīhoihoi	
	tīaho		tīahoaho	
	tīaka		tīakaaka	
	tīare		tīareare	
	tīhae		tīhaehae	
	tīhō		tīhōhō	
	tīhoka		tīhokahoka	
	tīkā		tīkākā	
	tīkaku		tīkakukaku	
	tīkape		tīkapekape	
	tīkoro		whaka- tīkorokoro	
	tīmata		tīmatamata	
	tīpaki		tīpkipaki	
	tīpako		tīpakopako	
	tīrama		tīramarama	
	tīrango		tīrangorango	
	tīrari		tīrarirari	
	tīrau		tīraurau	
	tītaka		tītakataka	
	tītangi		tītangitangi	
	tītari		tītaritari	
	tīwē		tīwēwē	
	tīwai		tīwaiwai	
	tīwara		tīwarawara	
	tīwata		tīwatawata	
	tīweka		tīwekaweka	
	tīwhai		tīwhaiwhai	
	tīwhara		tīwharawhara	
tikoke			tīkokekoke	
tinei		tinetinei	tīneinei	
tioka			tīokaoka	
tiori			tīoriori	
tioro			tīorooro	
tipoko			tīpokopoko	
tirepa			tīreparepa	
titaha			tītahataha	
	tīripua	tīritīripua		

titore			tftoretore	
tonini	tongarewa		tōnininini	tongarerewa
	tōhī		tōhīhī	
	tōiti		tōitiiti	
	tōkari		whaka- tōkarikari	
	tōkau	tōtōkau		
	tōkihi		whaka- tōkihikihi	
	tōpū	tōtōpū		
	tōpata		tōpatapata	
	tōriki	tōririki	tōrikiriki	
	tōrire		tōrirerire	
	tōrohe		tōroherohe	
	tōwhiri		tōwahiwhahi	tōwāwahi
topī			tōwhiriwhiri	
toreke			tōpipī	
			whaka- tōrekereke	
torete			tōreterete	
	torohī			
	torongū			tōtorongū
	toropuku			tōtoropuku
	torotī			torotītī
towene			tōwenevene	
tuaka			tūakaaka	
	tuauki		tuaukiuki	
	tuaui		tuauiuri	
tukoki			tūkokikoki	
tunewha			tūnewhanewha	
tungou			tūngoungou	
tunou		tunotunou		
tupana			tūpanapana	
tupehu			whaka- tūpehupehu	
tupere			tūperepere	
turaki		turaturaki		
turou			tūrourou	
turua		turuturua		
turuki			tūrururuki	
	turupeke			
	turuwhatu	turuturuwhatu		
	tūhoe		tūhoehoe	
	tūhono		tūhonohono	
	tūngutu		tūngutungutu	
	tūpaki		tūpakipaki	tūpāpaku
	tūpaku			
	tūpari		tūparipari	
	tūparu		tūparuparu	
	tūpeke		tūpekepeke	
	tūpeu		tūpeupeu	
	tūpuhi		tūpuhipuhi	
	tūrama		tūramarama	
	tūranga		tūrangananga	
	tūrere		tūrererere	

	turupeke tūtaki tūtanga tūtira				tūtakitaki tūtangatanga tūtiratira tūwhangawhanga tūwhengewhenge tūwherawhera	turupēpeke
tuwhanga tuwhenge tuwhera unahi upane			unaunahi		ūpanepane ūkuikui ūngutungutu	
	ūkui ūngutu					
wāhi			wāwāhi waiwaipū waiwaitao			
weia	waipū waitao	weweia	weiweia			
	whāiro whāita whākou whāngai whārahi whāriki		whāwhākou		whāiroiro whāitaita whāngaingai	whangawhangai
whāro				whārarahi	whārikiriki whārooro whāruarua whātaitai whāterotero whātinotino whāura whāura	
	whārua whātai whātero whātino whāura whaiā whaiaro		whāwhārua	whātatai	whaiaroaro tōkarakara	
whaka- tokara whanake					whānakenake whaupakupaku whakawhēauau	
wheau	whaupaku		wheawheau		whēiroiro whēkaukau whēkerekere whēnako whēorooro whēterotero whētikitiko whēuriuri	
	whēiro whēkau whēkerekere whēnako whēorooro whēterotero whētikitiko whēuriuri				whētētē whētōtō whēteketeke whēuauau whIoioi	
whetē whetō wheteke wheua whioi						
384	568	24	84	26	770	71

Appendix D

Reduplications resulting from multimoraic stems

hauaitu		hauhauaitu		
karapetau		kaikaiārure	kaiārurerure	karapetapetau
koitareke		koikoitareke		
koromāhu		korokoromāhu		
matapōuri		matamatapōuri		
pairuaki		paipairuaki		
pākauroha			pākauroharoha	
pākehā		pakepakehā	pākehakeha	
pārāriki			pārārikiriki	
parataniwha			paratāniwhaniwha	
	pepehatū	pehapehatū		
pīnauheā		pīnaunauheā		
pōkēāo		pōkēkēāo		
pōpōroa		pōpōroroa		
porokaiwhiri(a)	poporokaiwhiri	poroporokaiwhiria		
porotutuki			porotukituki	
pouwhenua		poupouwhenua		
puataua	puatataua	puatautaua		
pūkōnohi			pūkōnohinohi	
pūpūtangiātoa			pūtangitangiātoa	
putawētā		putaputawētā		
tāhoata		tātāhoata		
tataiao		taitaiao		
tāinahi	tāinanahi			
takāamio			takāamio	
tapātiu		tapatapātiu		
tarāmoa		tātarāmoa		
taumātakitahi			taumātakitahi	
titipārera			titipārera	tītitipārera
titouretua		tītitouretua		
tūāporo			tūāporo	
uruwhenua		uruuruwhenua		
whaikōrero		whaiwhaikōrero		
32	4	22	13	1

Appendix E

Frozen reduplications

Word (= possible equivalent form)	Gloss	Word (= possible equivalent form)	Gloss
<i>āeaea</i>	‘panting’	<i>haurokuroku</i>	‘unsettled, uncertain’
<i>āheahea</i>	‘rainbow’	<i>hāwaniwani</i>	‘skin disease’
<i>āhiwahiwa</i>	‘cut, gash’	<i>hāwiniwini</i>	‘shiver with cold’
<i>āhukahuka</i> (= <i>kāhukahuka</i>)	‘resemble, coincide, nearly’	<i>hemihemi</i>	‘back of head’
<i>āhumehume</i>	‘suitable pleasing’	<i>hīeweewe</i>	‘separated, disarranged’
<i>ākengokengo</i>	‘tomorrow’	<i>hīkaikai</i>	‘move feet to and fro’
<i>akeake</i>	‘poor land’	<i>hīmoemoe</i>	‘acid, sour’
<i>aneane</i>	‘sharp’	<i>hīngarungaru</i> (= <i>hīnarunaru</i>)	‘uneven lump’
<i>anoano</i>	‘alarm, giddiness’	<i>hinamoremore</i>	‘a variety of kumara’
<i>ārikarika</i> (= <i>rikarika</i>)	‘unrestrained, stinted’	<i>hīnawanawa</i>	‘papillae of human skin’
<i>aroaroā</i>	‘lonely’	<i>hīramuramu</i>	‘out of regular order’
<i>atiutiu</i>	‘a univalve shell fish’	<i>hīrawerawe</i>	‘irksome, cumbersome’
<i>āuriuri</i>	‘free from tapu’	<i>hītakataka</i> (= <i>hīwakawaka</i>)	‘fantail’
<i>āwangawanga</i>	‘disturbed, undecided’	<i>hīwiniwini</i>	‘suffer from aching pains’
<i>epeepe</i>	‘distant relation’	<i>hohuhohu</i>	‘sob violently’
<i>hahohaho</i>	‘disarranged, disordered’	<i>hokehoke</i>	‘lonely’
<i>hākinakina</i>	‘sport, enjoy oneself’	<i>hokehokeā</i> (= <i>hongehongēā</i>)	‘out of patience’
<i>hakuhakutai</i>	‘act in a lazy slovenly manner’	<i>hōmiromiro</i>	‘a bird’
<i>hākuikui</i>	‘a sea bird’	<i>hōnekeneke</i>	‘shuffle with both feet on the ground’
<i>hāmoamoā</i>	‘clay’	<i>hōrakerake</i>	‘exposed without shelter’
<i>hāneanea</i>	‘pleasant, comfortable’	<i>hōrirerire</i>	‘grey warbler, a bird’
<i>hangehange</i>	‘intensive’	<i>horohororē</i>	‘to eat greedily’
<i>hāngengengenga</i>	‘loose, floppy’	<i>horopekapeka</i>	‘whaler shark’
<i>hāngoangoā</i>	‘a plant’	<i>hōtaetae</i>	‘prevent, obstruct’
<i>hāpūpū</i>	‘blunt’	<i>houtahutahu</i>	‘a plant’
<i>hāramuramu</i>	‘out of regular order’	<i>hōutuutu</i>	‘a bird’
<i>hārearea</i>	‘heard indistinctly’	<i>huarewarewa</i>	‘a variety of potato’
<i>hārērē</i>	‘a small fish’	<i>huhure</i>	‘lazy’
<i>hariharitae</i>	‘gibe at, vilify, hold in contempt’	<i>hukihukiraho</i>	‘a plant’
<i>haruharu</i>	‘soiled, disagreeable to the eye’	<i>hūkokikoki</i>	‘wobble’
<i>hātaretare</i>	‘slug, snail’	<i>hūnonoi</i> (= <i>hūnounou</i>)	‘chill, cold’
<i>hātoitoi</i>	‘bird, robin’		
<i>haurakiraki</i>	‘familiar spirit’		

<i>hūngeingei</i> (= <i>hūneinei</i>)	‘anger, vexation’		debilitated’
<i>hūngongoi</i> (= <i>hūngoi</i>)	‘trembling’	<i>kāruhiruhi</i>	‘a bird’
<i>hūngorongoru</i>	‘loose’	<i>kātaitai</i>	‘a sea bird’
<i>hūpenupenu</i>	‘mashed up’	<i>kātoitoi</i>	‘a bird, shrub, give a response’
<i>hūrokuroku</i>	‘continually’	<i>kātuhituhi</i>	‘a bird’
<i>hūwiniwini</i>	‘chilled’	<i>kaumingomingo</i>	‘state of confusion, disorder’
<i>iheuheu</i>	‘separate’		‘dusky’
<i>ikuiku</i> (= <i>hikuhiku</i>)	‘eaves of a house’	<i>kaunenehu</i>	‘act of nagging’
<i>inoino</i>	‘tattoo marks on the corner of the mouth of a woman’	<i>kāungaunga</i>	‘gather, together’
<i>kakekake</i>	‘pant’	<i>kauopeope</i>	‘a fish’
<i>kākahi</i>	‘a plant & other meanings’	<i>kauparapara</i> (= <i>kaupararā</i>)	‘a plant’
<i>kāhikuhiku</i>	‘upper part of a tree’	<i>kaupārerarera</i> (= <i>pārerarera</i>)	‘pointed piece of wood used in fire making’
<i>kāhiwahiwa</i>	‘intensely dark’	<i>kaurimarima</i>	‘move briskly’
<i>kāhorehore</i>	‘a fish’	<i>kautangatanga</i>	‘coming at intervals’
<i>kahurakiraki</i>	‘unreliable’	<i>kauteatea</i>	‘grasshopper’
<i>kāiaia</i> (= <i>kārearea, kāeaea, kāieie</i>)	‘bush hawk’	<i>kauwhitiwhiti</i> (= <i>mōwhitiwhiti</i>)	‘yearning’
<i>kaiherehere</i>	‘small species of eel’	<i>kāwatawata</i>	‘palings of fence’
<i>kaikaiatua</i>	‘a shrub’	<i>kāwāwā</i>	‘taper’
<i>kaikaikaroro</i>	‘a shrub’	<i>kāwetoweto</i>	‘a trout’
<i>kaikaiwaiū</i>	‘someone who turns traitor’	<i>kawikawi</i>	‘a pattern of carving’
<i>kaimakamaka</i>	‘game of knuckle bones’	<i>kāwhatuwhatu</i>	‘foul, offensive’
<i>kāipuipu</i>	‘hollow’	<i>kerakera</i>	‘a bird’
<i>kaireperepe</i>	‘present given at marriage’	<i>kerekerematātu</i>	‘gather, assemble’
<i>kaiwharawhara</i>	‘feathers of wings of a albatross’	<i>karapinepine</i> (= <i>kerepinepine</i>)	‘a plant’
<i>kāmehameha</i>	‘priceless’	<i>kiokio</i>	‘blear eyed’
<i>kāmuimui</i>	‘trifle’	<i>kirikiritona</i>	‘spleen’
<i>kanakanaia</i>	‘witchcraft’	<i>kōateate</i>	‘young of inanga’
<i>kāniuniu</i>	‘spur of hill’	<i>kōeaea</i> (= <i>kāeaea</i>)	‘cuckoo’
<i>kāngatungatu</i>	‘veranda’	<i>koekoeau</i> (= <i>kawekaweau, kuekuea, koekoeā</i>)	‘twigs’
<i>kāpetopeto</i>	‘a variety of potato’	<i>kōetoeto</i>	‘whisper’
<i>kāpunipuni</i>	‘assembly, gathering place’	<i>kōhamuhamu</i> (= <i>kōhumuhumu</i>)	‘putrid’
<i>karangaungau</i>	‘a fish’	<i>kōhangohango</i> (= <i>kōrangorango</i>)	‘fan’
<i>kāraroraro</i>	‘plebeian’	<i>kōheuheu</i> (= <i>kōwhiuwhiu</i>)	‘nibble’
<i>kārikarika</i>	‘jest’	<i>kōhonihi</i>	‘a tree’
<i>kāroaroa</i>	‘coast where landing is difficult’	<i>kōhūhū</i>	‘shorn close’
<i>karokaropounamu</i>	‘a fish’	<i>kōhumuhumu</i>	‘crushed, infant’
<i>kārorirori</i>	‘feeble,	<i>kōhungahunga</i> (= <i>kōngahungahu</i>)	‘a tree’
		<i>kōhutuhutu</i> (= <i>kōtukutuku</i>)	

<i>kōiheihe</i>	‘irregular, crooked’	<i>kōrimurimu</i>	‘covered with seaweed’
<i>kōipuiipu</i>	‘foot sore, blistered’	<i>kōriwhariwha</i>	‘a fish’
<i>kōhīhī</i>	‘fragments of wood & rubbish’	<i>kōroaroa</i>	‘tall, long’
<i>kōkōhou</i>	‘breeze’	<i>koroheihei</i>	‘tuck up’
<i>kōkōtai</i>	‘a sea bird’	<i>kōroiroi</i>	‘wander idly’
<i>kōkōtaia</i>	‘stick used in planting’	<i>kōrokoroko</i>	‘?’
<i>kōkōtaua</i>	‘male of kōkō bird’	<i>korokoropounamu</i> (= <i>karakarapounamu</i>)	‘a fish’
<i>kōkōtea</i>	‘female of kōkō bird’	<i>korokororiki</i>	‘trifling, unimportant’
<i>kōkōuri</i>	‘haziness, decreasing gloom’	<i>koromāungaunga</i>	‘barnacle, anxious’
<i>kōkōwai</i>	‘earth used for red ochre’	<i>koromemenge</i> (= <i>koromengemenge</i>)	‘crumbled’
<i>kōmāmā</i>	‘soft, light’	<i>koromingomingo</i> (= <i>kōmingomingo</i>)	‘twist’
<i>kōmehomeho</i>	‘small’	<i>koromiomio</i> (= <i>koromiromiro</i>)	‘whirl, swirl’
<i>kōmuramura</i> (= <i>kōramuramu</i>)	‘eat at odd times’	<i>koropungapunga</i>	‘soft, porous, pumice stone’
<i>kōnakonako</i>	‘dazzling light, glove’	<i>korotakataka</i>	‘name of constellation’
<i>konekone</i>	‘shy, bashful’	<i>korotingatinga</i> (= <i>kōtingatinga</i>)	‘spotted, speckled’
<i>kōnēnē</i>	‘fruit of a parasitic plant’	<i>korotiotio</i>	‘prickly’
<i>kōnononono</i>	‘watery waxed, applied to potatoes’	<i>korowheowheo</i>	‘blowing in whirls or eddies’
<i>kōnukunuku</i>	‘bend’	<i>kōruirui</i>	‘shake vigorously’
<i>kōngarangara</i> (= <i>kōrangaranga</i>)	‘colic’	<i>kōtaitai</i>	‘brackish, unpleasant to the taste’
<i>kōngongengonge</i>	‘feeble’	<i>kōtakataka</i>	‘round’
<i>kōngotungotu</i>	‘firebrand, burning stick’	<i>kōtangitangi</i> (= <i>kōtengitengi</i>)	‘breeze’
<i>kōngutungutu</i> (= <i>kōmutumutu</i>)	‘a fish’	<i>kōtātā</i> (= <i>mōtātā</i>)	‘fern bird’
<i>kōpaopao</i>	‘kind of eel’	<i>kōtengitengi</i>	‘gentle wind’
<i>kōpāpā</i>	‘hook of a bird snare’	<i>kotikotipa</i> (= <i>kōtipatipa</i>)	‘a bird’
<i>kōpehupehu</i>	‘strike down, smash’	<i>kōtiwhatiwha</i>	‘spotted’
<i>kōpiupiu</i>	‘swill, oscillate’	<i>kōtungatunga</i>	‘docile’
<i>kōpūangaanga</i>	‘variety of kumara’	<i>koukouporo</i>	‘a fish’
<i>kōroherohe</i>	‘wrinkle’	<i>kōutauta</i>	‘dip’
<i>kōrahoraho</i>	‘unfledged, young bird’	<i>kōwaiwai</i> (= <i>kōwhaiwhai</i>)	‘ancient style of painting’
<i>kōrangorango</i>	‘mottled, spotted’	<i>kōwarawara</i>	‘coarsely plaited’
<i>kōrotarota</i>	‘clear, not turbid’	<i>kōwarowaro</i>	‘having steep banks’
<i>kōreirei</i>	‘root stork of raupo’	<i>kōwauwau</i>	‘fern root’
<i>kōrengarenga</i>	‘overflowing, soft, boggy, mashed’	<i>kōwenewene</i>	‘a moth’
		<i>kōwerewere</i>	‘young of kahawai’
		<i>kōwerowero</i>	‘shoot out, appear’
		<i>kōwharawhara</i>	‘a plant’

<i>kōwharowharo</i>	‘a fish’	<i>māorooro</i>	‘rumble, reverberate’
<i>kōwhekowheko</i>	‘die out and blaze up’	<i>māreparepa</i> (= <i>tāreparepa</i>)	‘rippling, splashing’
<i>kōwheuwheu</i>	‘neap of the tide’	<i>matahanahana</i>	‘blushing, glowing’
<i>kukukuku</i>	‘pig’	<i>mātahetaha</i>	‘oozing, dripping’
<i>kūkuruatu</i>	‘a bird’	<i>matainaina</i>	‘desire’
<i>kūkurutoki</i>	‘a bird’	<i>matairaira</i>	‘very small eels’
<i>kūkuruwhetū</i>	‘a sea bird’	<i>mātakataka</i>	‘crashing’
<i>kunikuni</i>	‘dark’	<i>matakerekere</i> (= <i>matangerengere</i>)	‘benumbed with cold’
<i>kūpiapia</i>	‘sticky’	<i>matakirikiri</i>	‘gravel’
<i>kūraruraru</i>	‘perplexed, bothered	<i>matakōkikiriki</i>	‘a childish pastime’
<i>kurawiniwini</i>	‘a children’s game’	<i>matakuikui</i>	‘joyous, talkative, full of spirits
<i>kurekure</i>	‘species of earthworm, blow, pleased, glad’	<i>matamatahuānga</i>	‘distant relative’
<i>kūreureu</i> (= <i>tīreureu</i>)	‘uneven, out of rank’	<i>matamatahuia</i>	‘a plant’
<i>kurikuri</i>	‘fishy, evil smelling, a beetle, adverb’	<i>matamataika</i>	‘a hard stone’
<i>kurukuruwhatu</i>	‘curdled as milk’	<i>matamatarauo</i>	‘a fish’
<i>kurumetometo</i>	‘of no account’	<i>matamatarongō</i>	‘?’
<i>kurupetipeti</i>	‘mossy, spongy consistency’	<i>mātangatanga</i>	‘loose’
<i>kurutahitahi</i>	‘swoop’	<i>matangurunguru</i>	‘numbed’
<i>kurutoitoi</i>	‘stunted’	<i>mataroharoha</i>	‘freedom from care’
<i>kutekute</i>	‘lazy, confused’	<i>matarekereke</i> (= <i>matarukuruku</i>)	‘benumbed’
<i>kutukutuahi</i>	‘delirium, raving wandering’	<i>mātarikoriko</i> (= <i>mārikoriko</i>)	‘twilight’
<i>kūwāwā</i> (= <i>pūwāwā</i>)	‘a large rush’	<i>matatangitangi</i>	‘lament, dirge’
<i>kūwhewhewhe</i>	‘wrinkled, puckered’	<i>matawaiwai</i>	‘a variety of kumara’
<i>māereere</i>	‘a fern’	<i>māteatea</i>	‘shame, distress’
<i>māhurehure</i>	‘cut to pieces, reduced to fragments’	<i>mātātā</i>	‘fernbird’
<i>mākatikati</i>	‘galling, irritating’	<i>mātūtū</i>	‘convalescent, not quite healed, attend to’
<i>mākinakina</i>	‘prickly, rough’	<i>māuiui</i>	‘sickly, wearied with labour’
<i>mākinokino</i>	‘disgusted, nauseated’	<i>mauminamina</i>	‘accepting eagerly’
<i>mākiukiu</i>	‘spear with two or more barbs’	<i>maunawenawe</i>	‘hesitating, uncertain
<i>makoakoa</i>	‘joy’	<i>māungaunga</i>	‘scurf, dandruff’
<i>māmāngi</i>	‘shrubs’	<i>māwāwā</i>	‘cracked, split’
<i>mānehenehe</i>	‘querulous, peevish’	<i>mekameka</i>	‘ladder’
<i>mānoenoe</i>	‘itching’	<i>whakamenomeno</i> (= <i>metometo</i>)	‘show off, make a display’
<i>mangamangaiatua</i>	‘a race of spirits or ghosts’	<i>meramera</i>	‘prepare by steeping in water’
<i>mangemange</i>	‘a fern’	<i>mikoikoi</i>	‘a plant’
<i>māngiongio</i>	‘chilblain’	<i>mimire</i>	‘bind, lash’
<i>māngoingoi</i>	‘fish with line from the shore’	<i>mirumiru</i> (= <i>miromiro</i>)	‘a bird’
		<i>mōhakahaki</i> (= <i>mōwhakiwhaki</i>)	‘a fish’

<i>mōheahea</i>	‘light haired’	<i>ngoungou</i>	‘thoroughly ripe,
<i>mōheuheu</i>	‘scrub,		well cooked, live
	brushwood’		coal, a hair
<i>mōhinahina</i>	‘grey coloured’		fashion’
<i>mōhinuhinu</i>	‘shiny’	<i>ngoungoua</i>	‘a fool’
<i>mōhukihuki</i>	‘pierce through,	<i>ngōuruuru</i>	‘few’
	thrill’	<i>nguengue</i>	‘quiet, silent,
<i>mōkarakara</i>	‘savoury’		reserved’
<i>mōkinokino</i>	‘lowering, dark,	<i>ngurengure</i>	‘an insect’
	threatening,	<i>ngutungutu ahi</i>	‘delirium’
	disgusting’	(= <i>kutukutuahi</i>)	
<i>mōkitokito</i>	‘minute, small’	<i>ngutungututahi</i>	‘cover with hot
<i>mokohuruhuru</i>	‘a wind’	(= <i>ngutungutu</i>)	embers’
<i>okuoku</i>	‘few’	<i>omoomo</i>	‘gourd’
<i>mōkutukutu</i>	‘vermin’	<i>whakaomoomo</i>	‘tend a child’
<i>mōmōhanga</i>	‘remnant’	(= <i>whāomoomo</i>)	
<i>monemone</i>	‘smooth, bare’	<i>paeangaanga</i>	‘variety of taro’
(= <i>moremore</i> ?)		<i>pāengaenga</i>	‘a sandal, tease,
<i>monimoni</i>	‘consumed’	(= <i>pārengarenga</i>)	annoy’
<i>mongamonga</i>	‘crushed’	<i>paepaeroa</i>	‘type of cloak’
<i>mōrihariha</i>	‘disgusting’	<i>pāhakehake</i>	‘broad, shallow’
<i>mōtātā</i>	‘extirpated, swept	<i>pāhanahana</i>	‘smear with red
	away’		ochre’
<i>mōtihetihe</i>	‘a bird’	<i>pāhehaheha</i>	‘lean, emaciated’
<i>mukimuki</i>	‘a fern’	<i>pāhengahenga</i>	‘a tree’
<i>munumunu</i>	‘dredge, scrape	<i>pāhengihengi</i>	‘blow gently’
	up’	<i>pāhikohiko</i>	‘bow, fence’
<i>nāereere</i>	‘a plant’	<i>pāhohoro</i>	‘hurry ?’
<i>nanahi</i> ?	‘yesterday’	<i>pāhoahoa</i>	‘head cold,
<i>namunamuā</i>	‘flavour’	(= <i>ngāhoahoa</i>)	giddiness’
<i>nekuneku</i>	‘decline’	<i>paiahaaha</i>	‘a shout’
<i>niania</i>	‘slip’	<i>pāitiiti</i>	‘decrease, subside’
<i>noenoe</i>	‘tickle’	<i>pākahukahu</i>	‘strength’
<i>ngāeroero</i>	‘young eel’	<i>pākaikai</i>	‘string to secure
<i>ngākoikoi</i>	‘a fish’		bait on hook’
<i>ngānehenehe</i>	‘querulous,	<i>pākokokeke</i>	‘thin, lean’
(= <i>mānehenehe</i>)	peevish’	<i>pākohikohi</i>	‘a fish’
<i>ngangarangi</i>	‘a yam’	(= <i>pākoikoi</i>)	
<i>ngāoheohe</i>	‘a fish’	<i>pāniwhaniwha</i>	‘a fish’
<i>ngāoriori</i>	‘song, lullaby’	<i>pāngarengare</i>	‘a fish’
<i>ngauraparapa</i>	‘edge on cloak’	<i>pāngohengohe</i>	‘a fish’
<i>whakangeongoe</i>	‘tickle’	(= <i>pāngoengoe, pāngoungou</i>)	
<i>ngerungeru</i>	‘smooth, sleek	<i>pāngunungunu</i>	‘roast’
(= <i>pūngerungeru</i>)	soft’	(= <i>parahunuhunu</i>)	
<i>ngetangeta</i>	‘worn out	<i>pāoraora</i>	‘open mussels’
	garment’	<i>papangarongaro</i>	‘rotten’
<i>ngeungeu</i>	‘move wriggle’	<i>pāpāuma</i>	‘a tree’
<i>ngihongiho</i>	‘a diminutive’	(= <i>paraparauma</i>)	
<i>ngingongingo</i>	‘malevolent	<i>paraheahea</i>	‘lazy, ugly’
(= <i>rikoriko</i>)	devouring spirits’		
<i>ngoengoe</i>	‘scream, screech’	<i>pāarakaraka</i>	‘be orange
<i>ngōetoeto</i>	‘a kind of eel’		coloured’
<i>ngohongoho</i>	‘a fish’	<i>parakonekone</i>	‘a variety of
<i>ngongengonge</i>	‘crippled’		potato’
<i>ngongopuni</i>	‘a fish’	<i>parakōtukutuku</i>	‘a variety of
<i>ngorangora</i>	‘a diminutive’		potato’

<i>paranokenoke</i>	‘dirty, ugly, unkempt’	<i>pītongitongi</i>	‘movement or method of using huata spear’
<i>paraparauma</i> (= <i>pāpāuma</i>)	‘a tree’	<i>pīwatawata</i> (= <i>tūwatawata</i>)	‘full of open spaces, palisade of pā’
<i>paratoketoke</i>	‘nauseous of unpleasant taste’	<i>pīwauwau</i>	‘wren’
<i>parawhēwhē</i>	‘a variety of potato’	<i>pīwekeweke</i>	‘thin’
<i>pārekareka</i>	‘pleasant, shag’	<i>pōangaanga</i>	‘skull’
<i>pārekereke</i>	‘seedling bed, close together, barren of animals’	<i>pōāritarita</i> (= <i>pūāritarita</i>)	‘be in a hurry’
<i>pārengarenga</i>	‘a kind of legging’	<i>pōātinitini</i>	‘giddy, dizzy’
<i>pātakitaki</i>	‘division, boundary’	<i>poautinitini</i>	‘tribulation, evil, death’
<i>pātiotio</i>	‘a bivalve mollusc, rock with mussels, frozen over’	<i>pōhangahanga</i>	‘dirge, lament’
<i>pātakataka</i>	‘south east sea breeze’	<i>pōheahea</i>	‘?’
<i>pātakotako</i>	‘game played with string’	<i>pōhēhē</i>	‘mistake’
<i>patopato</i>	‘pig’	<i>pōhekaheka</i> (= <i>pūhekaheka</i>)	‘mould, fungus’
<i>patutiketike</i>	‘shrub’	<i>pōhūhū</i>	‘cloudy, overcast’
<i>penopeno</i> (= <i>kenokeno</i>)	‘offend with bad odour’	<i>poikurukuru</i> (= <i>pōkurukuru</i>)	‘lump, clod’
<i>petapeta</i>	‘worn out, rags, all at once’	<i>pōkākā</i>	‘stormy, hot, storm, heat, a tree a bird’
<i>pīhoihoi</i> (= <i>pīoioi</i>)	‘a bird’	<i>pōkīkī</i>	‘confused’
<i>pīkaokao</i> (= <i>tikaokao</i>)	‘cock bird (modern)’	<i>pokinikini</i>	‘?’
<i>pīkawikawi</i>	‘flexible, flaccid’	<i>pōnahanaha</i>	‘bastard’
<i>pīkōkō</i>	‘a plant’	<i>pōnakoako</i>	‘dim-sighted’
<i>pīmirumiru</i> (= <i>pīmiromiro</i> , <i>pīngirungiru</i> , <i>miromiro</i>)	‘a bird’	<i>pōniania</i> (= <i>pōngiangia</i> , <i>pōngiengie</i>)	‘lower part of nose, tattoo marks on side of nose’
<i>pīokaoka</i>	‘strip off’	<i>pōnīnī</i>	‘dog muzzle, muzzle’
<i>pīoraora</i>	move, cause to shake’	<i>pōnotinoti</i>	‘stunted’
<i>pīrahoraho</i>	‘almost fledged’	<i>pōngahangaha</i>	‘muzzle’
<i>pīrakaraka</i> (<i>pīwakawaka</i>)	‘fantail’	<i>pōngarongaro</i>	‘midge’
<i>pīripiriwharauoa</i> (= <i>pīpīwharauoa</i>)	‘cuckoo’	<i>pōpokoriki</i>	‘ant’
<i>pīroiroi</i>	‘entangled’	<i>pōrakaraka</i>	‘ball of clay, red ochre’
<i>whakapītaitai</i>	‘nibble’	<i>pōrangorango</i>	‘parti-coloured, piebald’
<i>pitakataka</i>	‘tumble about’	<i>pōrārā</i> (= <i>pōnānā</i>)	‘perplexed, flurried’
<i>pītaketake</i> (= <i>pītakitaki</i>)	‘small’	<i>pōrewarewa</i> (= <i>pōrewhawha</i>)	‘giddy, mad, stupid’
<i>pītātā</i>	‘south-east sea breeze’	<i>pōrihirihi</i> (= <i>pārihirihi</i>)	‘skull’
<i>pītawitawi</i> (= <i>pīngawingawi</i>)	‘bending, sagging’	<i>pōritarita</i> (= <i>pōririta</i>)	‘perplexed, bothered, bewildered’
<i>pītoitoi</i>	‘a robin’	<i>porowhiwhiwhiwhi</i> (= <i>porowhīwhiwhi</i>)	‘entangle’
		<i>pōtarotaro</i>	‘cut close, cropped’

<i>pōteketeke</i> (= <i>pōtēteke</i>)	‘turning over’	<i>pūngitangita</i> (= <i>pūnitanita</i>)	‘nettle, prickles’
<i>pōteretere</i>	‘drift’	<i>pūngorongoru</i>	‘light or loose of earth’
<i>pōtētē</i>	‘make grimaces’	<i>pūngoungou</i>	‘mode of dressing hair into a topknot’
<i>pōtīhitihi</i> (= <i>poutihitihi</i>)	‘unkempt, dishevelled’	<i>pūpakapaka</i>	‘a trumpet’
<i>pōtoketoke</i>	‘gather’	<i>pūrekireki</i>	‘turfs of sedge in a swamp, a plant’
<i>poupourere</i>	‘start up suddenly, spring up’	<i>pureureu</i>	‘a short badly executed dive’
<i>poupoutahi</i>	‘column of army, move in column’	<i>pūrikiriki</i>	‘broken in pieces, shattered’
<i>poupoutea</i> (= <i>pōpokotea</i>)	‘a bird’	<i>pūrikoriko</i>	‘slimy, stained’
<i>pōuruuru</i>	‘drowsy, sleepy’	<i>pūtangitangi</i> (= <i>pūtakitaki</i> ,	‘a weta, paradise duck’
<i>pōwaiwai</i>	‘whirl or whisk’	<i>pūtangitangiātama</i> , <i>pūtangitangiātoa</i> ,	
<i>puahinahina</i>	‘a variety of potato’	<i>pūpūtangiātama</i>)	
<i>pūāritarita</i> (= <i>pōāritarita</i>)	‘hurried, in a hurry’	<i>pūtenetene</i>	‘having protuberances’
<i>puatorotoro</i>	‘clematis’	<i>pūtuhituhi</i>	‘closed cropped of hair’
<i>pūngaiwerewere</i> (= <i>puawerewere</i> , <i>pungawerewere</i>)	‘spider’	<i>pūtimutimu</i>	‘stump’
<i>pūhaehae</i>	‘envious’	<i>pūtiotio</i>	‘prickly’
<i>pūhekaheka</i>	‘mould, fungus on food’	<i>pūtoetoe</i>	‘survivor form older generation’
<i>puhikorokoro</i>	‘an eel’	<i>pūuruuru</i>	‘abdomen’
<i>pūhuruhuru</i>	‘hairy, covered with hair’	<i>pūwatawata</i>	‘full of interstices or open spaces, a shrub’
<i>pūhutihuti</i>	‘shaggy, unkempt’	<i>pūwāwā</i>	‘a rush’
<i>pūioio</i>	‘knotty, hard, tough, muscular’	<i>pūwakawaka</i>	‘to undulate, waver’
<i>pūkanekane</i> (= <i>pūtanetane</i>)	‘feeling revulsion or irritation’	<i>pūwhāwhā</i>	‘partly decayed of timber’
<i>pūkarakara</i>	‘fragrant, well flavoured’	<i>rakorakoā</i>	‘a bird’
<i>pūkatakata</i>	‘dry, crisp’	<i>rakorakorere</i>	‘an insect’
<i>pūkatokato</i>	‘biting, keen of the wind’	<i>raorao</i>	‘level, undulating country’
<i>pūkēkē</i>	‘armpit’	<i>rāpopoto</i>	‘be assembled’
<i>pūkōareare</i>	‘whitebait’	<i>ratahuihui</i>	‘a sun fish’
<i>pukuwhenewhene</i>	‘ball or excrescence of tree trunk’	<i>rāwakiwaki</i>	‘hopeless, grief, regretful’
<i>pūnaunau</i>	‘satiated, self sown potato’	<i>rawherawhe</i>	‘shake’
<i>pūnotinoti</i>	‘stitch, patch up roughly, tie in bunches, stunted’	<i>rehareha</i>	‘floating, dangling’
<i>pūngaengae</i>	‘envy, jealous’	<i>reporepowai</i>	‘a small green beetle’
<i>pūngahungahu</i>	‘soft’	<i>rērēwai</i>	‘a plant’
<i>pungakengake</i>	‘?’	<i>retareta</i>	‘annoyance?’
<i>pūnganangana</i>	‘eager’	<i>retoreto</i>	‘a floating water’
<i>pūngarungaru</i>	‘rippling, wavy’	<i>rīrīwai</i>	‘stakes in bed of river’
<i>pungawerawera</i>	‘sulphur’	<i>rīrīwaka</i>	‘a swamp plant, a bird’
<i>pūngenengene</i>	‘muffled up’		
<i>pūngerungeru</i>	‘stout of persons’		

<i>rukaruka</i>	‘utterly’	<i>tāngōngō</i>	‘soft, thoroughly ripe, cooked’
<i>taetaeata</i>	‘early morning rain’	(= <i>tāngoungou</i> , <i>ngorungoru</i> , <i>ngoungou</i>)	
<i>tāhaohao</i>	‘cease of rain’	<i>tāparepare</i>	‘be bounded, enclosed’
<i>tāharahara</i>	‘be diminished, belittle oneself’	<i>tapetapeuma</i>	‘a shrub, a tree’
(= <i>taiharahara</i>)		<i>tāpetupetu</i>	‘a dispute’
<i>tāhengihengi</i>	‘calm of wind’	<i>tāpihapiha</i>	‘gills of a fish’
<i>tahiwehewehe</i>	‘name for last month of Maori year’	<i>tāpūpū</i>	‘hillock’
		<i>tārahara</i>	‘trap or snare for birds’
<i>tāhorehore</i>	‘stripped bare’		
<i>taiahoaho</i>	‘very bright’	<i>tarakumukumu</i>	‘a sea fish or reptile’
<i>taiākotikoti</i>	‘wear out’		
<i>taihemohemo</i>	‘genitals of either sex’	<i>taramengemenge</i>	‘crisped, curled’
		<i>taratarawai</i>	‘heartburn, indigestion’
<i>taikorekore</i>	‘beam of heketua’		
<i>taitaiāhenga</i>	‘producing no food’	<i>tārekoreko</i>	‘dimly seen out of sight’
<i>taiwhatiwhati</i>	‘a mollusc’	<i>tāreperepe</i>	‘buttocks, ragged’
<i>takahorohoro</i>	‘impetuous’	<i>tarihahohaho</i>	‘disarrange, rumple’
<i>takamingomingo</i>	‘turn round, twisted, tangled’		
		<i>taringapokipoki</i>	‘species of eel’
<i>takanewhanewha</i>	‘close the eyes’	<i>tāromiromi</i>	‘soft, pulpy, overripe fruit’
<i>takaokeoke</i>	‘move to and fro’		
(= <i>takaoreore</i>)		<i>tāruarua</i>	‘repeated’
<i>takaoraora</i>	‘toss about, writhe, struggle’	<i>tārupeupe</i>	‘shake about, wave about’
<i>takawhiwhiwhiwhi</i>	‘entangled, interlaced’	<i>tātāapopo</i>	‘a bird’
(= <i>takawhiwhiwhiwhi</i>)		<i>tātāeko</i>	‘a bird’
		(= <i>tātāeto</i> , <i>tātāngaeko</i> , <i>tātāranaeko</i> ,	
		<i>tātāraeko</i>)	
<i>takihakohako</i>	‘heap up’	<i>tātāraheke</i>	‘bristling, having numerous bare branches’
<i>tākīhīkīhī</i>	‘stripped bare’		
(= <i>tākīkī</i>)		<i>tātārārarakau</i>	‘species of eel’
<i>takitakio</i>	‘word to represent the stridulation of the cicada’	<i>tātārākura</i>	‘a small fresh water fish’
<i>tāmaramara</i>	‘swaggering’	<i>tātarariki</i>	‘leader of flock of kākā parrots’
<i>tamatamārangī</i>	‘ancient weapon’	(= <i>tātāriki</i>)	
<i>tāmuimui</i>	‘throng, crowd around’	<i>tātarawhare</i>	‘variety of kōkopu’
<i>tāmutumutu</i>	‘discontinuous, intermittent’	<i>tātāriki</i>	‘small’
		(= <i>tātarariki</i>)	
<i>tāngaengae</i>	‘umbilical cord, crop of bird, prostration, exhaustion’	<i>tatarikuha</i>	‘a bird’
		<i>tātāwhāinga</i>	‘vie, compete’
		<i>tatetate</i>	‘rattle, loose of lashings’
<i>tāngahangaha</i>	‘a fish’		
<i>tāngāngā</i>	‘loose not tight, stragglers’	<i>tautauā</i>	‘inactivity’
		<i>tauhikohiko</i>	‘move backwards and forwards’
<i>tāngaongao</i>	‘subside’		
<i>tangetange</i>	‘consumed, exhausted, forthwith’	<i>tauhonehone</i>	‘snatch or pull from one another’
<i>tāngengangenga</i>	‘loose not firmly fixed’	<i>tauhutihuti</i>	‘pull one another’s hair’
<i>tāngongangonga</i>	‘?’	<i>tauikaikai</i>	‘quarrel, contend’
		<i>tāukiuki</i>	‘longstanding’

<i>taukumekume</i>	‘contend for, struggle for’	<i>tiharahara</i>	‘diminutive’
<i>taumāhekeheke</i>	‘compete with one another’	<i>tikatakata</i>	‘smaller of Magellan clouds’
<i>whakataumiromiro</i>	‘curved part of kō’	<i>tikorikori</i>	‘quiver, wriggle’
<i>taungaungau</i>	‘wrangle’	<i>tīmokamoka</i>	‘detached portion, fragment’
<i>tauomaoma</i>	‘race, strive in running’	(= <i>mokamoka</i>)	‘speckled’
<i>tauonioni</i>	‘copulate’	<i>tingotingo</i>	‘a large moth’
<i>taupapatu</i>	‘beat one another, compete or vie with one another’	<i>tīngoi</i>	(= <i>tīngoungou, tūngoungou</i>)
(= <i>taupatupatu</i>)		<i>tīonioni</i>	‘waggle, flutter’
<i>tauparapara</i>	‘play with one another, an incantation’	<i>tīoreore</i>	‘larger of Magellan clouds’
<i>taupetupetu</i>	‘uncertain, doubtful’	<i>tīrangaranga</i>	‘scattered’
<i>tauponapona</i>	‘quipu, knotted cord’	<i>tīrehurehu</i>	‘a scared fire’
<i>taurakuraku</i>	‘scratch one another’	<i>tītīkorekore</i>	‘cry of robin’
<i>taurapirapi</i>	‘scratch or claw one another’	(= <i>tītīketeketemanawa</i>)	
<i>taurekereke</i>	‘knotted, tied in knots’	<i>tītītipounamu</i>	‘a bird’
<i>tauriparipa</i>	‘horizon’	<i>tīwanawana</i>	‘dishevelled, of hair’
<i>tauronarona</i>	‘pull against one another’	<i>tīwerawera</i>	‘loud, intense’
<i>taurumarumaki</i>	‘duck one another in water’	<i>tīwhangawhanga</i>	‘lie at full length’
<i>tautauāmoa</i>	‘without organisation, each for himself’	<i>tīwharawhara</i>	‘be split, separated’
<i>tautauhea</i>	‘plebeian’	<i>tōhenehene</i>	‘disarrange, disturbed’
(= <i>tautauwhea</i>)		<i>tōkenekene</i>	‘tickle’
<i>tautaumahei</i>	‘variety of taro’	<i>tokepiripiri</i>	‘a wren (bird)’
<i>tautētete</i>	‘feint, fence in fighting’	<i>tokotokohau</i>	‘a variety of taro’
<i>tautūtakitaki</i>	‘meet one another’	<i>tōngakengake</i>	‘drawn, as in a vortex’
<i>taututetute</i>	‘jostle one another’	(= <i>tōngekingeki</i>)	‘upper part of spine’
<i>tauwhaiwhai</i>	‘fly, hasten’	<i>tongamumuhu</i>	‘uncooked’
<i>tauwhawhai</i>	‘contend with one another, race’	<i>tōngāngā</i>	
<i>tāwekeweko</i>	‘cord to lash bait on hook’	<i>tongitongipia</i>	(= <i>tokitokipia</i>)
<i>tāwiniwini</i>	‘a shrub’	<i>torehapehape</i>	‘rough, uneven in surface’
<i>tāwheuwheu</i>	‘a tree’	<i>tōreherehe</i>	‘toboggan’
<i>tēterereia</i>	‘a variety of kumara’	<i>toretore</i>	‘species of stingray’
<i>tētēwai</i>	‘watery, of eyes’	<i>torohīhihi</i>	‘short, scanty hair’
<i>tīwakawaka</i>	‘fantail’	<i>tōtōara</i>	‘robin’
(= <i>tīrairaka, tīrakaraka, tītīrairaka</i>)		(= <i>tōtorowara</i>)	
<i>tīaroaro</i>	‘scrape or move to one side’	<i>tōtōeka</i>	‘variety of greenstone’
<i>tīhahuhahu</i>	‘scatter about’	<i>tōtoroene</i>	‘a climbing plant’
		(= <i>tōtorowene</i>)	
		<i>tōtoroie</i>	‘a grey warbler’
		(= <i>tōtororire</i>)	
		<i>tōtōrori</i>	‘a forest bird said to be extinct’
		<i>tōtorowhiti</i>	‘a shrub’
		<i>tōtōwahi</i>	‘a kete’
		<i>toutouwai</i>	‘robin’
		(= <i>tōtōwai</i>)	

<i>tuakirikiri</i> (= <i>kirikiri</i>)	‘gravel’	<i>whaiwhairoroa</i>	‘persevere, be urgent’
<i>tuarangaranga</i>	‘unsettled, perplexed’	<i>whākapakapa</i>	‘pass by, leave out’
<i>tuatinitini</i>	‘many parts, many strands’	<i>whākoekoe</i>	‘tickle’
<i>tūheihei</i>	‘dishevelled’		
<i>tukatuka</i>	‘start up, proceed forward’		
<i>tūkawikawi</i>	‘eager, quick, nimble’		
<i>tūkirakira</i>	‘standing on end, dishevelled’		
<i>tūmāhoehoe</i> (= <i>tūmārōhoehoe</i>)	‘vertical, high’		
<i>tūmatarehurehu</i>	‘ills from infringing tapu in war’		
<i>tūmoremore</i>	‘shorn of external appendages’		
<i>tunuhuruhuru</i>	‘do violence to, ill treat’		
<i>tūngāngā</i>	‘out of breath’		
<i>tūngarangara</i> (= <i>tūrangaranga</i>)	‘fatigued, wearied’		
<i>tūpahipahi</i>	‘sandspit’		
<i>tūpahupahu</i>	‘vaunting, blustering’		
<i>tūpākākā</i>	‘scorched, parched’		
<i>tūpurupuru</i>	‘a plant’		
<i>tūputuputu</i>	‘one of the Magellan clouds’		
<i>tūretireti</i>	‘oscillating, shaky’		
<i>tūringiringi</i>	‘diffuse’		
<i>turingangengange</i>	‘cripple, lame’		
<i>turiwātaimai</i>	‘be numbed, shiver’		
<i>turiwētautau</i>	‘be numbed, shiver’		
<i>tūwatawata</i>	‘main fence of pā’		
<i>tuwerewere</i>	‘variety of eel’		
<i>utiuti</i>	‘annoy, worry’		
<i>waiheuheu</i> (= <i>māheuheu</i>)	‘second growth in a clearing’		
<i>waikotikoti</i>	‘ceremonial cutting of hair’		
<i>waitakataka</i>	‘brains’		
<i>wakewake</i>	‘hurry, hasten’		
<i>wekeweke</i>	‘a plant, tentaculae of octopus etc, an eel’		
<i>wētangotango</i>	‘a bird’		
<i>whāereere</i>	‘mother’		
<i>whāioio</i>	‘a bird, numerous’		

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