

Patterns of Reduplication in Kwakwaka

by

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Abstract: Patterns of Reduplication in Kwakwala

Kwakwala utilizes reduplication to express at least five different morphemes in the language: distributive, plural, diminutive, 'too much' and repetitive. Each of the reduplicative morphemes surfaces due to a unique ranking of faithfulness and prosodic markedness constraints in the constraint hierarchy. The distributive, plural, diminutive and 'too much' morphemes each employ partial reduplication. The repetitive morpheme is expressed with total reduplication.

The distributive morpheme manifests itself in one of two allomorphic prefixes. The surface form is dependent on the shape of the underlying root and a general restriction against heavy syllables in the language. Deletion of a resonant coda or reduction of a vowel will occur if a resulting syllable would otherwise surface as more than one mora in weight. The locus of this change is determined by a distinctly ranked base-reduplicant correspondence constraint. Interestingly, un-reduplicated forms only ever reduce a full vowel as a means of repairing an over-weight syllable, while the base of a reduplicated form deletes the resonant. This is unexpected given the traditional definition of input-output faithfulness (McCarthy & Prince, 1993). In the traditional view, the base of reduplicated forms is the same string as the stem in un-reduplicated forms. Therefore, the two are expected to behave in a similar fashion in terms of repair mechanisms. The Kwakwala data does not bear this out. Rather, I adopt the definition of existential input-output faithfulness (Struijke, 1998, 2000), where the "output" is redefined as the entire reduplicated form, the base and the reduplicant. Here, an input segment must surface somewhere, but anywhere, in the output to satisfy faithfulness. In this way, the behaviour of roots in un-reduplicated forms and with the distributive morpheme is accounted for.

The plural, diminutive and 'too much' morphemes each contain a fixed vowel. I account for the locus, size, and shape of the morphemes by appealing to individual ranking of base-reduplicant correspondence constraints which govern each reduplicative morpheme separately. I determine that the fixed vowels of the plural and diminutive reduplicants are specified in the underlying representation. The fixed vowel of the 'too much' morpheme, however, arises as least marked segment.

Repetitive reduplication is expressed through total reduplication. Again, this is possible in a language with partial reduplication due to a unique position in the constraint hierarchy of the base-reduplication correspondence constraints responsible for this particular morpheme. They are ranked above any of the markedness constraints which were responsible for truncating the partial reduplicants, allowing total reduplication to surface.

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1. Introduction

K^wa^kw^ala is a Wakashan language traditionally spoken on the North and North-Eastern end of Vancouver Island and the adjacent mainland, in British Columbia, Canada. It is classified as belonging to the Northern Wakashan branch of the language family, along with Heiltsuk, Oowekyala, and Haisla (Boas, 1893; SIL website 2002; Yinka Dene Language Institute (YDLI) website 2002). At present there are fewer than 200 native speakers remaining, according to the YDLI website (2002). It is crucial that a unified effort is made to document this language and to elucidate its linguistic properties for the sake of developing materials to be used in language revitalization projects. In this thesis, I explore the morpho-phonological process of reduplication in K^wa^kw^ala, and provide a theoretical account for the patterns.

The data presented in this thesis, upon which my hypotheses and analysis are based, was provided through K^wa^kw^ala speaking consultants living in Vancouver, and Alert Bay, just off the northern tip of Vancouver Island. Many members of the community supported this work, but specifically, we worked with seven consultants. Edward Dawson, has lived in Alert Bay since 1957. He was born in 1942 and grew up in Kingcome and Gilford. His father was from Blunden Harbour, and his mother from Gilford Island. Ruby Hanuse was born in Alert Bay in 1940, and grew up partly in Village Island, and partly in Alert Bay. She has lived since 1959 in Vancouver. Her father was born in Fort Rupert and her mother was born in Alert Bay. Lorraine Hunt was born in 1953 and has lived her whole life in Alert Bay. Her mother was also from Alert Bay. Frances Puglas Mountain was born in 1942. Since then, she has lived in Village Island, Campbell River, Port McNeill, and now Alert Bay. Her father was born in Village Island, and her mother was born in Gilford Island. Harry (Cash) Mountain was born in 1920 and grew up in Village Island from the time he was born until 1929. At that time he went to St. Michael's residential school in Alert Bay, and remained there until 1936. After that, he moved back to Village Island for one year, but since then has lived most of the time in Alert Bay. His father was from Village Island and his mother was from Turnor Island. Vera Newman was born in 1944 and grew up in Village Island until 1955. Since then, she has lived in Alert Bay. Her father was from Knight's Inlet and her mother was from Alert Bay. Douglas Scow was born in 1940. He grew up in Kingcome and Gilford, but came to Alert Bay in order to attend St. Michael's residential school. His parents were both from Gilford Island. Although the speakers may have slightly different dialect backgrounds, there were not any recorded differences between the speakers in pronunciation or language use, for the purpose of the reduplication data reported here.

I began looking at K^wa^kw^ala in Spring 2002. From February 2003 to September 2003, I traveled to Alert Bay once a month, for several days at a time, to do more intensive data collection sessions through cooperation with the U'mista Cultural Centre, along with Yunhee Chung. We transcribed each utterance that was provided. Each session was also taped with a TEAC DAT tape recorder, digitized and then

edited using Sound Studio 2.0.7 (Felt Tip Software, © Lucius Kwok, 2002). I then reviewed these digitized, individual sound files to re-check transcriptions for accuracy. Lorraine Hunt, one of the consultants, added a major contribution by providing her transcription of many of the reduplicative utterances, providing us with additional valuable native speaker insight. The entire corpus consists presently of 1292 utterances.

The goal of this thesis is to provide an account for the reduplicative patterns confirmed in the fieldwork in K^wa^kwala. I show that the patterns witnessed are a result of the interface of prosody and morphology in the phonology of the language. In section 1.1, I lay out the issues and provide examples of the various forms of reduplication. In section 1.2, I discuss my assumptions within Optimality Theory (OT) in which I couch my account of reduplication, and lay out the theoretical points which I adopt. In section 1.3, I provide a brief overview of previous research done on K^wa^kwala and highlight the points on which I diverge.

In chapter 2, I discuss my hypotheses and assumptions of the prosodic structure of the language. From these perspectives, I provide an account of the various forms of reduplication. In chapter 3, I analyze 'distributive' reduplication, which is reduplication with allomorphy. In chapter 4, I look at the different forms of reduplication with fixed segmentism. In turn, I examine 'plural', 'diminutive' and 'too much' reduplication. In section 4.4, I provide an account for these forms of reduplication. Here, I show that the different patterns of reduplication are governed by unique and individually ranked base-reduplicant correspondence constraints. I analyze total reduplication, or 'repetitive' reduplication, in chapter 5. Here, I reconcile the fact that the language has one phonology, but both partial and total reduplicative patterns. In chapter 6, I summarize my conclusions.

1.1 *The Issue*

K^wa^kwala has several patterns of reduplication, each a unique morpheme. Through fieldwork I have confirmed at least five patterns of reduplication: plural, diminutive, 'too much', distributive and repetitive. The first four types of reduplication are partial; the fifth one, is total. Throughout the following sections examples are provided for each morpheme, and the distribution of the morphemes are discussed, to the extent that it is possible.

1.1.1 *Plural*

The 'plural' morpheme manifests itself in a /Ci-/ prefix.¹

¹ Throughout this thesis, I adopt the following abbreviations: brackets () = foot, period . = syllable boundary, hyphen - = morpheme boundary, an equal sign = indicates concatenation of a lexical suffix, **bold text** = reduplicant, C stands for a consonant, V for a vowel, O for an obstruent and R for a resonant. After each English translation I provide the number corresponding to that entry in our field notes. Furthermore, I will include Boas' (1947) and Grubb's (1977) references for the word in brackets. Where it is possible, I also include the un-reduplicated root form of a word in separate brackets. Inside these brackets, I will also include a Grubb (1977) or Boas (1947) reference for the un-reduplicated root form, to the extent that it is possible. Unless otherwise noted, all glosses are from the current consultants. Unless otherwise marked, the data in

- (1) a. **ṗí-ṗəsṗəyú** ears/103 ('ear' [ṗəsṗəyú]/102; Grubb, p. 66)
 pRED-ear
- b. **Gi-GáGəs** grandfathers/120 (Grubb, p.80 'grandfather' /gágas/)
 pRED-grandfather
- c. **ḥí-tuq^wa** feast dishes/902 (Grubb, p.70 'feast dish' /lhúkw'a/)
 pRED-feast.dish

As I show in chapter 4, the plural morpheme may be prefixed onto nominal, adjectival, and verbal roots.

One point left unanswered is the precise distributional limitations on the plural morpheme. An independent word [qínəm], meaning 'many' was also frequently used to denote plurality.

- (2) a. **qínəm q^waχ** lots of trees/152
 many tree ('tree' /q^waχ/ 140)
- b. **ʔólakal qínəm muχ-dá-q^waχ-ala** there's a lot of trees over there/212
 really many dist-det-tree-? ('tree' /q^waχ/ 140)
- c. **qínəm dəmχsi** lots of salt/261
 many salt ('salt' /dəmχsi/ 259; Grubb, p.122)

For both 'tree' and 'salt', I tested the grammaticality of using the plural reduplicative morpheme to mean 'lots of X'. The judgment was that both were ungrammatical- *[q^wi-q^waχ]/142 and *[di-dəmχsi]/262.

Moreover, another word meaning 'many' was also elicited: [d^ʔikas].

- (3) a. **dəmχsi d^ʔikas** lots of salt/260
 salt many ('salt' /dəmχsi/ 259; Grubb, p.122)
- b. **q^wáχ d^ʔikas** lots of trees/141
 tree many ('tree' /q^waχ/ 140)

This word was not frequently found in the data. In fact, these are the only two examples of it. What is striking is that it is precisely the two nouns which could not take the plural reduplicative morpheme which appear with this independent lexeme.

This leads me to hypothesize that some nouns may be considered "countable" with the plural reduplicative morpheme and others "uncountable" in that fashion. Unfortunately, these were the only two

this thesis was collected by Michele Kalmar and Yunhee Chung. Thanks to Yunhee Chung for discussion on several of these topics. All finalized transcriptions, and errors are my own.

(7)

- | | | |
|----|--------------------------------|---|
| a. | ʔəmábidu kùtələh
small fish | small fish/RH362 |
| b. | ʔəmábidu busi?
small cat | small cat/RH180 |
| c. | ʔəmábidu dʔalà:k
small lake | small lake/572 ('lake' [dʔəlák]/557;Grubb, p. 94) |
| d. | məngæs bidu
butt small | small butt/770 (Grubb, p.196 'butt' /məngas/) |
| e. | hániGəm bidu
toy boat small | small toy boat/134 |

Several questions arise from this data. First of all, what is the difference between [bidu] or [ʔəmbidu]? Clearly, their syntactic position differs. [ʔəmbidu] always precedes the noun being modified, while [bidu] follows the noun. Secondly, what is their specific distribution? Is this independent morpheme in free variation with the diminutive reduplicative prefix? If not, what is the distribution of each? Is there a semantic difference between 'small' and the 'diminutive'? At this point, there are no examples of both the diminutive reduplicative morpheme occurring concomitantly with the independent lexeme, although this should be tested. If the semantic correspondence of each is unique, it seems logical that they could appear concurrently, since the information would not be redundant. So, is this strictly ungrammatical, or in certain contexts would utilizing both morphemes be permissible? Unfortunately, I was unable to answer these questions in the scope of this particular study, but I leave these questions as fodder for future research.

1.1.3 'Too Much'

Another morpheme meaning 'too much' is expressed as a /Cə-/ prefix.

- | | | | |
|-----|----|---|--------------------------------|
| (8) | a. | mə -míx-kən
t.mRED-sleep-excessive | I over-slept/418 (Boas p. 356) |
| | b. | kʷə -kʷónx-kən
t.mRED-wet-excessive | over-wet/426 (Boas p.356) |

The 'too much' reduplicative morpheme is seen concatenated to verbs and adjectives. The exact gloss of the morpheme is difficult to pinpoint precisely. In the morpheme-by-morpheme gloss I label [-kən] as 'excessive' and /Cə-/ reduplication as 'too much' (t.m), as Boas (1947) also labels it. At first blush, it

1.1.4 *Distributive*

K^wak^wala has another partial reduplicative morpheme that can be described as ‘distributive’. This morpheme does not utilize a fixed vowel. Unlike the other partial reduplicants, its shape is variable. Distributive contains two allomorphs, both of which are prefixes: /CəR-/ and /CV-/. Descriptively, if the root has a full vowel nucleus, the reduplicant will surface as /CV-/. If the root has a schwa nucleus, a following resonant coda will also be copied, and the reduplicant will surface as /CəR-/.

- (11) Distributive as /CV-/
wá-wap=stola watery eyes/586 (from ‘water’ [wap])
distRED-water=eye
- (12) Distributive as /CəR-/
k^wəl-k^wəl-χ=stu grey/light eyes/587, 820 (from ‘faded’ [k^wəl])
distRED-fade-passive=eye

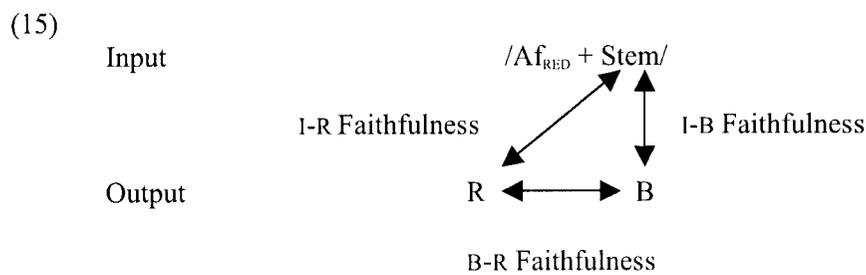
In some crucial cases, a resonant coda will appear in the reduplicant along with the schwa nucleus, while the resonant coda deletes from the base.

- (13) Distributive with deletion in the base
qə́n-qaØs-ṁut wood chips/1033 (Boas, p.340)(from ‘adze’ [qə́ns-])
distRED-adze-remains

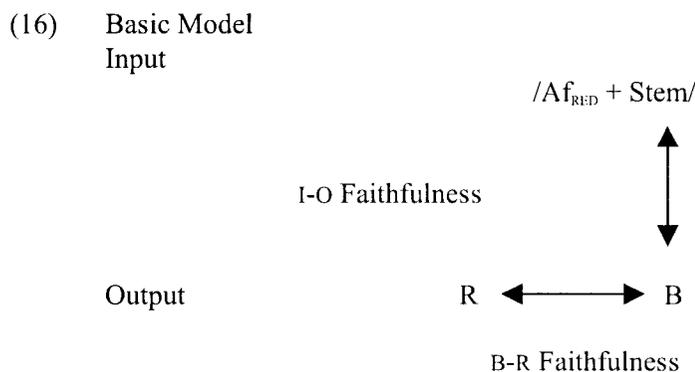
I show in chapter 3 that this fascinating pattern is the result of the interaction of prosody and phonology, which determines the allomorph chosen to surface. I also show that this data is problematic for the traditional view of Correspondence Theory, which does not account for deletion in the base of reduplicated words, but no deletion in non-reduplicated words, and provide evidence for an existentialist view of I-O correspondence (Struijke 1998, 2000;), where the input is in correspondence with both the reduplicant and base.

The exact distribution of the distributive morpheme is not totally transparent. This pattern of reduplication may surface consistently in conjunction with a suffix. For example, the suffix /-ṁut/ ‘remains’ is always found concomitantly with reduplication. It is unclear if the suffix triggers reduplication, or if the presence of ‘distributive’ reduplication is simply conjunctive with the suffix, as a result of the intended meaning. The distributive morpheme may also occur, but only occasionally, with some lexical suffixes. These suffixes take the place of an independent morpheme. While the lexical meaning seems the same, the phonological shape is entirely different. In K^wak^wala, a good example of the free morpheme/bound lexical suffix pairing is seen with body parts. For example ‘hand’ is [ʔayasu],

The notion of correspondence between elements is crucial to reduplication in Kwakwaka. The patterns witnessed above are a result of certain levels of correspondence between the base, reduplicant and input. These patterns cast fresh light into our understanding of correspondence and the definitions therein. Traditional Correspondence Theory (CT) (McCarthy & Prince 1993a, 1994b, 1995, 1999) is explanatorily inadequate to account for the Kwakwaka data. Correspondence is a relationship between related strings of elements, either the input and output, base and reduplicant, or the reduplicant and the input. The relationship between these sets of strings is formalized in the Full Model of correspondence provided in McCarthy and Prince (1995, 1999).



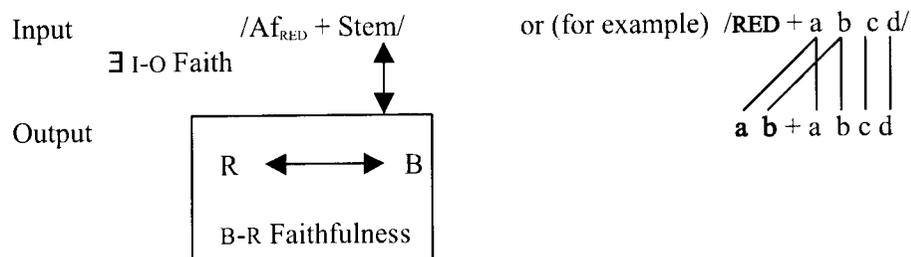
The relationship between elements is governed in both directions. That is, the input is evaluated for correspondence with the output, and the output is evaluated for correspondence with the input (I-B Faith). Correspondence is similarly evaluated both ways between the base and reduplicant (B-R Faith), and the input and reduplicant (I-R Faith). The faithfulness relations between the input and the reduplicant in this model of correspondence, however, are determined to be subsidiary due to a universal stipulation on ranking (McCarthy & Prince, 1995). This stipulation mandates that faithfulness between the input and output is ranked above faithfulness between the input and reduplicant. The result is that I-R faithfulness loses its effect typologically. From this metacondition comes a sub-theory, illustrated in the Basic Model, where only I-O faithfulness and B-R faithfulness are considered in the evaluation of correspondence (McCarthy & Prince 1993a, 1999).



Outputs are consequently predicted never to express superior correspondence between the input and reduplicant than between the input and output. K^wa^kw^ala distributive reduplication is a stumbling block for this model of Correspondence Theory (Struijke, 1998, 2000). In K^wa^kw^ala the reduplicant may contain an element that is present in the input, but not in the base, as in (13). This is unexpected given the universal ranking stipulation of traditional Correspondence Theory. As I will show in section 3.2.2, even the full model of CT, with I-R correspondence, is problematic, as it predicts the same behaviour of bases in both reduplicated and non-reduplicated roots, which is not attested in this language. The K^wa^kw^ala data is unaccounted for under such an analysis.

In this thesis, I adopt the notion of Existential Faithfulness (Struijke, 1998, 2000;), which is, essentially, a broader definition of correspondence between the input and output. Rather than the input being in correspondence only with the base of the output in a reduplicated word, the input is in correspondence with the entire output string, both the base and the reduplicant. Base-Reduplicant correspondence still exists in this model, capturing the observation that bases and reduplicants share a unique relationship.

(17) Existential Faithfulness Model (adapted from Struijke 2000)



Under Existential Faithfulness, an element is simply required to appear somewhere in the output to satisfy the constraint. There is no inherent necessity for an element to appear in the base rather than the reduplicant. If an element does appear in the reduplicant, it has satisfied Existential Faithfulness, and does not have to appear in the base. The size and content of the reduplicant is monitored by markedness constraints, the language's reduplicant template constraints, and base-reduplicant correspondence constraints. The relative ranking of these constraints determines the output of both the reduplicant and base. In chapters 3, 4, and 5, I explore the interaction of the various relevant constraints in K^wa^kw^ala, and demonstrate more clearly the necessity for Existential Faithfulness.

An interesting outcome of existential Correspondence Theory is that it violates INTEGRITY.

(18) INTEGRITY (McCarthy & Prince, 1995)

No element of the input has multiple correspondents in the output

Under this model of correspondence, every example of reduplication will violate INTEGRITY. This is clearly illustrated in the second diagram of (17). Each element in the input that is present in the reduplicant and in the base will have two correspondents, and incur a violation of INTEGRITY. Therefore, this constraint must be dominated by B-R Faithfulness. Base-Reduplicant correspondence will require that elements of the base be present in the reduplicant, and vice versa, at the expense of INTEGRITY. Elements in the input may consequently correspond to more than one element in the output. Existential I-O correspondence still requires a B-R correspondence relation to be present in the theory. Without B-R Faithfulness, a reduplicative input such as /RED + abcd/ could be realized as [ab + cd], where [ab] is the manifestation of the reduplicant, and [cd] is the realization of the base, fully satisfying existential faithfulness and completely avoiding any violations of integrity. Each element in the input has a correspondent in the output, once and only once. The reduplicant morpheme is fully realized phonetically and no other faithfulness violations are incurred. B-R correspondence ranked above INTEGRITY ensures that such a candidate is not possible for the output, since the reduplicant and base share no corresponding elements whatsoever. I assume all base-reduplicant correspondence constraints to be ranked above INTEGRITY in K^wa^kwala, and will not actually include the constraint in any tableaux.

In this thesis, I follow the theory of Generalized Templates (McCarthy & Prince, 1994a, 1994b, 1995), where the reduplicant is defined as an M_{cat}: RED = M_{cat}. Through the reduplication chapters I demonstrate that two different constraints are active in K^wa^kwala; RED = AFX and RED = RT. These constraints, in conjunction with the phonotactic constraints on affix and root size in the language, play a large role in determining the size of the different reduplicative morphemes. Each morpheme is governed by one of these templatic constraints, which are ranked separately in the constraint hierarchy.

An alternative to the Generalized Template Theory (GTT) approach, would be to apply to a prosodic template analysis. In this theory, the size of the reduplicant is governed by a constraint RED = P_{cat}. For example, RED = σ. This approach has a clear disadvantage. An analysis of reduplication governed by a P_{cat} leads to the Kager-Hamilton Conundrum (Spaelti 1997; McCarthy and Prince 1999; Pulleyblank, in press), where factorial typology predicts that it should be possible for a prosodic template constraint to be situated in a hierarchy Faith B-R >> RED = P_{cat} >> Faith I-O. This predicts that whatever limitations are placed on the size of the reduplicant will also be placed on the size of the base. Any sort of root truncation of this sort is purportedly unattested in natural languages. Therefore, I reject this approach for K^wa^kwala.

1.3 *Previous Research*

A significant contribution to our understanding of Kwákwála was provided by Franz Boas, who worked in the late nineteenth century and whose work was edited and published posthumously, completed a Kwákwála grammar (1947), as well as another insightful illustrative linguistic sketch of Kwákwála for the Bureau of American Ethnology (1910). His work focused specifically on the Kwákiutl dialect. Boas' observations and generalizations are invaluable. One goal in this study was to re-elicite his forms in the current dialect of my speakers, in as far as the tokens were relevant to clarifying the one small aspect examined in this thesis, the morpho-phonological process of reduplication. Many roots and reduplicative forms were confirmed. Some of Boas' words, however, were not recognized by the speakers.

The fascinating patterns witnessed in Kwákwála phonology have not gone unnoticed in current research. In 1977, David Grubb's "A Practical Writing System and Short Dictionary of Kwákwála (Kwákiutl)" was published. This considerable work is very useful, as it provides a more recent listing of words, including stress marking, in a coherent dictionary format, with both English to Kwákwála, and Kwákwála to English translations. One problem with this work is the general lack of phonetic distinction (the work is mostly phonemic). A problem with this is seen specifically in the lack of the use of schwa in the orthography (instead he just uses /e/ and does not distinguish this from a full vowel [e]). Precise vowel distinction is pivotal in the analysis of the prosody of the language, and as a result, the process of reduplication. Nonetheless, this work is significant as a reference tool, and as a jumping off point for developing hypotheses and constructing elicitation lists.

The different complicating issues discussed above disadvantage an analysis based solely on these works, and increase the variables which may skew the conclusions. Therefore, in this thesis I provide an account of reduplication in Kwákwála based primarily on the tokens elicited during our current field sessions. I use Boas' and Grubb's work to trigger or to supplement the data elicited. However, any analyses made in this thesis, are first and foremost based upon the current elicitations.

Some additional research has been done on Kwákwála phonology, based on Boas' work and Grubb's work. In 1975, Bach addressed the issue of long vowels and stress in Kwákwála. He concludes that most occurrences of long vowels are reduced to a sequence of schwa plus resonant (glide, nasal, or liquid) underlyingly. Although I do not adopt his analysis, it does not conflict with my assumption against bi-moraic long vowels in the language, since I hypothesize schwas to be non-moraic (see chapter 2). Bach's work is based on Boas, 1947 and Grubb 1974.

A thesis on syllable structure in Kwákwála and Heiltsuk was published by Wilson, P. (1978). This thesis is full of observational insights, based in large part on his own field notes. The data have led

me to agree with his observations on syllable structure, except his assumption of K^wa^kwala as an iambic language.

In 1982, a thesis outlining the stress rules of Wakashan in general, including K^wa^kwala was produced by Wilson, S. A. This account, couched in an autosegmental framework, is extremely insightful, based on observation of Boas' 1943, and 1947 data. I converge with his work in analyzing K^wa^kwala as a trochaic language.

In 1988 (also 1995), Zec discussed the prosodic structure of K^wa^kwala, specifically expounding on syllable structure and the unique behaviour of codas in terms of weight, based on Boas 1947. While I accord with her analysis for the most part, I crucially depart from her analysis of K^wa^kwala as an iambic language. In chapter 2, I provide evidence for K^wa^kwala as a trochaic language.

The enigmatic behaviour of reduplicants has also caught the attention of current researchers. In 1998 and 2000, Struijke looked at the various allomorphs of distributive reduplication as support for a broad definition of input-output faithfulness. Again, I diverge from her analysis, which claims that K^wa^kwala is iambic. This point is hinged upon the assumption that schwa is equal in weight to all other vowels. In chapter 2, I provide evidence that schwa is non-moraic. This point radically alters the account of reduplication. Struijke (1998, 2000) accounts for the patterns of distributive reduplication by appealing to a constraint in the language to avoid stress clash. This account, based on her prosodic assumptions, does not capture the behaviour of all distributive reduplicant forms, however, as I show in chapter 3. I adopt Struijke's (1998, 2000) definition of existential, or broad, input-output faithfulness, but diverge from her assumptions on stress, and account for the data based on general prosodic conditions active in the language. Her conclusions were based on the data collected by Boas (1910, 1947).

In the following chapter I expound on the prosodic system of K^wa^kwala in light of this previous research. My own conclusions are the springboard from which I then analyze reduplication.

2. Prosodic Background

A look at the prosodic structure of K^wa^kwala is essential to an analysis of its patterns of reduplication. Prosodic considerations affect the journey to a phonological output from the morphological realm. The behaviour of stress in the language sheds much light into the prosodic inner-workings. From the observations of this visible manifestation of prosodic conditions, I develop hypotheses for the underlying constitution of the syllable hierarchy. I show that K^wa^kwala syllabic structure is strictly governed by a mono-moraic weight restriction. I also explore the status of different syllabic positions in relation to weight.

2.1 Phonemic Inventory

Below is the phonemic inventory of K^wa^kwala (Wilson, P., 1978), divided into manner and place of articulation groupings. In addition to a full set of oral and nasal stops, the voiceless obstruents and voiceless affricates, and all resonants also have a set of glottalized counterparts.

(19)

consonants:

	labial	alveolar	velar	uvular
stop	p b	t d	k k ^w g g ^w	q q ^w G G ^w ?
glottalized O	p̣	ṭ c̣ ʎ̣	ḳ ḳ ^w	q̣ q̣ ^w
affricate		c dʒ ʎ λ		
fricative		s ʃ	x x ^w	χ χ ^w h
glottalized R	ṃ ẉ	ṇ ḷ	ɰ	
nasal	m	n		
liquid		l		
glide	w		y	

The phonemic vowel inventory is basically a six vowel system, with five “full” vowels, and a reduced central vowel.

(20)

vowels:

i		u
e	ə	o
	a	

I assume that the schwa is underlying. At present there is no evidence to suggest that it is epenthetic. Phonetically, some allophonic vowels surface.

(21) Allophonic vowels

- | | |
|-----------------|--|
| a. yǽqəntónuxʷ | someone who is good at speaking/1178 |
| b. təkǽ | dirty/1288 (Grubb, p.63) |
| c. kɪ́pi | hug; the action of hugging/960(Grubb, p.89, to hug [kepa]) |
| d. wədəʔéʔba | cold nose/878 (from [-eʔba] Boas, p.239) |

Phonetically, [ɪ] and [ɛ] appear to function as allophones of /ə/, although I have not fully worked out their exact distribution at this point. [æ] appears to function as an allophone of /a/, although, again, I have not worked out the distribution at this point.

Boas (1947) marks a difference between short and long vowels. Some analyses based on this data take this length to be phonemically underlying (S.A. Wilson, 1982; Zec, 1988; Struijke 1998, 2000). Long vowels are analyzed as a branching nucleus, consisting of two moras. Again, this crucially impacts on the analysis of the prosodic structure, and, therefore, reduplication in K^waḵ^wala. The phonological system must inherently allow for bi-moraic syllables, if phonemic long vowels do truly exist. The analysis of stress and foot patterning are consequently affected. In the data currently provided, the only vowels on which I detect *some* length (though not a lot), are always stressed ones. This phonetic observation is also noted in Wilson (1978). A common property of stressed vowels is increased duration. Therefore, I do not want to conclude that long vowels are in fact underlying. When I questioned the consultants on the perceived length of vowels, none of them indicated any definitive, contrastive length in any vowels. There did not seem to be any perceived length even on vowels that were stressed. Vowel length is certainly not distinctive (Wilson, P. 1978). If vowel length were crucially phonemic, certainly native speakers would intuit and distinguish long versus short vowels in surface pronunciation. Additionally, I would expect to find minimal pairs distinguished solely on the length of the vowel. I have not found any such pairs. The only way to alleviate the discrepancy is to precisely test the comparative

length of vowels. The data that has been collected from our fieldwork has been digitized and is segmented. This could provide the opportunity to exactly calculate vowel duration and ratify or nullify the existence of long vowels in the current dialect of K^wa^kwala. At the moment, I find no compelling evidence for bi-moraic long vowels. If further research corroborates the phonetic realization of long vowels, however, then Bach's (1975) conclusion that long vowels are a sequence of schwa plus resonant (glide, nasal, or liquid) underlyingly still accords with my assumption against bi-moraic long vowels in the language, which will be elucidated in chapter 2. At this point, I leave the issue of long vowels for further research, and assume that bi-moraic long vowels are not present.

2.2 Syllable Structure Overview

Generalizations regarding syllable structure in K^wa^kwala are found in Boas (1947), Bach (1975), Wilson (1978), Struijke (2000), (see also Werle 2002). The following syllable shapes have been observed in the current data: CV, Cə, CəR, CəO, CəRO, CVO, CVOO³. Onsets in K^wa^kwala are obligatory. This follows from the cross-linguistic constraint requiring syllables to have onsets.

- (22) ONSET (Prince & Smolensky 1993)
 *[_σV ('Syllables must have onsets.')

This constraint is never violated in K^wa^kwala. I assume that this constraint is not dominated by any other constraint that could force an onset-less syllable. This is very relevant for reduplication. Since under the present theoretical assumptions, reduplication is not templatic in the sense that it is specified for CV slots, and is underlyingly empty phonologically for segmental content, there is no absolute precondition that the reduplicant have an onset. The high ranking of the constraint ONSET militates against /V-/ or /VC-/ reduplicants and will effectively ensure that all optimal outputs contain C onsets in the reduplicant (and elsewhere). For this reason, I will only consider candidates in my tableaux which obey the onset constraint.

Onsets consonant clusters are prohibited in K^wa^kwala. This is due to the constraint *COMPLEX^{ONS}, which penalizes forms with non-simple onsets, as formalized below (from Kager, 1999; Prince & Smolensky, 1993).

³ Some gaps exist in my corpus. For example, I have yet to find words of the shape CVR', CəO.CəR., or CV.CəR, or CV.Cə.CəR, all of which are expected given the prosodic structure of the language. It is too early to conclude, however, whether the gaps are accidental or systematic.

- (23) *COMPLEX^{ONS}
 *_{[σ}CC ('Onsets are simple')

I assume that this constraint is also un-dominated by any other constraints which could possibly force a violation, since onset consonant clusters never surface in the language. This is also relevant for reduplication, since there are no examples of reduplication of just a /C-/. Reduplicants are minimally /CV-/, or /Cə-/, in order to avoid a consonant cluster at the beginning of the word. Again, I will only consider candidates in the tableaux conforming to this requirement.

Codas are not required, but permitted. There may be up to two maximally. Single codas may be either an obstruent or a resonant. If there are two codas, they may consist of either a resonant and obstruent, or two obstruents, but never two resonants. A resonant and obstruent pairing must always occur in that order, resonant + obstruent, in keeping with the Sonority Sequence Principle (SSP).

- (24) SONORITY SEQUENCY PRINCIPLE (Clements 1990)

Complex onsets rise in sonority, and complex codas fall in sonority.

There is one example exhibiting a surface CVR syllable: [l̥.ɣʷɔ̃l.ca] 'make a fire' (911). This example, however, is circumspect. It is possible that, underlyingly, the nucleus of the CVR syllable, /o/, is actually /ə/, which is influenced by the rounding of the previous consonant and the features of the following consonant. Precise testing would clarify the uncertainty. At the moment, however, based on the paucity of CVR examples, I will draw the generalized conclusion that such syllable shapes are not permitted in K^waḱ^wala.

These observations about syllable shape are crucial when viewed in light of prosodic weight in the language, and contain the key to an analysis of reduplication. I will take the observations about syllable shape into consideration when more deeply examining the moraic level of the syllable hierarchy. The following sections further flesh out the details of the prosodic observations.

2.3 *Prosodic Overview*

The behaviour of stress in a language reveals much about the prosodic structure of syllables, including the relevance of weight and the moraic status of constituents. Fortunately, much of the language recorded in the latter part of nineteenth century, (Boas, 1947), includes primary stress marking. Based on this work, previous researchers have drawn various conclusions about the stress patterns of K^waḱ^wala (Boas, 1947; Bach, 1975; Wilson, 1978; Wilson, 1982; Zec, 1995; Struijke, 2000, 1998). Building on this research and my own research on original field data, I provide the following hypotheses

regarding stress and prosodic structure in K^wa^kwala.

2.3.1 Trochaic Feet

I propose that K^wa^kwala is a trochaic language (Wilson, S.A., 1982), contra previous analyses where feet have been analyzed as *iambic* (Wilson, P., 1978, Zec, 1988, 995; Struijke 1998, 2000). The previous iambic conclusion is based on the fact that schwa is analyzed the same as other full vowels. That is, they are assumed to be equally weighted; ə = μ, V = μ. If syllables are equally weighted, stress should surface on the left syllable if the language is trochaic, and on the right if the language is iambic. There is no 'extra' weight to draw stress away from the default syllable head. In Cə.CV words then, stress *looks* iambic:

(25) bə.há 'to cut' (in Zec, 1995 from Boas, 1947, p. 218)

Many K^wa^kwala words consist of such syllable patterns. However, there are also many examples of left headed stress. These are seen in words of the form CəR.CV. Positing a quantity sensitive language predicts that any heavy syllable, that is a syllable with two moras, will attract stress, by virtue of the weight to stress principle.

(26) Weight to Stress (Kager, 1999; Shaw et al., 1999)
Heavy syllables are stressed.

Syllables with codas, if codas are moraic, would contain two moras. As will be shown, resonant codas are moraic in K^wa^kwala. Obstruent codas are not moraic. As discussed in section 2.2, CVR syllables are not fully attested. But, granting the previous assumption that schwa is moraic (Zec, 1988, 995; Struijke 1998, 2000), CəR syllables would be bi-moraic in K^wa^kwala and would attract stress. Therefore, given a word CəR.CV, stress would shift away from the right-most iambic syllable, to the heavy left-most syllable. This is witnessed in:

(27) dəl.xa 'damp' (in Zec, 1995; from Boas 1947., p.218)

In this way, some of the left-headed stress examples are accounted for and the basic stress pattern is analyzed as iambic.

However, looking at bi-syllabic words with "equal" syllables supports the alternate hypothesis

that feet are *trochaic*. That is, feet are left-headed. This is formalized below.

(28) FOOT FORM-T (Kager, 1999)

Feet have initial prominence

Equal syllables are where both syllables are headed by either a schwa or full vowel, so that confounding variables due to vowel quality are eliminated. Obstruent codas do not add to weight, as will be shown and are, therefore, irrelevant. Resonant codas do add weight, as will be shown. So equally weighted syllables are also where the occurrence, or non-occurrence, of a resonant coda is mirrored in both syllables.

- | | | |
|------|--------------|---|
| (29) | a. mí.χe | my dream/842 |
| | b. dʒá.kʷa | S.W wind/360; (Grubb, p.152) |
| | c. ʔí.gis | sand/822 (Grubb, p.122) |
| | d. gé.las | bedroom/838 |
| | e. kú.γʷid | to split/1060 (Grubb, p.132) |
| | f. hén.λəm | gun/801 (Grubb, p.82) |
| | g. cəl.wən | hot body/1084 |
| | h. kʷós.kʷəs | bluejay; steller's jay/1114; 1132 (Grubb, p.46) |

When everything is equal between syllables, that is CV.CV or CəR.CəR, *trochaic stress* prevails.

2.3.2 *Schwa Status*

Crucial to this discussion is the moraic status of schwa. Certainly, there seems to be something unique about schwa, setting it apart from the other full vowels in Kʷaḱʷala. Boas (1947), Bach (1975) and S. A. Wilson (1982), both point out the avoidance of stressed schwas in Kʷaḱʷala. Demonstrating this is a set of minimal pairs below.

- | | | |
|--------|-------|-----------------------------------|
| (30)a. | ńá.la | day/621 (Boas, p.220;Grubb, p.61) |
| b. vs: | ńə.lá | swan/622 |

Since (30.a) contains open syllables with only full vowels, and stress appears on the left-most syllable, we can confirm that the stress pattern is trochaic. Now, let's assume that the previous assumption about schwas being moraic were right. Then, each syllable in each of (30.a,b) would equally have one mora. Adopting a trochaic stress pattern predicts that the left-most syllable in *both* words should therefore take

stress. (30.a) bears out this prediction, but (30.b) does not. The schwa does not behave the same as the full vowels. I conclude, consequently, that what differs about schwas is that they do not carry weight (Shaw, 1993 ff). If there is no mora projected from these nuclei, then stress will not be drawn to the schwa, thus accounting for the tendency against stressed schwas⁴. Again we see that Weight to Stress Principle (WSP) factors in heavily in K^wa^kwala. The definition is repeated below.

- (31) Weight to Stress Principle (Kager, 1999; Shaw et al., 1999)
Heavy syllables are stressed.

For the data in K^wa^kwala, I interpret this constraint as requiring stress to fall on syllables containing greater weight (Shaw et al., 1999). Weightless syllables are not forbidden, just dispreferred. The more moras a syllable has, the more preferred it is as a stress bearer. A violation is incurred if a syllable is stressed, when an immediately adjacent syllable has more weight. Since full vowels are moraic, they are preferential heads to schwas, which are not moraic. Stress will consequently be placed on a syllable which contains a full V as seen in the following examples.

- (32) a. kə.pá to cut /555 (Grubb, p.60)
b. ɔ̃.k^wá short /633 (Grubb, p.126)
c. G^wə.ná to pay back /888
d. nəx.wí swallow /591

e. ɔ̃.má.la index finger /695 (Grubb, p.71)

f. ʔə.qə.lá opening mouth continuously /934 (Grubb, p.103- just to open mouth)
g. λə.qə.lá to clap /1015

One observation complicates this matter. There is an irregular pattern of full vowel reduction to schwa. This process can be seen in the following examples.

- (33)a. ɔ̃ú-ɔ̃ət=ɔ̃ana black hands/250 from: [ɔ̃úʔ-a] black/249
distrRED-black=hand (Boas p.372 'hand' [-ɔ̃ana])

b. ʔí-ʔəx^w=sis bruised legs/757 from: [ʔíx^w-a] bruised/755;448
plRED-bruise=leg (Boas, p.370 'foot' [-sis])

⁴ An alternative approach is to concede that schwa IS moraic, but stress avoids featureless nuclei. This approach is inferior, however, as later, I show that R codas are moraic, and draw stress to syllables headed by schwa, which are otherwise avoided as a stress head. This suggests that stress has more to do with weight and not with features. If it were dependent on proper-headedness (features), then even with a moraic coda to give weight to the syllable, stress would still resist that syllable, since it is still headed by a featureless nuclei, and stress would persist on a subsequent syllable headed by a full vowel, regardless of the moraic R coda on the first syllable.

- c. $c\acute{i}-c\grave{a}x^w-\acute{m}ut$ leftovers of scooping/1037 from: [$c\acute{i}x^w-id$] scoop up/1036
 distrRED-scoop-remains (Boas, p.242 'refuse' [- $\acute{m}ut$])

In the cases seen here, it is clear that a full vowel is present underlyingly, and when concatenated with another morpheme, the non-stressed full root vowel reduces. The pattern, however, is not seen in the following cases, with similar morphological concatenation.

- (34)a. $G\acute{i}-Ganu\ddot{t}$ nights/864 from: $G\acute{a}nu\ddot{t}$ night
 plRED-night
- b. $\acute{t}\acute{i}-\acute{t}\acute{i}x^w=stu$ black eyes/256 from: $\acute{t}\acute{i}x^w\acute{a}$ bruised/755;448
 plRED-bruise=eye (Boas, p.239 'eye' [- sto])
- c. $\acute{y}\acute{a}-\acute{y}\acute{a}k-\acute{m}ut$ garbage/402 from: $\acute{y}\acute{a}ks\grave{a}m$ no good/403
 distrRED-bad-remains

This raises questions about other examples with schwa for which we have no alternate forms to test the quality the schwa (for example, the data in 32). It is not always possible to say for certain whether the schwa is underlying (accounting for the stress pattern hypothesized), or if the schwa was a full vowel underlyingly and reduced because it was not stressed (not accounting for the stress pattern hypothesized). Furthermore, the irregularity of the vowel reduction precludes me from a generalized account of the process; how and where to predict it, and the motivating factors behind it. A comprehensive account of the interaction between stress and vowel quality is beyond the scope of this thesis. But what can be gleaned even from the examples showing vowel reduction is that the behaviour of stress accords with my hypothesis that $K^w\acute{a}k^w\acute{a}$ is a trochaic language.

2.3.3 *The interaction between WSP and FOOT FORM-T*

The drive to stress a weighted syllable dominates obedience to trochaic foot form: WSP (26) >> FOOT FORM (T) (28). Effectively, it is better to stress a weighted syllable, than to maintain a left-headed stress pattern. As demonstrated above, full vowels are moraic and schwas are weightless. If the left-most syllable happens to contain a full vowel, so much the better. Both WSP and trochaic stress are satisfied. If the left-most syllable is headed by a schwa, however, stress will select a subsequent syllable with a full vowel to head the word, to satisfy the higher ranking constraint requiring a weighted stress head. This consequently affects foot form. Several approaches are possible. As a result of moving rightward to find a full vowel to head stress, either trochaic foot form suffers, or foot alignment suffers. For example, a bi-syllabic word of the type $C\grave{a}.CV$ may be parsed into one foot and violate trochaic foot form.

(35) (kə.pá) to cut /555 (Grubb, p.60)

Or, this same word can stress the full vowel to satisfy WSP, and maintain trochaic foot form by leaving the first syllable unparsed to the foot, and parsing the second syllable into a degenerate foot.

(36) kə.(pá) to cut /555 (Grubb, p.60)

Multi-syllabic words have more options. When stress is in the second out of three syllables, WSP and trochaic foot form can be maintained by parsing the second and third syllable into a foot. The remaining first syllable is either parsed into a degenerate foot or left unparsed.

(37) a. (čə).(má.la) or b. čə.(má.la) index finger/695 (Grubb, p.71)

When the third out of three syllables contains the only full vowel, that syllable could be parsed as a degenerate syllable and maintain trochaic stress by virtue of the fact that there is only one syllable in the foot. The first and second syllables would either be parsed as a foot together, or both left unparsed.

(38) a. (xə.qə).(lá) or b. xə.qə.(lá) to clap/1015

Alternatively, this same word could follow the parsing structure of (34) and parse the second and third syllables into a foot, violating trochaic foot form. The remaining first syllable could be exhaustively parsed into a degenerate foot of its own, or left unparsed.

(39) a. (xə).(qə.lá) or b. xə.(qə.lá) to clap/1015

From the myriad options above, how do we determine which of the parsing strategies to follow? We must choose the strategy that is optimally consistent throughout the language and accounts for all the data observed. Based on evidence that will be shown in 2.3.6, the leftmost foot in the word takes primary stress in K^wa^kwala. Given this, we can eliminate (37a), (38a) and (39a) as options. Since the first syllable or syllables are parsed into a foot here, but they do not take primary stress, the parsing structure is clearly inaccurate. For 'index finger' / čə.má.la/, the parsing method is [čə.(má.la)]. Option (38b) for 'to clap' is also unlikely, since it is unlikely that two adjacent syllables remain unparsed (Kager, 2001; Shaw, to appear). For 'to clap' /xə.qə.lá/, the only parsing method left is [xə.(qə.lá)]. Given these two conclusions, I observe that there is a tendency against degenerate syllables and tolerance of violations against trochaic foot form (when in favor of WSP satisfaction). I will assume, therefore, that 'to cut'

/kə.pá/, is parsed as [(kə.pá)]. Applying these parsing assumptions to the data at large yields the following footings.

- (40)
- a. (kə.pá) to cut /555
 - b. (čə.kʷá) short /633
 - c. (Gʷə.ná) to pay back /888
 - d. (nəx.wí) swallow/591

 - e. čə.(má.la) index finger/695

 - f. ?ə.(qə.lá) opening mouth continuously/934
 - g. λə.(qə.lá) to clap/1015

With these foot parsing assumptions, the predictions of a weightless schwa, and the predictions emergent from WSP ranked higher than FOOT FORM (T) are borne out precisely in the data. The behaviour of stress in Kʷaʔʷala is accounted for if schwas are analyzed as non-moraic. To ensure a weighted stressed syllable, stressed full vowels are preferred, to the detriment of preserving trochaic foot form. The following tableau demonstrates how the constraint ranking determined above selects the optimal candidate.

(41)

input: ńəla	WSP	FOOT FORM (T)
a. (ńó.la _μ)	*!	
☞ b. (ńə.lá _μ)		*

(42)

input: λəqəla	WSP	FOOT FORM (T)
a. (λó.qə)(la _μ)	*!	
b. (λə.qó)(la _μ)	*!	*
☞ c. λə.(qə.lá _μ)		*

This ranking also predicts that if only reduced vowels are present in a word, and syllables are of a similar shape, stress will fall on the first syllable, preserving trochaic stress.

- (43)
- (kʷəs.kʷəs) bluejay; steller's jay/1114; 1132 (Grubb, p.46)
 - (mól.Gəm) white face/87 (Boas, p.240)

Weight to Stress no longer plays a role here. Each of the nuclei are weightless; all syllables are equal in their weight distribution. Therefore, the standard foot form of the language will surface; in this case, trochaic.

(44)

input: k ^w əsk ^w əs	WSP	FOOT FORM (T)
a. (k ^w əs.k ^w əs)	*	
b. (k ^w əs.k ^w əs)	*	*!

2.3.4 Codas

Since K^wak^wala is clearly sensitive to weight, it is imperative to explore the moraic status of codas. The conclusions drawn here are regarding codas in both word-medial and word-final position.

2.3.4.1 Resonants

As has been previously demonstrated (Wilson, 1982; Zec, 1988, 1995), resonants (R) are moraic in coda position. This is illustrated in the words below.

- (45)
- a. ʔə.wənyχ winter; time of giving/1145 (Grubb, p.152)
 - b. dʔə.wən salmon/1146 (Grubb, p.121)
 - c. qə.qəl.kən over-tired/817(Boas, p.356) (Grubb, p.142 'tired' [qelka])
 - d. ʔə.qə.stən seaweed/765 (Grubb, p.124)
 - e. wə.də.kən cold body/1083 (Boas p.240 'body' [-kən])

Each syllable above is headed by /ə/. This being the case, stress is independent of the quality of the vowel. As we saw above, when the syllables are equally weighted, stress will appear on the left-most syllable. If all codas were non-moraic and did not contribute to syllable weight, we would expect left-most stress in each of the above examples in (44). However, in each case, stress is drawn from the left-most syllable, in favor of a subsequent syllable, with a resonant in coda position. Clearly, coda resonants affect the placement of stress. Such examples evince the moraicity of resonants in coda position in K^wak^wala. We again see that stress prefers weighted syllables to non-weighted syllables, even at the expense of stressing the left-most syllable.

One prediction falls out from this hypothesis when evaluated in relationship with the other prosodic conclusions already determined. As established above, schwa is non-moraic, and consequently, This analysis predicted that given a word Cə.CV., the stress would be right-headed: Cə.CV́. This determined that stress prefers a weighted syllable to a non-weighted one. But, if resonants in coda position are moraic, then a syllable, headed by schwa with an R coda, will be equal to one mora: CəR = μ. Given a word CəR.CV, each syllable would have one mora. Subsequently, stress should appear left-headed: CəR.CV́. To test this prediction, consider the following two elicitations.

- (46)a. gə.lá crawl; bear/218 (Grubb, p.43, 168)
 b. vs. gəl.ta long/339 (Grubb, p.97 gélt'a)

Utterance (46.a), is an example of the predicted Cə.Cv̄ pattern; stress prefers a weighted syllable to a non-weighted one. In utterance (46.b), however, we see that stress is on the first syllable, headed by ə, because the weight of the R coda makes the first syllable now equal in weight to the second syllable, and trochaic stress defaults. This pattern is repeated below.

- (47) a. mən.xʷi smile (imperative)/658
 b. λəm.qa conceited/666 (Grubb, p.209)
 c. dəm.p̄a salty/683
 d. qəl.sa something oily/929 (Grubb, p.187)
 e. qən.sa to adze /390 (Boas, p.340)

The conclusion that can be drawn is that there is no preference for a full vowel /V/ over schwa + R /əR/; but both are preferred over a weightless syllable headed just by schwa /ə/: V, əR >> ə.⁵

2.3.4.2 Obstruents

Unlike resonants, obstruents (O) in coda position are NOT moraic in K^wak^wala (Zec, 1995). The stress patterns witnessed above for resonants are not mirrored in obstruent codas.

- (48)a. həχ.sís swollen legs/662 (Grubb, p.175)
 b. p̄əs.p̄ə.yú ear/1161 (Grubb, p.66)

We see here that stress falls on the syllable with the full vowel. The previous syllables, headed by schwa, resist stress, despite their codas. This is especially significant in utterance (47.b). If obstruents were moraic in coda position, the first two syllables would each be equal to one mora, the same as the final syllable with a full vowel and no coda. When weight is equal between syllables, stress is prognosticated to be on the left-most syllable, as we have previously seen. Stress does not follow such a pattern, however. Therefore, obstruents are not moraic in coda position. Consequently, the syllable with weight, the full vowel, takes primary stress. Furthermore, when both syllables in a word contain full vowels, an obstruent coda on the right syllable will not detract stress away from the left-most syllable.

- (49) yá.xid bad, spoiled meat/463

⁵ This is reflected in the fact that canonical root shapes are optimally at least CV or CəR, over just Cə. In the data I have found no roots of the shape Cə, and few CəO.

Stress remains trochaic here. If obstruents were moraic, the second syllable would have two moras. Heavy syllables should captivate stress, given that Weight to Stress is highly active in K^wak^wala. As this is not evidenced, coda obstruents must not be moraic.

2.3.4.3 Glottalized Resonants

Glottalized resonants in K^wak^wala do not pattern with the resonants, as may be expected, but with the obstruents. They are not moraic in coda position. Glottalized R do not draw stress back to ə-headed first syllables, as resonants do in (46).

- | | | |
|------|-------------------------------|---------------------------------------|
| (50) | Gə́m̥.χú.tə.neʔ
Gə́m̥χ.sís | left side of body/273
left leg/272 |
|------|-------------------------------|---------------------------------------|

Therefore, glottalized R are not moraic in coda position. Based on this evidence, I categorize them along with obstruents.

Weight by Position, (Hayes, 1989), is relevant, then, but only for plain resonants, in K^wak^wala.

- (51) Weight by Position (WxP)
Coda consonants must be moraic

This constraint insists that segments in coda position are moraic.

Distinctively, in K^wak^wala, not all codas are moraic. Weight by Position must, therefore, be outranked by the universal constraint against obstruents carrying moras *O_μ (Shaw 1996) *O_μ >> WXP.

- (52) *O_μ
Obstruents are non-moraic

This constraint militates against obstruents carrying moraic weight. *O_μ is directly in conflict with WXP. One constraint wants obstruent codas to have weight, the other wants to ensure that obstruent codas do NOT have weight. Since the latter is true in this language, we can conclude that *O_μ outranks WXP. The result of these two constraints, is that the optimal output candidate should exhibit resonant codas that are moraic, while obstruents are anticipated to be non-moraic in the output form. An OT framework of analysis exactly plays out these selection process predictions.

(53)

input: t̪əqəstən	*O _μ	WXP	WSP	FT FRM (T)
a. t̪ə.(qəs.tən _μ)		*		*
b. t̪ə.(qəs.tən _μ)		*	*!	*
c. t̪ə.(qəs.tən.)		**!		*
d. t̪ə.(qəs.tən.)		**!	*	*
e. t̪ə.(qəs.tən _μ)		*	*!	
f. t̪ə.(qəs.tən.)		**!	*	
g. t̪ə.(qəs _μ .tən _μ)	*!			

(54)

input: yahid	*O _μ	WXP	WSP	FT FRM (T)
a. (yá _μ .hí _μ d)		*		
b. (ya _μ .hí _μ d)		*		*!
c. (yá _μ .hí _μ d _μ)	*		*!	
d. (ya _μ .hí _μ d _μ)	*			*!

2.3.5 Maximal One Mora Syllable

Viewing the analysis of codas and schwas in light of the syllable shapes discussed in section 2.2, allows me to conclude that syllables are never more than one mora in weight. That is, if a syllable contains a full vowel, a resonant coda is prohibited. Conversely, if a syllable contains a schwa, a resonant coda is permitted. The observation of a maximal mono-moraic syllable is reflected in the fact that two resonant codas are not part of the canonical syllable shape. I believe that this observation is due to the fact that K^wa^kwala is a trochaic language, and optimally maintains even trochees (Kager, 1999; Hayes, 1995; but see Shaw, to appear). In an overall ranking of possible feet, those made up of two light syllables are preferred to those made up of a single heavy syllable, which in turn are preferred to those made up of a heavy and light syllable: (LL) >> (H) >> (HL). This is the result of a constraint on stress contours: RH-CONTOUR - where a foot must end in strong-weak contour at the moraic level (Kager, 1999). For my analysis of K^wa^kwala, I translate this drive for maximally one mora syllables (light syllables) into the constraint $\sigma \leq \mu$, formalized below.

(55) $\sigma \leq \mu$

Syllables are less than, or equal to, one mora.

A violation is incurred for any syllable over one mora in weight. Since there are no syllables which definitively contradict this restriction, the constraint must be un-dominated in the language. The constraint reflects the data and captures the generalization that K^wa^kwala does not permit heavy syllables, but strives for light syllables, only.

the language, and illuminates the dominance of WSP over FOOT FORM (T) in the constraint hierarchy. Additional data are presented to bolster these conclusions.

- (58) a. mək.(sə.mé_μ?) to beat on a drum/908
 *(mək.sə).(me_μ?)
 *(mək).(sə.me_μ?)
- (59) b. t̥ə.(q̥əs.tən_μ.) seaweed/765 (Grubb, p.124)
 *(t̥ə).(q̥əs.tən_μ.)
 *(t̥ə.q̥əs).(tən_μ.)

An alternative approach to footing, which assumes that exhaustive parsing is active in the language, is not borne out. For example, assuming left to right footing, /məksəmeʔ/ would be parsed (mək.sə).(meʔ). In order to account for the fact that the final syllable takes primary stress here, one could hypothesize that the Leftmost alignment constraint is outranked by the Weight to Stress Principle. This alternative is not borne out, however. LEFTMOST only governs primary stress. WSP would stress a weighted syllable in a foot. The first foot would assign default trochaic stress to the first syllable, (mək.sə.). The second foot would stress the only syllable present, satisfying WSP and trochaic stress vacuously. These are foot level stress. LEFTMOST would still assign primary stress to the left most foot and (mək.sə).(mèʔ) would be predicted. This is an inaccurate prediction. Under these assumptions we can conclude, therefore, that exhaustive parsing is not active in K^wak^wala. The constraint requiring all syllables to be parsed into feet, PARSE-SYLL (Shaw, 1994; McCarthy & Prince, 1993; Prince & Smolensky, 1993) , is lowly ranked.

Prosody plays an important role in reduplication. This is especially evident in 'distributive' reduplication, but also throughout the other reduplicative processes. The interface is exemplified in the following chapters.

3. Partial Reduplication with Allomorphy

One reduplicative morpheme in K^wak^wala has the associated meaning “distributive”. The term “distributive” is perhaps arbitrary, in that the meaning imparted is not directly distributed. That is, the meaning is not precisely “some here, some there”, but rather “a little of this here”. For lack of precise terminology, I gloss this morpheme as ‘distributive’ or ‘distRED’.

The “distributive” morpheme manifests itself in a reduplicant which surfaces as either CV or CəR prefixal reduplication. The surface form is completely dependent on the shape of the root. If the root has a full vowel, only CV will surface in the reduplicant.

- (60) Distributive Reduplication as /CV-/
- | | |
|-----------------------------|---|
| a. wá-wap=stola | watery eyes/586 (from ‘water’ [wap]; Grubb, p.148) |
| distRED-water=eye | |
| b. ká-kax ^w -mùt | leftover peeling; shavings/1045 (from ?) (Boas p.340) |
| distRED-shave?-remains | |
| c. qá-qas-mùt | animal tracks; footprints/1049 (from ‘walk’ [qas-]/137; |
| distRED-walk-remains | Grubb, 147) (Boas p.340) |
| d. dí-dəx-mùt | what you wiped up/ 488 (Boas p.234 [dédəmut]) |
| distRED-wipe-remains | (from ‘wipe’ [díx?id]/32; Grubb p.152) |
| e. xí-xʔəx-mùt | leftovers from the burned out fire/1043 |
| distRED-burn-remains | (Boas, p.246 ‘to be on fire’ xíqala) |
| f. ýá-ýak-mùt | garbage/402 |
| distRED-bad-remains | |
| g. xá-xax ^w =sis | red legs/639 (from ‘red’ [xáq ^w -]/247; Grubb p.117) |
| distRED-red=leg | |

If the root has a schwa nucleus, and a resonant (R) coda, CəR will copy.

- (61) Distributive Reduplication as /CəR-/
- | | |
|--|---|
| a. k ^w əl-k ^w əl-x ^w =stu | grey/light eyes/587, 820 (from ‘faded’ [k ^w əl(x ^w -)]1160; |
| distRED-fade-passive?=eye | Grubb, p.69) |
| b. q ^w əl-q ^w əl-x=sis | tickled feet/781 (from ‘tickle’ [q ^w əl(q ^w -)]737; Grubb, p.141) |
| distRED-tickle-passive=foot | |
| c. qəl-qəl-x=stu | tired eyes/ 585 (from ‘tired’ [qəl-]/ 818; Grubb p.142) |
| distRED-tired-passive=eye | |
| d. Gəl-Gəls=əma | painting on your face/233 (from ‘to paint’ [Gəlsa]/232; Grubb, |
| distRED-paint=face | p.109) (Boas, p.239 ‘face’ [-əm]) |

- e. **món**-mən^w=stu smiley eyes/303 (Wilson '78, p.10) (from 'smile'[mónx^wa]/304)
 distRED-smile=eye
- f. **məl**-məl=caña white hands/90 (from 'white' [məlá]/87; Grubb, p.151)
 distRED-white=hand

Some additional forms follow the "distributive" pattern, without body part suffixes, or the 'remains' suffix.

- (62) a. **gəl**-gəl-iŋa d²ikas lots of little ones crawling all over the place/127 (from 'crawl' [gəl]/218;Grubb, p.147))
 distRED-crawl-inside many
- b. **wən**-wən-xəs truly amazing/113 (Boas, p.247;Grubb, p.218) (from ?)
 distRED-?-?

The surface patterns of the reduplicant are consistent. The surface pattern of the base, however, is not absolute. Certain crucial examples show the full copy of the resonant coda into the reduplicant, but the deletion of it in the base.

- (63) **qəns**-qas-mút wood chips (1033) (from 'to adze' [qəns];Boas, p.340)
 distRED-adze-remains

This behaviour is fascinating and challenges traditional theories of correspondence and reduplication in OT. In the next section, I expound on the theoretical implications of distributive reduplication.

3.1 *The interaction of Prosody and Reduplication*

The correspondence pattern seen above, where the root in un-reduplicated forms contains an input segment, while the root in reduplicated forms does not contain that segment, violates the traditional view of Correspondence Theory (McCarthy & Prince, 1995), where the base in an un-reduplicated form is not predicted to be more faithful than the base in a reduplicated form. This generalization is a result of the definition of FAITH I-O, which treats the root portion of the 'base' string of an un-reduplicated form the same as the root portion of the 'base' string in a reduplicated form. The ineffectiveness of such an analysis is exemplified in section 3.2.2. Challenging this traditional view of correspondence, I adopt an existentialist view of input-output correspondence (Struijke, 1998, 2000) to account for the data. This is especially relevant in reduplicated forms. Here, segments in the input are in correspondence with not just the 'base' but the entire reduplicated form. In order to satisfy Faithfulness, a segment can appear in either the base or the reduplicant, but does not have to appear in both. Prosodic requirements mediate the

location, or locations, of the surface segment (or segments, if the segment is copied in both the base and reduplicant). Following Generalized Template Theory (McCarthy & Prince, 1994), I hypothesize that the distributive morpheme's shape is governed by a generalized template equal to that of an Affix (RED = Affix). In the sections to follow, I provide a comprehensive account for the phonological variance in the surface form of distributive reduplication in K^wak^wala.

3.1.1 Account of Distributive Reduplication.

Before we proceed with a detailed analysis, some basic definitions are in order. When looking at reduplication we must refer to the base and the reduplicant. Following McCarthy and Prince (1995), I define the base and the reduplicant as follows.

(64) Reduplicant:

RED is a morpheme lexically unspecified for segmentism, but requiring a correspondence relation with its BASE, the phonological structure to which it attaches. The reduplicant is the phonological material that serves as the exponent of RED.

(65) Base:

The string of segments to which the reduplicant is attached.

These definitions are obviously fundamental to any account of reduplication. I can now turn to the analysis of distributive reduplication.

As seen, distributive reduplication is either CəR or CV. Based on the prosodic structure of K^wak^wala, these shapes can be translated into a prosodic generalization. The distributive morpheme is a syllable equal to one mora. For this analysis, I assume McCarthy and Prince's (1994a, 1995) assertion that a reduplicant is equal to an Mcat, either a root or an affix. Since the distributive morpheme does not reduplicate the entire root, it is equal to an affix. This is reflected in the generalized template constraint:

(66) RED = Afx (McCarthy & Prince 1994)

Cross-linguistically it has been found that affixes are less than or equal to a syllable. (McCarthy & Prince 1994, 1995, Urbanczyk 1996). This generalization is captured in the following constraint.

(67) $Afx \leq \sigma$ (McCarthy & Prince, 1995)

The phonological exponent of an affix is no larger than a syllable.

A violation is incurred for every segment in the affix over one syllable. As shown in section 2.2 and formalized in (55), the canonical syllable shape in K^wa^kwala is never more than one mora ($\sigma \leq \mu$). I predict that the phonological constraint on syllable size interacting with the constraint on reduplicant size, mediated by Faith B-R, will select a candidate with a reduplicant that copies as much of the base as possible, without exceeding one mora. Faithfulness between the base and reduplicant is governed by the constraint MAX B-R.

(68) MAX B-R (McCarthy & Prince, 1995)
Every element of S_1 has a correspondent in S_2 .

The interaction of constraints leading to the prediction on reduplicant size is illustrated in the following examples.

- (69) **Gəl**-Gəls-əṁ-a painting on the face /233
 distRED-paint=face-empty.sfx (root: 'paint' [Gəls-]232;Grubb, p.171)
- qá**-qas-ṁut animal tracks; footprints/1049 (from
 distRED-walk-remains 'walk' [qas-]/137;Grubb,147)(Boasp.340)

input: /RED-Gəl.s-ə.ṁ-a/	$\sigma \leq \mu$	RED = Afx	$Afx \leq \sigma$	MAX B-R
a. Gəl _μ -Gəl _μ -sə.ṁ-a _μ				****
b. Ga _μ l _μ -Gəl _μ .s-ə.ṁ-a _μ	*!			****
c. Gəl _μ sə.-Gəl _μ .s-ə.ṁ-a _μ			**!	**
input: /RED-qas-ṁut/	$\sigma \leq \mu$	RED = Afx	$Afx \leq \sigma$	MAX B-R
a. qá _μ -qa _μ s-ṁu _μ t				****
b. qá _μ m _μ -qa _μ s-ṁu _μ t	*!			***
c. qá _μ .mu _μ -qa _μ s-ṁu _μ t			**!	**

As the account stands, however, there is one element not anticipated. As seen in the tableaux above, the obstruent coda in the root of /kuχ^w/ is not copied into the reduplicant. Since codas are permitted in K^wa^kwala reduplicants, and since obstruent codas do not contribute to weight thus forcing a reduplicant to be 'oversize' on its mono-mora requirement, obstruent codas should be permitted in reduplicants. They are not, however. This is an example of the emergence of the unmarked (McCarthy & Prince 1994, Alderete et. al 1999). When some markedness constraint (M) outranks faithfulness between a reduplicant and base, the result is a reduplicant lacking the marked element in the language. The marked segment will persist in the root, however, due to the un-dominated faithfulness requiring faithfulness between the input and output. That is, every segment going in has got to come out. This is true, regardless of the model of input-output correspondence. In general, then, marked segments will surface, but in

reduplicants, unmarked segments are more likely to emerge. The ranking consistent with this phenomenon is FAITH I-O >> M >> FAITH B-R. Assuming that the base-reduplicant faithfulness constraint is DEP B-R, we can demonstrate the efficacy of the M >> FAITH B-R ranking to get us the desired result, without tying ourselves to a particular definition of input-output faithfulness at this time⁶. The base-reduplicant correspondence constraint DEP B-R effectively militates against mapping segments into the reduplicant that are not present in the base.

(70) DEP B-R (McCarthy & Prince, 1995)

Every element of S₂ has a correspondent in S₁.

In Kwakwaka, the markedness constraints are those mediating obstruent moraicity and coda weight (as discussed in chapter 2), *O_μ >> WXP >> DEP B-R. WXP demands that all codas are moraic, but *O_μ does not allow them to be. Since *O_μ is higher ranked than WXP, it is worse to have a moraic obstruent coda, than to have a non-moraic obstruent coda. In itself, this does not automatically get us an optimal avoidance of obstruent codas altogether from the reduplicant. We could simply copy the obstruent coda, as a non-moraic coda. But since base-reduplicant faithfulness is ranked lowly there is not a compelling insistence to necessarily copy every single segment. A non-moraic coda still violates the lower ranked markedness constraint WXP. Being ranked higher than faithfulness B-R, the optimal candidate would rather delete a segment, than incur a violation of this more demanding constraint. By deleting obstruent codas from the reduplicants, we lessen the overall number of markedness violations. Although there will be a violation to B-R Faithfulness, the higher-ranked constraints are better satisfied. This is demonstrated in (71).

(71) **čú-čəf-tu** black eye /819 (Grubb, p.68) (from 'black' [čúfa]/249)
 distRED-black=eye⁷

RED-čúf-stu	*O _μ	WXP	DEP B-R
a. čú _μ -čəf _μ -tu	*!	*	
b. čú _μ -čəf _μ -tu	**!		
c. čúf-čəf-tu		**!	
d. čúf-čəf _μ -tu	*!	*	
e. ču-čəf-tu		*	
f. ču-čəf _μ -tu	*!		
g. čúf-čə-u		*	*!
h. čú _μ čə.tu	*!		*

⁶ In order to defer discussion of input-output faithfulness, I only consider candidates which have at least one occurrence of each element in the input somewhere in the output, assuming that whatever definition is taken for input-output correspondence, its high ranking position will demand a surface correspondent of each element in the output. This rules out *[čú-čə-tu] as a possible candidate, which otherwise satisfies the M constraints.

⁷ I ignore the loss of the /s/ from the lexical suffix /=stu/ here.

Candidate (e) wins, with deletion of the non-moraic obstruent coda in the reduplicant.

So far, the analysis has accurately predicted the CV allomorph, and the CəR allomorph. It has also accounted for a lack of copying of obstruent codas into the reduplicant. The distributive reduplicative morpheme will either take the shape CV if there is no resonant coda in the root base, or CəR if there is a resonant coda in the root base. This account also predicts that a root of the shape CəO, CəR' (glottalized resonant) or just Cə will have a corresponding reduplicant that is just /Cə-/. Since obstruent and glottalized resonants are not moraic and do not copy into coda position of the reduplicant, and there is no resonant to do so, then the reduplicant will simply contain a consonant and vowel corresponding to the root. In these cases, that would be /Cə-/. Interestingly, I have no examples of roots of this type involved in distributive reduplication. Few roots of this shape even exist in Kwakwala. Boas cites one example of distributive with a CəR' root, given below.

- (72) ʔə-čəmə-mút left after melting (Boas, p.340; from čəmə-)
 distRED-melt-remains

Although this form has not been confirmed in current Kwakwala, the surface shape of the reduplicant (/Cə-/) is as expected for CəO or CəR' roots, given my account of distributive reduplication.

As it is, the two confirmed surface allomorphs seen in current Kwakwala, CV and CəR, both create optimal light reduplicated syllables. Specifically, when the root is of the shape CəR, the reduplicant can also be of the shape CəR, since each syllable is equal to one mora. No deletion is necessary, or predicted.

- (73)a. (Gəl_μ.-Gəl_μ.)-(s-e.m-a_μk^w.) person that is painted/234 (Grubb, gélsem, 109)
 L L L L
 distRED-paint=face-passive (from 'paint' /Gəls/)
- b. (mə́l_μ.-mə́l_μ.)-(ca_μ.na_μ.) white hands/90
 L L L L
 dsitRED-white-hand (from 'white' /mə́l/; Boas p.221)
- c. (k^wəl_μ.-k^wəl_μχ-s.)-(tu_μ) light eyes/820
 L L L
 dstRED-faded=eye (from 'faded' /k^wəlχ^w/)

This is not the case in Struijke's (1998, 2000) previous analysis. Her analysis assumes /ə/ to be moraic. It also assumes Kwakwala to be an iambic system, where feet are (LH), (H), (LL). Her analysis

proposes a highly ranked constraint, *CLASH, which prohibits adjacent stressed syllables; (*HH). This analysis would predict deletion of the R coda in the reduplicants in each of the forms above.

(74) **What Struijke's analysis would predict:**

(Gə _μ l _μ .)-(Gə _μ l _μ .)(s-e _μ .m-a _μ k ^w .)	person that is painted/234
* H H L L	
predicts: *(Gə _μ .-Gə _μ l _μ .) (s-e _μ .m-a _μ k ^w .)	person that is painted/234
L H L L	

The data do not bear this prediction out.

In my analysis no deletion is to be expected, given the claim (in (55)) that there are no surface heavy (CVR) syllables in Kwakwaka, which could potentially violate the constraint on syllable size. At least, this is true at first sight. The following section explores some examples, which challenge this view at the underlying level.

3.2 Imperfect B-R correspondence

Some examples of distributive reduplication are particularly fascinating, yet enigmatic. These are cases where a CəR root copies the resonant into the reduplicant, but then deletes it from the base. If deletion were in the reduplicant, the Emergence of the Unmarked (McCarthy & Prince 1994, Alderete et al., 1999) could account for it, provided there were some markedness constraint driving the deletion. Surprisingly, here, deletion is in the base.

- | | |
|--|--|
| (75)a. qón-qas-mút
distRED-adze=remains | wood chips /1033 (from 'to adze' qóns-; [qónsa]/309)
(Boas, p.340) |
| b. kól-kat-mút
distRED-break.copper=remains | pieces you broke off of a copper/1048 (from 'to break copper' /kól-/-; [kólta]/(Grubb, p.48)) |
| c. hól-hat-mút
distRED-saw-=remains | sawdust/1054 (Boas, p.340)(from 'to saw' /hól-/-; [hólta]/872/
Grubb, p.122)) |
| d. mól-ma-nù.χ=ə.m-e?
distRED-white-side=face-? | side of your face is white/492 (from 'white' /mól-/-;
[mólta]/87/Grubb, p.151) (Boas p.239 [móló:s]) |

Other forms following this pattern were found in Boas (1947), some of which are listed below.

- | | |
|--|---|
| (76)a. kóm-kat-mút
distRED-clean.berries?=remains | leavings after cleaning berries (Boas p.340)
(from /kəmt-/-) |
|--|---|

- | | |
|--|--|
| b. yən -yat- ^ˈ m̥ut
distRED-?eat?-remains | gnawings (Boas p.234)
(from /yənt-/) |
| c. kəm -kaʔ- ^ˈ m̥ut
distRED-?-remains | chips made by adzing (Boas, p.340)
(from /kəmχ-/) |

Deletion is unforeseen in the present analysis given that the roots all seem to be of the shape CəR(O). However, something noticeable, and very revealing, about each of these forms, is that the reduplicated form's root contains a full vowel, while the un-reduplicated root does not. An interesting point to notice is that all of these types of distributive reduplication involve bases that surface with [a]. At the moment I cannot conclude whether this is a systematic pattern in the language, or whether there are simply gaps in the data and that there are bases surfacing with other full vowels. Further testing should be done. The point to take from these examples, however, is that a full vowel does indeed surface in the base of these distributive forms. Two possible explanations for this striking pattern are:

Hypothesis A:

The underlying form of the root is /CəR/ and for some reason, the vowel strengthens in reduplicated words, forcing deletion of the R coda to create a mono-moraic syllable.

Hypothesis B:

The underlying form of the root is CVR. The full vowel reduces in unreduplicated forms to create a light syllable due to pressure for a mono-moraic syllable. In the reduplicated form, the R coda is deleted from the base, freeing the full vowel to surface and still satisfy the one mora syllable weight constraint.

The generalization I take from this data is that there is imperfect mapping between bases and reduplicants in K^wa^kwala. In the following sections, I provide an analysis to account for the anomalous correspondence behaviour and explore the implications of each of these hypotheses as it pertains to correspondence.

3.2.1 *An Expanded Account*

I propose an existentialist view of I-O correspondence (\exists Max I-O)(Struijke 1998, 2000) to handle this recalcitrant data.

(77)

\exists -MAX I-O (Struijke, 2000)

Every segment in the input has some correspondent in the output.

This theory has the input being in correspondence with the WHOLE reduplicant form, not just the base. Since the reduplicant is a corresponding mirror of base material, input segments have TWO chances to surface. As long as an element is present *somewhere* in the output (reduplicant OR base) \exists -MAX I-O Faithfulness is satisfied. The interaction of markedness constraints determines where a coda will get deleted. In K^wak^wala these constraints are on syllable size, $\sigma = \mu$, and reduplicant size, $Afx \leq \sigma$. This adjustment to Correspondence Theory has many implications on an account of reduplication. The implications relevant to distributive reduplication are discussed in the following sections.

3.2.1.1 Predictions of \exists -MAX I-O

Several consequences fall out of this adjusted definition. There are three ways to satisfy this constraint relevant to K^wak^wala. A morphological input of /RED + C₁VC₂/ could yield an output of [C₁VC₂ - C₁VC₂]. Here, \exists -MAX I-O is satisfied. A morphological input of /RED + C₁VC₂/ could yield an output of [C₁V - C₁VC₂]. Here, \exists -MAX I-O is satisfied. A morphological input of /RED + C₁VC₂/ could also yield an output of [C₁VC₂ - C₁V]. Here too, \exists -MAX I-O is satisfied. In any given language, however, this faithfulness constraint may itself be constrained by the markedness conditions of the language. As we saw for K^wak^wala, the distributive reduplicant is equal to one mora. Nothing less, or more, than that in the reduplicant will satisfy the markedness constraints.

We can now apply these constraint implications to the relevant data in K^wak^wala. The theory must accurately predict all of the distributive patterns we have seen- full mapping of CəR or CV with no deletion in the base or reduplicant, and now, full mapping of CəR into the reduplicant, with deletion of the R from the base. The first two patterns are easily accounted for with this faithfulness constraint. I will assume that the constraint is very highly ranked, since in every form seen so far, every element has at least *some* correspondent in the output. With \exists -MAX I-O acting in concert with the constraint demanding the reduplicant be equal to one mora, and the constraint optimizing symmetry between the base and reduplicant, the surface form will optimally copy as much of the base into the reduplicant as possible, without exceeding one mora, and with no deletion anywhere.

(78)

input: / RED + k ^w əl + χ + stu/	\exists -Max I-O	$\sigma \leq \mu$	RED = Afx	Afx $\leq \sigma$	MAX B-R	DEP B-R
a. k ^w əl _μ -k ^w əl _μ -χ _μ -stu _μ					****	
b. k ^w əl _μ -k ^v ə-χ _μ -stu _μ					****	*!
c. k ^w ə-k ^w əl _μ -χ _μ -stu _μ					*****!	
d. k ^w ə-k ^w ə-χ _μ -stu _μ	*!				****	

input: /RED+wap+stola /	\exists -Max I-O	$\sigma \leq \mu$	RED = Afx	Afx $\leq \sigma$	MAX B-R	DEP B-R
a. $\text{wa}_{\mu} \cdot \text{wa}_{\mu} \text{p-s.to}_{\mu} \text{la}_{\mu}$.					*****	
b. $\text{wa}_{\mu} \cdot \text{wa}_{\mu} \text{l}_{\mu} \text{p-s.to}_{\mu} \text{la}_{\mu}$.		*!			*****	
c. $\text{wa}_{\mu} \text{l}_{\mu} \cdot \text{wa}_{\mu} \text{p-s.to}_{\mu} \text{la}_{\mu}$.		*!			*****	*

The third pattern, with deletion in the base, is less straightforward. To account accurately for these tokens, through evaluation of the satisfaction of the faithfulness constraint, is crucially dependent on the proposed underlying structure. In turn, I evaluate how \exists -MAX I-O interacts with both hypotheses A and B listed above for the underlying forms of the enigmatic examples.

First, I explore the implications of \exists -MAX I-O for Hypothesis A. If, underlyingly, there is a /ə/ in the root, CəRO , we would expect full copying to occur. That is, $[\text{C}_1\text{VC}_2 - \text{C}_1\text{VC}_2]$ or $[\text{CəR} - \text{CəRO}]$. Both the faithfulness constraint and the markedness constraint on reduplicant size are appeased. Furthermore, base-reduplicant correspondence is maximized. There is no reason to delete anywhere, in reduplicated or non-reduplicated words.

As we have seen, however, the schwa in the base of reduplicated forms ultimately surfaces as a full vowel. Since the full vowel carries weight, deletion of the moraic R coda would be predicted in the base. This is scenario three: $[\text{C}_1\text{VC}_2 - \text{C}_1\text{V}]$ or $[\text{CəR} - \text{CVO}]$, where there is CəR correspondence in the reduplicant, and CVO correspondence in the base. \exists -MAX I-O is satisfied, as are the constraints on reduplicant and syllable size. However, to complete this analysis there must be some constraint to strengthen the /ə/ to a full [V] in the base $[\text{CəR} + \text{CVRO}]$. Unfortunately, any argument that could be made for why the schwa strengthens here, has the burden of accounting for why it happens only sometimes. Recall that not all roots with underlying schwas surface with full vowels in the base of reduplicated forms. Why does it happen only in reduplicated forms? Furthermore, why does it happen only in the base? Moreover, what determines the distinctive quality of the vowel in each form? There are no clear answers to these problems. This analysis is problematic, therefore. It seems unlikely that schwa is the underlying vowel in these forms, based on the theory and the facts of that data. I, therefore, reject Hypothesis A.

I turn now to evaluate Hypothesis B. If, underlyingly, there is a full vowel in the root, /CVRO/, the theory of existential faithfulness combined with the restrictors on reduplicant size predicts that perfect mapping of the vowel and resonant will never happen. Both syllables in $[\text{C}_1\text{VC}_2 - \text{C}_1\text{VC}_2]$ or $[\text{CVR} - \text{CVRO}]$ have two moras, one for the vowel, one for the resonant. But as discussed, perfect mapping is not mandatory for existential faithfulness to be assuaged. The full vowel could surface in the reduplicant, while the resonant coda surfaces in the base: $[\text{C}_1\text{V} - \text{C}_1\text{VC}_2]$ or $[\text{CV} - \text{CVRO}]$. The root is still guilty of exceeding one mora. This is easily remedied, however, if the full vowel reduces to a schwa in the base

[CV-CəRO]. Now, the base and reduplicant each meet the markedness conditions and jointly satisfy \exists -MAX I-O. Equally possible is the reverse of this situation. The resonant may appear in the reduplicant with a reduced vowel, while the full vowel surfaces without the resonant coda in the base [$C_1VC_2 - C_1V$] or [CəR-CVO]. Again, all relevant constraints are completely fulfilled.

From this logic applied to the K^wa^kwala data, a root like [qans-], could predictably surface as *[qá.-qəns.-m̥ut] or [qən.-qas.-m̥ut.] ‘wood chips’. The winning candidate is ultimately determined by the faithfulness constraint mediating correspondence between the base and reduplicant, MAX B-R, defined in section 3.1.1. Recall that this constraint requires that every segment in the base has a correspondent present in the reduplicant. The first choice, *[qá.-qəns.-m̥ut], does not fair as well by MAX B-R Correspondence as [qən.-qas.-m̥ut]. The reduplicant in the first choice has two violations of MAX B-R, while the second choice has only one violation. The second choice transgresses the constraint militating against additional segments in the reduplicant not found in the base, DEP B-R, defined in section 3.1.1. Recall that this constraint requires every segment in the reduplicant to have a correspondent in the base. Since *[qá.-qəns.-m̥ut] does not deviate from obedience to this constraint, but is not selected as the optimal candidate, I conclude that in K^wa^kwala, MAX B-R outranks DEP B-R. Both of these constraints are outranked by the syllable size markedness constraints and existential faithfulness. Finally, we are left with the following constraint ranking.

(79) \exists -MAX I-O, $\sigma \leq \mu$ >> MAX B-R >> DEP B-R

With this ranking established, I can correctly extract the reduplicated surface form from an underlying input consisting of a full vowel /CVRO/. I demonstrate this in the following tableau.

(80)

input: /RED + qans + m̥ut/	\exists -MAX I-O	$\sigma \leq \mu$	MAX B-R	DEP B-R
a. qən _μ -qa _μ s.-m̥u _μ t.			****	*
b. qa _μ -qən _μ s.-m̥u _μ t			*****!	
c. qa _μ n _μ -qa _μ s.-m̥u _μ t.		*!	****	*
d. qən _μ -qa _μ n _μ s.-m̥u _μ t.		*!	****	
e. qa _μ n _μ -qa _μ n _μ s.-m̥u _μ t.		**!	****	
f. qa _μ -qa _μ s.-m̥u _μ t.	*!		****	

This account must also correctly predict how underlying forms such as this will surface in non-reduplicated contexts. An underlying form of CVRO will ultimately violate the moraic maximum on syllables, since both the full vowel and resonant coda carry moras /qa_μn_μ.sa_μ/ . In these situations, the

vowel will surface as a reduced vowel. Since there is no reduplicant, each input segment has only once chance to surface to satisfy existential faithfulness. In the attested output forms, the vowel is always reduced, while the moraic resonant coda is never deleted, indicating that perfect segmental mapping between the input and output is obligatory in the language. \exists -MAX I-O must be un-dominated, therefore. However, a reduced vowel indicates imperfect mapping on the featural level. It is necessary for the vowel to reduce, however, in order to satisfy the weight restriction for the root, $[q\acute{a}n_{\mu}.sa_{\mu}] \gg [q\acute{a}_{\mu}n_{\mu}.sa_{\mu}]$. These non-reduplicated forms show us that the markedness constraint on mono-moraic syllables crucially outranks IDENT faithfulness between the input and output.⁸ Since this constraint oversees input-output faithfulness, it is also defined and evaluated on an existential basis in this account.

(81) \exists -IDENT I-O (from Struijke, 2000)

Some output segment corresponding to an input segment preserves the feature specification $[\alpha F]$ of the input segment.

Effectively, this constraint says that the features of some segment in the input must perfectly match the features of a corresponding segment somewhere in the output. If one segment in the input has two corresponding segments in the output, only one is absolutely required to have an identical featural make-up as the input to satisfy the constraint. Of course, ideally, all corresponding segments will exhibit featural identity. This does not *have* to be the case, however. Some higher ranked markedness constraint may force imperfect feature mapping of a segment. If all corresponding segments share featural identity there is no violation. If at least one, anywhere in the output (base or reduplicant), shares featural identity there is no violation. But a violation is incurred if there is no corresponding segment at all which shares featural identity. This constraint does not prefer the base to the reduplicant for the locus of perfect feature correspondence. The other constraints (especially the base-reduplicant faithfulness constraints in $K^w ak^w ala$) determine the locus. This leaves us with a cumulative constraint ranking as follows.

(82) \exists -MAX I-O $\gg \sigma \leq \mu, Afx \leq \sigma, RED = AFX \gg \exists$ -IDENT I-O \gg MAX B-R \gg DEP B-R

⁸ An interesting note to point out is that we only observe possible underlying full V vowels followed by R codas when there is an additional O coda in the root, ie. CVRO roots. Underlying full V vowels are never seen with roots of the CoR type; that is without an additional O coda. Proof that the vowel is not underlyingly full comes from un-reduplicated forms, which are concatenated with the word final /-a/ suffix. This suffix would cause re-syllabification to be Co.Ra. If there were a full vowel underlyingly, it could surface in such a context. CV.Ra conforms to all prosodic requirements for the language. Since this does not appear to ever happen we can assume there isn't a full vowel underlyingly. I am unclear if the fact that full vowel plus R coda sequences are only possibly present in roots also containing a second obstruent coda (CVRO but not CoR) is a reflection of a systematic or accidental gap in the language.

From this analysis then, I conclude the following predictions for all types of roots. If a syllable can avoid having 2 μ by deleting a moraic sonorant coda, it will do so. This is only an option, however, if that coda has a chance to surface elsewhere, due to high ranking \exists -MAX I-O. Since the only situation this is possible in is reduplication, non-reduplicated roots will never delete. Alternatively, in order to avoid a bi-moraic syllable, a full vowel may reduce to a schwa. A bi-moraic syllable could only occur in Kwakwala with a full vowel and resonant coda, so reduction will only take place in such syllables. These predictions are worked out in the following tableaux.

(83)

input: /RED + qans + $\acute{m}ut$ /	\exists -Max I-O	$\sigma \leq \mu$	Afx \leq σ	RED = Afx	\exists -IDENT I- O	MAX B- R	DEP B-R
a. (qən _μ -qa _μ s.)-($\acute{m}u_{\mu}t$)						****	*
b. (qən _μ -qa _μ n _μ s.)-($\acute{m}u_{\mu}t$)		*!				***	
c. (qə _μ -qa _μ s.)-($\acute{m}u_{\mu}t$)	*!					*****	
d. (qə _μ -qa _μ n _μ s.)-($\acute{m}u_{\mu}t$)		*!				*****	
e. (qa _μ -qa _μ n _μ s.)-($\acute{m}u_{\mu}t$)		*!				*****	
f. (qa _μ n _μ -qa _μ n _μ s.)-($\acute{m}u_{\mu}t$)		**!				****	
g. (qa _μ n _μ -qa _μ s.)-($\acute{m}u_{\mu}t$)		*!				****	*
h. (qa _μ n _μ -qən _μ s.)-($\acute{m}u_{\mu}t$)		*!				****	
i. (qa _μ -qən _μ s.)-($\acute{m}u_{\mu}t$)						*****!	
j. (qa _μ -qa _μ s.)-($\acute{m}u_{\mu}t$)	*!					****	
k. (qən _μ -qən _μ s.)-($\acute{m}u_{\mu}t$)					*!	****	

(84)

input: /qans + a/	\exists -Max I-O	$\sigma \leq \mu$	Afx \leq σ	RED = Afx	\exists -IDENT I-O	MAX B- R	DEP B-R
a. (qən _μ .sa _μ)					*		
b. (qa _μ n _μ .sa _μ)		*!					
c. (qə.sa _μ)	*!						
d. (qa _μ .sa _μ)	*!						

In these two tableaux, we see the effect of the constraint ranking for CVRO reduplicated and non-reduplicated words. The surface representation of both reduplicated and non-reduplicated forms of underlyingly CəRO roots, without an underlying full vowel, are also correctly accounted for in this analysis.

(85)

input: /RED+Gəls+ə \acute{m} +a/	\exists -Max I-O	$\sigma \leq \mu$	Afx \leq σ	RED = Afx	\exists -IDENT I- O	MAX B- R	DEP B- R
a. (Gəl _μ -Gəl _μ).(s-ə. \acute{m} -a)						****	
b. (Gə _μ -Gəl _μ).(sə. \acute{m} -a _μ)						*****!	
c. (Gəl _μ -Gə _μ).(s-ə. \acute{m} -a _μ)						****	*!
d. (Gəl _μ -Ga _μ).(s-ə. \acute{m} -a _μ)					*!	****	*

(86)

input: /Gəls+a/	∃-Max I-O	$\sigma \leq \mu$	Afx $\leq \sigma$	RED = Afx	∃-IDENT I-O	MAX B-R	DEP B-R
a. (Gəl _μ .s-a _μ)							
b. (Gə _μ .s-a _μ)	*!						
c. (Ga _μ .s-a _μ)	*!				*		
d. (Ga _μ l _μ .s-a _μ)		*!			*		

3.2.2 Inadequacies of Traditional Input-Output Correspondence

The behaviour of reduplicated and non-reduplicated words in K^wak^wala is unexpected, given McCarthy and Prince's Full Model of correspondence (1995). Here, correspondence between the input and output is evaluated based on the output segments in the base only. The output of the root /qans/ is [qən-qas-*m̥*ut]. We can see that deletion of the moraic R coda in the base is preferred over reduction of the full vowel to a schwa. This means that IDENT I-O is highly ranked, as is the markedness constraint $\sigma \leq \mu$ (which forces the deletion). Using this model of Correspondence Theory can account for the reduplicative forms seen, with this specific ranking of constraints. The following tableaux illustrate this.

(87) CVRO roots

input: /RED + qans + <i>m̥</i> ut/	$\sigma \leq \mu$	IDENT I-O	MAX I-O	MAX B-R	MAX I-R
a. qən _μ -qa _μ s.- <i>m̥</i> u _μ t.			*	****	*
b. qən _μ -qən _μ s.- <i>m̥</i> u _μ t.		*!		****	*
c. qa _μ -qən _μ s.- <i>m̥</i> u _μ t.		*!		*****	**
d. qa _μ -qa _μ s.- <i>m̥</i> u _μ t.			*	****	**!
e. qən _μ -qa _μ n _μ s.- <i>m̥</i> u _μ t.	*!			****	*

(88) CəRO roots

input: /RED-Gəl.s-ə. <i>m̥</i> -a/	$\sigma \leq \mu$	IDENT I-O	MAX I-O	MAX B-R	MAX I-R
a. Gəl _μ -Gəl _μ .s-ə. <i>m̥</i> -a _μ				****	****
b. Gə _μ -Gəl _μ .se. <i>m̥</i> -a _μ				*****!	*****
c. Gəl _μ -Gə _μ .s-ə. <i>m̥</i> -a _μ			*!	****	****
d. Gəl _μ -Ga _μ .s-ə. <i>m̥</i> -a _μ		*!	*	****	****
e. Gə _μ -Gə _μ .s-ə. <i>m̥</i> -a _μ			*!	****	*****
f. Ga _μ -Gəl _μ .s-ə. <i>m̥</i> -a _μ				*****!	*****

(89) CəR roots

input: /RED + k ^w əl + χ + stu/	$\sigma \leq \mu$	IDENT I-O	MAX I-O	MAX B-R	MAX I-R
a. k ^w əl _μ -k ^w əl _μ -χ _μ -stu _μ .				****	****
b. k ^w əl _μ -k ^w ə-χ _μ -stu _μ .			*!	****	****
c. k ^w ə-k ^w əl _μ -χ _μ -stu _μ .				*****!	*****
d. k ^w ə-k ^w ə-χ _μ -stu _μ .			*!	****	*****

(90) CV(O) roots

input: /RED+wap+stola/	$\sigma \leq \mu$	IDENT I-O	MAX I-O	MAX B-R	MAX I-R
⊗ a. wa _μ ·-wa _μ p-s.to _μ .la _μ ·				*****	*****
b. wa _μ ·-wa _μ l _μ p-s.to _μ .la _μ ·	*!			*****	*****
c. wa _μ l _μ ·-wa _μ p-s.to _μ .la _μ ·	*!			*****	*****

Whether the root is underlyingly CəRO, CVRO, CəR, or CV(O), this particular ranking in the traditional view of CT can account for it. This analysis can also account for CəR(O) roots in un-reduplicated forms, predicting no deletion.

(91)

input: Gəl.s-a	$\sigma \leq \mu$	IDENT I-O	MAX I-O	MAX B-R	MAX I-R
⊗ a. Gəl _μ .s-a _μ ·					
b. Gəl _μ .s-a _μ ·			*!		
c. Ga _μ .s-a _μ ·		*!			
d. Ga _μ l _μ .s-a _μ ·	*!	*!			

Like the reduplicated form of this root (87), the base is not predicted to undergo deletion, but to be as faithful as possible to the underlying form.

However, this account predicts deletion in CVRO un-reduplicated forms, just like the base in the reduplicated form. Since $\sigma \leq \mu$ is so highly ranked, there are two possible repair mechanisms: either delete a moraic coda, or reduce a full vowel to schwa to eliminate a mora. Since IDENT I-O must be ranked higher than MAX I-O to account for deletion in the base in the reduplicated forms, deletion is also (incorrectly) predicted in the un-reduplicated form (rather than vowel reduction). The following tableau illustrates the false prediction. A ⊗ denotes an attested candidate which does not win. A ●* denotes an unattested candidate predicted to win.

(92)

input: /qans + a/	$\sigma \leq \mu$	IDENT I-O	MAX I-O	MAX B-R	MAX I-R
⊗ a. qən _μ .sa _μ ·		*!			
b. qa _μ n _μ .sa _μ ·	*!				
c. qə.sa _μ ·		*!	*		
●* d. qa _μ .sa _μ ·			*		

In order to avoid this infelicitous prediction, we could readjust the ranking, placing MAX I-O above IDENT I-O, making vowel reduction, instead of deletion, the optimal course of action against a bi-moraic syllable. This gets us the attested output for the un-reduplicated form. However, this re-ranking no longer accounts for base deletion in reduplicated forms.

(93)

input: /qans + a/	$\sigma \leq \mu$	MAX I-O	IDENT I-O	MAX B-R	MAX I-R
a. qən _μ .sa _μ			*		
b. qa _μ n _μ .sa _μ	*!				
c. qə.sa _μ		*!	*		
d. qa _μ .sa _μ		*!			
input: /RED + qans + mút/	$\sigma \leq \mu$	MAX I-O	IDENT I-O	MAX B-R	MAX I-R
a. qən _μ .-qa _μ s.-mú _μ t.		*!		****	****
b. qən _μ .-qən _μ s.-mú _μ t.			*	****	****
c. qa _μ .-qən _μ s.-mú _μ t.			*	*****!	*****
d. qa _μ .-qa _μ s.-mú _μ t.		*!		****	****
e. qən _μ .-qa _μ n _μ s.-mú _μ t.	*!			****	****

The bases in both reduplicated and non-reduplicated words are expected to act the same. Their surface differences are unaccounted for in this analysis.

Of course, the underlying form of these examples is crucial. What if the underlying representation of the forms demonstrating imperfect base-reduplicant correspondence were CəRO, rather than CVRO as determined, (ie. */qəns/) ? With this underlying form, featural identity is no longer an issue to cause deletion between the input and the output of un-reduplicated forms.

(94)

input: /qəns + a/	$\sigma \leq \mu$	IDENT I-O	MAX I-O	MAX B-R	MAX I-R
a. qən _μ .sa _μ					
b. qa _μ n _μ .sa _μ	*!	*			
c. qə.sa _μ			*!		
d. qa _μ .sa _μ		*!	*		

Now, however, the problem is in the reduplicated forms. There is absolutely no reason why a full vowel would surface and force deletion of the moraic resonant coda in the base as demonstrated in the following tableau.

(95)

input: /RED + qəns + mút/	$\sigma \leq \mu$	IDENT I-O	MAX I-O	MAX B-R	MAX I-R
a. qən _μ .-qa _μ s.-mú _μ t.		*!	*	****	****
b. qən _μ .-qən _μ s.-mú _μ t.				****	****
c. qa _μ .-qən _μ s.-mú _μ t.				*****!	*****
d. qa _μ .-qa _μ s.-mú _μ t.		*!	*	****	*****
e. qən _μ .-qa _μ n _μ s.-mú _μ t.	*!	*		****	****

Re-ranking the two I-O constraints would do nothing to ameliorate the situation, since the attested candidate (a) violates both featural identity and input-output correspondence, while the falsely predicted candidate (b) does not. Regardless of the underlying form, traditional Correspondence Theory cannot adequately account for the surface forms of both reduplicated and non-reduplicated words. Since the root 'output' in unreduplicated and reduplicated forms is the same string segmentally, both are predicted to behave the same way in terms of constraint satisfaction in any account utilizing the traditional definition of input-output Faithfulness. That is, either both bases should delete, or both will reduce the full vowel. The traditional definition of FAITH I-O makes this model inadequate to handle the K^wa^kwala data.

3.3 Unresolved Issues; unpredicted deletion

The analysis utilizing existential input-output correspondence accurately accounts for the distributive reduplication pattern witnessed in the data provided during current field work. Boas (1947), however, lists some words, which are not predicted in my analysis. These are CəR roots, which surface in reduplicated forms with deletion in the base, without any strengthening of the V.

- (96)a. **wən**-wəØ-ɾmut refuse of drilling (from 'drill' /wən-/; Boas, p.339)
distRED-drill-remains
- b. **kən**-kəØ-mut what is left after scooping up (from 'scoop up?' /kən-/; Boas, p.339)
distRED-scoop.up?-remains
- c. **səl**-səØ-mut what is left after drilling (from 'drill?' /səl-/; Boas, p.339)
distRED-drill?-remains

There are also examples of CəR roots, which delete the R in the reduplicant.

- (97)a. **məØ**.-mən.dʔə.-mut leavings after cutting kindling wood (from ?)(Boas, p 234/339)
distRED-?-remains
- b. **k^wəØ**-k^wəmɿ-mut remains of burning (Boas, p.340)
distRED-burn-remains (from k^wəmɿ-)

These are obviously crucial examples, as they are not accounted for in my analysis. These examples were not confirmed by current consultants. This could indicate that language shift, driven by the current K^wa^kwala constraint ranking is responsible for these forms being unattested in the current K^wa^kwala dialect, but at this point nothing is confirmable. Theoretically speaking, it is also purely conjecture as to

why the distributive morpheme may have behaved like this in an earlier stage of the language. Was schwa previously moraic? If so, then the entire prosodic structure was also different. Bi-moraic roots were permissible (CəR), and stress may not have been trochaic (Cə.Ć). According to Boas' data, the pattern of deletion of resonant codas in /CəR-/ reduplicated forms also seems random. In some cases there is no deletion, in others it is in the base ([wə́n-wə̀Ø-ḿut]), and in others it is in the reduplicant ([mə̀Ø.-mən.dʒə́.-mut]). At the moment, I have no way of elegantly drawing these recalcitrant tokens into my analysis. It is an important issue which I will leave for further research.

4. Partial Reduplication with Fixed Segmentism

In addition to allomorphic variation in distributive reduplicants, several K^wa^kwala reduplicative morphemes manifest themselves with fixed vowels. The reduplicant consonants always exhibit clear correspondence with the root. The vowels, however, are fixed. Regardless of the vowel in the root, the surface vowel in the reduplicant will be invariant. The following sections illustrate the different patterns of fixed segmental reduplications, with generalizations about behaviour.

The fixed segments are of theoretical interest. There are two basic ways to account for this behaviour. One analysis would hold that the vowel is a default in the language. In an Emergence of the Unmarked (McCarthy & Prince, 1994; Alderete et. al, 1999) constraint hierarchy, this vowel could surface instead of a corresponding root vowel to avoid some Markedness constraint, as it bears the least marked features. This approach presupposes that there is only one least marked value, however. As seen, there are several different fixed vowels in K^wa^kwala, which surface in the different reduplicative morphemes. One of these vowels may arise as a least marked vowel, which I discuss in section 4.4.3.2. I adopt the second optional analysis, where the fixed segment is somehow specified for the other two morphemes. In section 4.4.3.1, I lay out the details of this analysis.

4.1. Plural Reduplication

One prevalent use of reduplication with fixed segmentism is seen in the plural morpheme /Ci-/. This morpheme is prefixed to a root and expresses a general lexical meaning of 'plurality'. This meaning is witnessed in myriad examples of nouns elicited. The use of the plural reduplicative morpheme is witnessed in the following samples of elicited nominal utterances.

- (98) **Plural Nouns**
- | | | |
|----|---|--|
| a. | ǀí-ǀǎspǎyú | ears/103 ('ear' [ǀǎspǎyú]/102; Grubb, p. 66) |
| b. | Gí-GáGǎs⁹ | grandfathers/120 (Grubb, p.80 'grandfather /gágas/) |
| c. | d^zí-d^zǎfǎt | lakes/613 (Boas p.220 [d ^z ǎxd ^z ǎ'fǎls] ('lake' [d ^z ǎfǎk]/557;Grubb, p. 94) |
| d. | mí-mayinux^w | killer whales/861 (Boas, p.222)(Grubb,p.93 'killer whale' /máx ^w inuxw/) |
| e. | Gí-Ganuǀ | nights/864 (Boas, p.220 [Gá-Ganuǀ]) (Grubb, p.105 'night' /gánutl/) |

⁹ The stress on this particular plural form is unexpected given my hypothesis of stress. I leave a thorough explanation of the interaction of stress with reduplication to further research.

frequently suffixed to adjectives, where the adjective modifies the state of the body part. The plural reduplicant is prefixed to the adjective. The “pluralized” adjective is meant to express that *all* the objects, or *both* the objects, referred to are of the quality X. The emergence of the plural morpheme in these examples is not considered a quantificational modifier. For example, [fí-tíx^w=stu] does not mean “the whole eye is bruised”, as opposed to only part of the eye., but ‘both eyes are bruised’

(101) **Plural Concatenated with Adjectives**

- | | |
|---|--|
| a. fí-tíx ^w =stu
plRED-bruise=eye | black eyes/256
(Grubb, p.208 ‘black-eye’ /t’íxwstu/) |
| b. hi-həx=sis
plRED-swollen=leg | swollen legs/749
(Grubb, p.137 ‘feet swell up’ /hexsís/) |
| c. hi-həx=stu
plRED-swollen=eye | swollen eyes/750
(Grubb, p.137 ‘eyes swell up’ /hexstí/) |
| d. fí-təx ^w =sis
plRED-bruise=leg | bruised legs/757
(‘bruise’ /t’íx ^w / 755; Grubb, p.49) |

These data sets exemplify the invariant shape of the plural morpheme. Regardless of the input stem’s phonetic content, the reduplicative pattern for plurality manifests itself in the same manner, /Ci-/. It is always the first consonant which is duplicated, never the second, thus preserving maximal contiguity between input and output segments. The vowel is consistently /i/, regardless of the vowel following the first consonant in the root. The vowel is not mapped from the root to the reduplicant, but is rather fixed. This is not the only fixed segment in reduplication. As will be explicated below, the diminutive and ‘too much’ reduplicative morphemes express themselves with fixed vowels. In section 4.4 I will expound on an analysis accounting for the plural morpheme shape.

4.2 Diminutive Reduplication

Fixed segmentism is also seen in the reduplicative morpheme meaning ‘diminutive’. This morpheme is expressed in the prefixal shape /Ca-/. All examples of this form of reduplication with nouns gathered during our sessions are listed in (101).

(102) **Diminutive**

- | | |
|--|--|
| a. gá-giqəm
dimRED-chief | almost a chief (next hereditary); small chief/77
(Grubb, p. 170 ‘noble’ /gígemi/) |
| b. bá-bəg ^w ənəm
dimRED-male | small boy/446 (Boas, p.301)
(Grubb, p.100 ‘man’ /begwánem/) |

- c. **λá-λag^wak^w=cane** cedar arm/wrist band/532
 dimRED-cedar=arm (Grubb, p.210 'cedar bark head band' //tlágek^w/)
- d. **čá-čadaqəm** little girl/560 (Boas, p.301)
 dimRED-female (Grubb, p. 153 'woman' /ts'edák/)

This morpheme clearly expresses the meaning of a small nominal X. Two other examples from the corpus exhibit /Ca-/ reduplication and are prefixed to verbal and nominal stems. I must assume that these reduplicants are the diminutive morpheme, although this is not transparent through the imparted semantic meaning. The meaning is that the verb or adjective is a little "more". The English translation comes out as the comparative "more or less X", as seen in the examples below.

- (103) a. **wá-wak-æfə** bent a little more/1215 (Boas, p.323/233 [wá:wak'afa])
 dimRED-bend.over-cont. (from 'bend over' [wákæfə]/1214)
- b. **wá-wad-æfə** a little colder/1216 (Boas, p.323/233; from 'cold' [wəd-])
 dimRED-cold-cont.

Other examples utilize the same /Ca-/ reduplicative prefix, with the meaning "try to do something". Perhaps, one could view these forms as 'diminutive' actions; they are not 'full' actions, but are being attempted. Below are some examples.

- (104) a. **q^wá-q^wəf-ʔa** try to scratch an itch/1217 (Boas, p.233)
 dimRED-scratch-try (from 'to scratch' [q^wəfá]/1218)
- b. **dá-duG^w-aχəf-a** try to see/989 (Boas p. 243 [dá:doqwa])
 dimRED-look-cont?-try (from 'to look' [dúq^wa]/1225; Grubb, p.98)
- c. **wá-wiloχ-a** try to get it all/991 (Boas, p.310; from [wifoχ])
 dimRED-get.all-try
- d. **Gá-Gak-a** try to get a wife/863
 dimRED-wife?-try

It is difficult to draw concrete conclusions regarding the usage and distribution of this particular morpheme at the moment, due to a paucity of examples in the corpus. Further utterances need to be gathered. Boas (1947), includes additional instances of 'diminutive' use, some of which are listed below.

- (105) a. **íá-téd'əm** small stone (Boas, p.220)
- b. **gá:-gənləm** a little child (Boas, p.244)

c. Gá:- Gaŋaəm	a little while (Boas, p.244)
d. má- madəm	small horse clam (Boas, p.301)
e. ǰá- ǰənyəm	little bear (Boas, p.301)
f. dʔá- dʔomegəm	small pole for punting (Boas, p.301)
g. ná- nesəmʔ	a grass (Boas, p.301)
h. wá:- wən-aŋa	to drill a little more (Boas, p.323)
i. má:- məχ-aŋa	to torment a little more (Boas, p.323)
j. xwá- xwəkwa	to try to get a canoe (Boas, p.309/243)

These forms have yet to be confirmed by the current K^wak^wala consultants¹¹.

Every utterance gathered which employs the diminutive reduplicative prefix agrees in the surface phonological expression. This is also echoed in Boas' forms. The morpheme is unvaryingly /Ca-/. As in the plural, the reduplicant C always corresponds to the first C in the root. The vowel is invariant. Regardless of the vowel present in the root, the surface vowel is always [a]; it is a fixed segment.¹² Section 4.4 sees an account of this form.

4.3 "Too Much" Reduplication

The morpheme meaning 'too much' in K^wak^wala manifests itself in a reduplicative prefix /Cə-/. The reduplicated prefix is abbreviated in the morpheme-by-morpheme glosses as 't.mRED'. This morpheme may act in concert with a suffix, [-kən] (Boas 1947, [-kən]), to yield the meaning of 'way 'too much''. Examples of these forms are below.

¹¹ It is unclear why few nominal diminutives have been found. Has the diminutive prefixal reduplicant been replaced by the unbound, independent morpheme for 'small' (which Boas cites also, but restricts to certain classes of roots (1947))? Was the context of the elicitations awkward, creating unfelicitous results with the /Ca-/ prefix? Further research into the distribution should be done.

¹² One example does not appear to fit with the generalization about the diminutive morpheme shape. It is not manifested in a /Ca-/ form, but rather it is a /CVC/ prefix, as seen in the repetitive morpheme.

kús-kus-a pocket knife/562

RED-knife?-empty.suffix

This recalcitrant example is unexpected given the otherwise unchanging /Ca-/ shape of the diminutive. The definition 'pocket knife', originally led me to assume that it was a diminutive form, since a pocket knife is a small knife. As this is the only form I have found, which could be considered diminutive through translation, yet does not match the /Ca-/ reduplicative pattern, I conclude that this is not a diminutive prefix. The "root" /kus/ does not mirror the root in any other words for knife, such as:

káw-ayu knife/404(Grubb, p.94)

cut-instrumental

I was unable to ascertain the exact meaning of the root /kus/. It is possible that the root has nothing to do with 'cut' or 'knife', and that whatever the root is, the 'repetitive' prefix is attached to give the 'repetitive' meaning of 'pocket knife'. This is only conjecture at this point. Further analysis of the word is necessary. I can conclude, however, that this putatively recalcitrant diminutive, is not a diminutive example at all.

(106)

- a. **pə-pəl-kən** way too thin/31 (Boas p.233)
t.mRED-thin-excessive ('thin' [pəl] 29; Grubb, p.140)
- b. **χə-χúma-kəns dónx-ala** you sing 'too much'/35 (Boas, p.233[dədənχkən])
t.mRED-?-really sing-progressive ('singing' [dónxala] 34; Grubb, p.126)
- c. **mə-míx-kən** over-slept/418 (Boas, p.356 [meme:xkən])
t.mRED-sleep-excessive ('sleep' [míxa] 414; Grubb, p.128 /míxa/)
- d. **kʷə-kʷónx-kən** over-wet/426 (Boas, p.356)
t.mRED-wet-excessive ('wet' [kʷónx] 425; Grubb p.150)
- e. **lə-lómx^w-kən** over-dry/428 (Boas p.356)
t.mRED-dry-excessive ('dry' [lómx^w] 427; Grubb, p.66)
- f. **pə-pút-kən** over-full/530
t.mRED-full-excessive (Grubb, p.76 'full' /púlh7id/)
- g. **də-dónχ-kən** over-singing (has a sore throat)/423(Boas, p. 233, 356)
t.mRED-sing-excessive ('singing' [dónχala]/ 34; Grubb, p.126)
- h. **də-dám̄pa-kən** over salty/1000
t.mRED-salt-excessive ('salt' /dám̄χsi/ 259; Grubb, p.122)
- i. **gə-gəl-ksəʔ** crawling everywhere/221 (Boas p.233)
t.mRED-crawl-all.over ('crawl' [gəlá]/218)

This pattern of reduplication is also invariant. The surface shape is /Cə-/ without exception. The first consonant of the root is duplicated and the vowel consistently takes the shape of a schwa. Regardless of the first vowel in the stem, the vowel in the reduplicant is always [ə]; it is fixed.

This kind of reduplication is also seen in reciprocal statements with the suffix [-a^{pa}] (Boas, 1947, p.245). The imparted meaning seems to be that where everyone is involved in an action and that "there is a lot X-ing going on", and thus the use of the 'too much' morpheme.

(107) 'Too Much' Concatenated with Reciprocal Verbs

- a. **mə-míc-a^{pa}** everyone is kissing each other/315
t.mRED-kiss-recip. (from 'to kiss'[míca]/312; Grubb p.93)
- b. **?ə-?íp-a^{pa}** everyone is pinching each other/318 (from 'to
t.mRED-pinch-recip. pinch' [?ípa]/316; Boas p.244; Grubb p.111)
- c. **nə-nís-a^{pa}** everyone is pulling each others' hair/321
t.mRED-pull-recip. (from 'pull' [nís-]/319;Boas p.221;Grubb p.114)

- | | | |
|----|--|---|
| d. | yə-yáq ^w -ápá
t.mRED-give-recip. | everybody is giving to each other/329
(from 'to give a gift' [yáq ^w a]/327) |
|----|--|---|

Again, we see that the 'too much' morpheme is invariant in its surface form /Cə-/.

4.4 *Account of Partial Reduplication with Fixed Segmentism*

Each of the above forms of partial reduplication involves fixed vowels, an onset consonant corresponding to the base, and concatenation to the left-edge of the stem. Following, I work out an analysis that accounts for the behaviour of each morpheme and demonstrate the application of this account for each.

4.4.1 *The Locus of the Reduplicant*

Like the distributive morpheme, the plural, diminutive and 'too much' forms of reduplication are expressed as prefixes to the root. An alignment constraint captures this generalization. The left edge of these reduplicative prefixes must be lined up with the left edge of the resulting word.

(108) ALIGN (RED, L, PrWd, L) (McCarthy & Prince, 1993)

The left edge of the reduplicant must be aligned with the left edge of the Prosodic Word.

Through this constraint, we are assured that, for all manifestations of reduplication in this language, the chosen output will have the reduplicant prefixed to the root. One violation is incurred for each segment away from the left edge that the reduplicant is located. This constraint is never violated in K^wak^wala. We can assume, therefore, that it is not dominated by any markedness constraints, which could force the reduplicant inwards. This is especially relevant for reduplicants with fixed segments, since alignment is crucial to the resultant output form of the reduplicant, as will be seen in section 4.4.3.1.

4.4.2 *Partial Reduplication- the size of the reduplicant*

In order to ensure that we copy as much material as possible from the base into the reduplicant we need a faithfulness constraint between the base and reduplicant. MAX B-R monitors the process and guarantees that for every segment in the base there is a corresponding segment in the reduplicant. Recall from chapter 3, that a violation is incurred for every segment that is in the base but is not in the reduplicant. These morphemes utilize partial reduplication, however. Every segment in the base will not

be in the reduplicant. As demonstrated with the distributive analysis, partial reduplication arises when a markedness constraint on reduplicant size dominates faithfulness to the base. Therefore, the reduplicant will consist of only a partial amount of the base to satisfy the more highly ranked constraint.

Since each reduplicant discussed here is not equal to the size of the entire root, but only part of the root, each can be classified as an affix, according to the constraint defined in chapter 3: $RED = Afx$. This constraint is not violated for any of the morphemes discussed here. Therefore, this constraint must be ranked higher than $MAX\ B-R$, which optimizes precise symmetry between the base segments and reduplicant segments.

In the distributive analysis, I established the ranking of a constraint governing the maximal prosodic size of an affix, following McCarthy and Prince (1994), $AFFIX \leq \sigma$, where the affix is equal to or less than the size of a syllable. As we have seen, the maximal size of a syllable in $K^w ak^w ala$ is one mora. This is mediated by a highly ranked markedness constraint proposed in chapter 2: $\sigma \leq \mu$, where syllables are required to be less than, or equal to, one mora. Therefore, unmarked syllables in $K^w ak^w ala$ are not more than one mora in weight. Since this constraint does not appear to be violated, it must be undominated. The effect of this is that heavy weighted syllables will not ever have a chance to surface in any context in the language. Through transitivity, the combined effect of the constraints $RED = Afx$, $AFFIX \leq \sigma$ and $\sigma \leq \mu$ ensure that reduplicants will never contain elements greater than one mora in weight.

Unlike distributive reduplication, which permitted R codas to surface in some contexts, these forms of reduplication do not permit any codas. The restriction on reduplicant size ($RED = Afx$) does not eliminate codas from occurring in the reduplicants outright. If the vowel were a schwa, which is weightless, resonants would be permitted to surface in coda position in the reduplicant. This is the case for $/Cə-/$ reduplication, but I defer discussion of this morpheme for a moment. Recall, that the plural and diminutive morphemes are specified for a full vowel. These full vowels are each one mora in weight. This mora takes up the maximum weight restriction and any possible weighted codas are banned from surfacing. This is illustrated below with a plural $/Ci-/$ example.

(109)

input: $/RED + Ganu\ddagger/$	$\sigma \leq \mu$	$Afx \leq \sigma$	$RED = Afx$	$BR-MAX$
a. $G_i\mu - Ga_\mu.nu_\mu\ddagger$				****
b. $G_i\mu n_\mu - Ga_\mu.nu_\mu\ddagger$	*!			***

Weightless obstruent codas are not restricted from the $/Ci-/$ and $/Ca-/$ reduplicant, however. To ensure that the winning candidate does not contain these segments, the same constraints limiting

weightless codas in distributive reduplication are employed. Remember that Weight by Position demands that all codas are moraic. Another markedness constraint, *O μ , does not allow codas to be moraic. *O μ is ranked higher than WXP in the language in general. Therefore, a non-moraic obstruent coda is always better than a moraic one. But, WXP dominates the faithfulness constraint MAX B-R. The faithfulness constraint seeks to copy as much of the base as possible in the reduplicant. Copying a non-moraic coda will satisfy *O μ , but will violate WXP. Since WXP is more highly ranked than MAX B-R, it is better to avoid copying the non-moraic obstruent coda into the reduplicant; it will violate MAX B-R, but satisfy the higher ranked WXP. It also vacuously satisfies *O μ . Overall, it is a more satisfactory output. Tableau (109) demonstrates this.

(110)

input: / RED + bəg ^w anəm/	*O μ	WXP	MAX B-R
a. bi μ .-bə.g ^w a μ .nəm μ .			*****
b. bi μ g ^w .-bə.g ^w a μ .nəm μ .		*!	*****
c. bi μ g ^w μ .-bə.g ^w a μ .nəm μ .	*!		*****

We now have the following constraint ranking for the reduplicant size.

(111) $\sigma \leq \mu$, AFFIX $\leq \sigma$, RED = Afx, \exists -FAITH I-O \gg *O μ \gg WXP \gg MAX B-R

Alignment is never compromised in order to satisfy any of the markedness constraints seen here. For example, moving a reduplicant inwards, may cause a coda to become an onset, thus eliminating any potential for weight bearing, thus eliminating any potential for violation of a markedness constraint. Since any scenario such as this never occurs, I can conclude that ALIGN, L is undominated. This now gives us the following ranking.

(112) Align(RED, L, PrWd, L), $\sigma \leq \mu$, AFFIX $\leq \sigma$, RED = Afx, \exists -FAITH I-O \gg *O μ \gg WXP \gg MAX B-R

In order to save space, I will leave out the alignment constraint from my tableaux unless it is crucial, and assume that all candidates to be considered will obey this constraint. So far, this analysis accounts for the locus of affixation, and the size of the reduplicant for the plural and diminutive morphemes. From these constraints, /CV-/ prefixal reduplication is expected.

Too much reduplication, manifested in a /Cə-/ prefix, does not follow from this account. While non-moraic codas may be accounted for by means of the *O μ and WXP constraints, resonant codas are not restricted from the reduplicant by virtue of highly ranked $\sigma \leq \mu$, as they are for /Ci-/ and /Ca-/

reduplication. Since the fixed vowel is schwa it carries no weight. Therefore, there is nothing preventing a resonant from surfacing in coda position in the reduplicant. The reduplicant will still obey the requirement for maximally mono-moraic syllables. In fact, my analysis predicts that if there is a resonant in the base, it should copy into the reduplicant, to better satisfy MAX B-R, just like in distributive reduplication. One way to avoid codas in the reduplicant all together would be to invoke the constraint that requires no codas.

- (113) NO CODA (Prince & Smolensky, 1993)
 *C]_σ ('Syllables are open.')

This constraint penalizes any occurrences of codas. If this constraint were ranked below \exists -FAITH I-O, then codas could generally surface in the language. If it were ranked above MAX B-R, then the emergence of the unmarked would occur in the reduplicant. That is, codas would optimally not occur in the reduplicant ever. While this accurately captures the generalization of the surface shape of 'too much' reduplication, this is not true in all types of reduplication (for example /CəR-/ distributive). Two different rankings are necessary. NO CODA has to be ranked above MAX B-R for 'too much' reduplication, but below MAX B-R for distributive. Ideally, one constraint ranking will be established for a language. Re-ranking constraints to account for an anomalous form is ad-hoc and not very desirable. This leads me to a crucial point in my account. Since each category of reduplication is unique, a unique set of reduplicant constraints governs each. Each morpheme is co-indexed as belonging to a unique "class" of reduplicants. This class may be governed by different generalized template constraints, and different base-reduplicant correspondence constraints, each individually ranked (Urbanczyk, 1996; Spaelti, 1997; McCarthy and Prince, 1999).

For example, 'distributive', 'plural', 'diminutive', 'too much' and 'repetitive' are each indexed with their own unique reduplicant number: 'distributive' = RED₁, 'plural' = RED₂, 'diminutive' = RED₃, 'TOO MUCH' = RED₄, and 'repetitive' = RED₅. Diminutive, plural, 'too much' and distributive are all examples of partial reduplication, and have all been determined to be governed by the constraint RED = Affix. In chapter 5, I demonstrate that repetitive reduplication, which is total, is governed by a different constraint: RED = Root. Now, each constraint can be redefined according to the reduplicants they govern: RED_{1,2,3,4} = Affix and RED₂ = Root. Each of these constraints is distinctly situated in the constraint hierarchy of the language (Benua, 1995; Urbanczyk, 1996; Spaelti, 1997; McCarthy and Prince, 1999).

There would also be a set of base-reduplicant correspondence constraints unique to each reduplicant, or group of reduplicants, co-indexed to the reduplicants over which they preside. The definition and role of each constraint is the same, but the domain of its governance differs. So, MAX B-R₁,

ensures that each element of the base has a corresponding element in the reduplicant, for RED₁ (distributive) reduplicant morphemes. Likewise, MAX B-R₂ ensures that each element of the base has a corresponding element in the reduplicant, in the set of RED₂ (plural) reduplicant morphemes, and so on, for each reduplicant. Just like the generalized template constraints, each B-R faithfulness constraint is individually ranked with respect to all other constraints.

As seen in the accounts of distributive, plural and diminutive reduplication size, the MAX B-R governing each is ranked in a similar position in the hierarchy. Therefore, this base-reduplicant constraint can be co-indexed with all three morphemes: MAX B-R_{1,2,3}. This constraint governs all three reduplicant morphemes in terms of B-R correspondence. Respecting the newly proposed NO CODA constraint, MAX B-R_{1,2,3} is ranked above it.

(114) \exists -FAITH I-O, $\sigma \leq \mu$, AFFIX $\leq \sigma$, RED_{1,2,3,4} = Afx >> *O μ >> WXP >> MAX B-R_{1,2,3} >> NO CODA

This way, codas will be allowed to appear in RED_{1,2,3}, as long as they are resonants (so as not to violate the *O μ and WXP constraints), and they do not cause the syllable to exceed one mora (so as not to violate the $\sigma \leq \mu$ constraint). This is seen in the following tableaux, for distributive and plural.

(115) **Distributive with co-indexed constraints**

input: / RED ₁ + q ^w əl + χ +sis/	\exists -FAITH I-O	$\sigma \leq \mu$	AFFIX $\leq \sigma$	RED _{1,2,3,4} = Afx	*O μ	WXP	MAX B-R _{1,2,3}	NO CODA
a. q ^w əl _μ -q ^w əl _μ -χ _μ -si _μ s.						**	****	****
b. q ^w ə _μ -q ^w əl _μ -χ _μ -si _μ s.						**	*****!	***
c. q ^w ə _μ -q ^w ə _μ -χ _μ -si _μ s.	*!					**!	****	**
d. q ^w əl _μ χs _μ -q ^w əl _μ -χ _μ -si _μ s.						****!	**	*****

(116) **Plural with co-indexed constraints**

input: / RED ₂ -pəspəʔyu /	\exists -FAITH I-O	$\sigma \leq \mu$	AFFIX $\leq \sigma$	RED _{1,2,3,4} = Afx	*O μ	WXP	MAX B-R _{1,2,3}	NO CODA
a. p _μ i _μ -pəspəʔ _μ .yu _μ .						**	*****	**
b. p _μ i _μ s _μ -pəspəʔ _μ .yu _μ .						***!	*****	***
c. p _μ i _μ sp _μ -pəspəʔ _μ .yu _μ .						****!	*****	****
d. p _μ i _μ s _μ pə _μ -pəspəʔ _μ .yu _μ .			**!			**	****	***
e. p _μ i _μ s _μ -pəspəʔ _μ .yu _μ .					*!	**	*****	***

As we have seen for 'too much' reduplication, this constraint ranking does not account for the prohibition on resonant codas in the reduplicant. If, however, the base-reduplicant correspondence constraint governing this morpheme, MAX B-R₄, is ranked below NO CODA, the non-occurrence of all codas is accounted for.

(117) $\sigma \leq \mu$, AFFIX $\leq \sigma$, RED = Afx, \exists -FAITH I-O \gg *O μ \gg WXP \gg MAX B-R_{1,2,3} \gg NO CODA \gg MAX B-R₄

It does not matter that MAX B-R_{1,2,3} is ranked above NO CODA because this constraint does not govern the relationship between the base and the ‘too much’ reduplicant. The constraint overseeing correspondence for that morpheme is ranked below NO CODA, making certain that the optimal output will never have a coda, and only /Cə-/ will surface. The following tableau illustrates this.

(118) ‘Too Much’ with co-indexed constraints

input: / RED ₄ + ləmx ^w -kən/	\exists -FAITH I-O	$\sigma \leq \mu$	AFFIX $\leq \sigma$	RED _{1,2,3,4} = Afx	*O μ	WXP	MAX B-R _{1,2,3}	NO CODA	MAX B-R ₄
a. lə-ləmx ^w -kən _μ						*		***	*****
b. ləmx _μ -ləmx ^w -kən _μ						*		****!	****
c. ləmx ^w -ləmx _μ -kən _μ						**!		*****	***
d. ləmx ^w _μ -ləmx _μ -kən _μ		*!			*	*		*****	***

In chapter 5, I discuss the ranking of the base-reduplicant correspondence constraints for the repetitive morpheme.

The account provided so far captures the locus and size of each of the reduplicants. I now turn to an analysis of the fixed segments in each of the plural, diminutive and ‘too much’ morphemes.

4.4.3 Fixed Segments

One of the most interesting aspects of the plural, diminutive and ‘too much’ reduplicated morphemes is their use of fixed segments. Fixed segments can be accounted for in two basic ways. The fixed segment may be a least marked segment in the language, emerging in the reduplicant because it is unmarked. Alternatively, the segment may be underlyingly specified in some way (Urbanczyk, 1996; Alderete et al., 1999). I propose that both classes of fixed segments are present in Kwakwaka reduplication. I posit that the plural and diminutive morphemes are underlyingly specified for their fixed vowels. I also posit that the emergent fixed vowel in ‘too much’ reduplication is a least marked vowel.

4.4.3.1 Plural /i/ and Diminutive /a/

Recall that the plural morpheme is underlyingly a /Ci-/ prefix. Recall that the diminutive morpheme is underlyingly a /Ca-/ prefix. Additionally, the ‘too much’ morpheme is phonologically a /Cə-/ prefix. Since three different vowels surface invariantly in their respective morphemes, it is not possible to say that each contains least marked features in the language. The /i/ is a front, high vowel, while /a/ is low and back, while /ə/ I assume to be featureless (Shaw, 1994). Considering the vocalic

inventory of K^wak^wala, these vowels do not share any common properties; they are as distinct from each other as is possible. This fact eliminates any notions that all three of these vowels surface due to least marked values. Therefore, at least two of the three must be specified for their particular morpheme. I propose that the /i/ and /a/ of the plural and diminutive respectively, are underlyingly specified¹³. I discuss the plural /i/ and diminutive /a/, and follow this with discussion of 'too much' /ə/.

The underlying representations for the plural and diminutive morphemes are specified to contain a defined vowel. This information is present in the input. I hypothesize that underlyingly, the plural morpheme is specified for its /i/ vowel. That is, the vowel is present in the underlying representation of the morpheme. I formalize this as /RED_{/i/}-. Therefore, according to the constraints of the language, the morpheme is an affix, which is a syllable containing a vocalic /i/ segment. Likewise, I hypothesize that the diminutive morpheme is specified underlyingly for its /a/ vowel. I formalize this as /RED_{/a/}-. Therefore, according to the constraints of the language, the morpheme is an affix, which is a syllable containing a vocalic segment /a/.

Since the underlying representation for these two morphemes contains some featural information, this information will be carried through to the output via the constraint overseeing the correspondence relationship between the input and output, \exists -MAX I-O. Since each vowel in the input is underlying, there will be no opportunity for deletion of a vowel. There is only one opportunity for each vowel to surface. To satisfy existential I-O faithfulness, each specified vowel will surface.

Here we can see the effect of highly ranked ALIGN (RED, L, PrWd, L). Perfect alignment of the underlying vocal segment to the left-edge of the prosodic word would result in a single syllable segment without an onset, for example /i.-CVC./-. This of course violates the highly ranked constraint demanding onsets for every syllable. The reduplicant gets its onset /C/ content through MAX B-R_{1,2,3}. (Recall that the base-reduplicant correspondence constraint governing the 'plural' and 'diminutive' morphemes is co-indexed as MAX B-R_{1,2,3}.) Without this constraint, any default consonant would simply get inserted to satisfy the ONSET constraint. MAX B-R_{1,2,3} will ensure that this is not the case, and that the onset is filled in with a corresponding consonant from the base. The fixed vowel will incur a violation of MAX B-R_{1,2,3}, since it is not co-indexed with the base vowel. This is true, even if the root vowel contains a vowel that is the same as the fixed vowel. Since the determined reduplicant segment is present in the underlying form, \exists -MAX I-O governs the output expression of that selected vowel. If that vowel does not appear, the candidate will suffer a violation of \exists -MAX I-O. Regardless of what the root vowel is, if the root vowel is reduplicated rather than the underlying reduplicant vowel, the surface and underlying reduplicant vowels will not be co-indexed. Therefore, a violation will be counted for existential faithfulness. On the other

¹³ A comprehensive account of the underlying specification of these segments is beyond the scope of this thesis. For the present purposes, I simply assume that it is somehow (fully- or under-) specified in the underlying representation.

hand, if the *root* vowel is not reduplicated, then those candidates will endure a MAX B-R_{1,2,3} violation. \exists -MAX I-O is ranked above MAX B-R_{1,2,3}, so therefore the winning candidate will contain the surface realization of the fixed vowel, rather than duplication of the root vowel.

We have now seen how the vowel gets specified and the consonant gets surface phonological form for the plural and diminutive morphemes. Below, I demonstrate how the attested outputs are selected by the constraints acting on the morpho-phonological input.

(119) Plural Reduplication

input: /RED _{2/} + gu _μ k ^w /	Align (RED, L, PrWd, L)	\exists -MAX I-O	$\sigma \leq \mu$	AFFIX $\leq \sigma$	RED = Afx	*O _μ	WXP	MAX B-R _{1,2,3}
a. gi _μ .-gu _μ k ^w							*	**
b. gu _μ .-gu _μ k ^w		*!					*	*
c. ga .-gu _μ k ^w		*!					*	**
d. gu _μ .- gi _μ -k ^w	**!						*	**
e. gi _μ k ^w .-gu _μ k ^w							**!	*
f. gi _μ k ^w _μ .-gu _μ k ^w			*!			*	*	*
g. gu _μ k ^w .-gu _μ k ^w		*!					**	

Here we see how the plural morpheme surfaces with a root with an underlying /u/. First of all, any candidates without perfect left-edge alignment to the prosodic word are automatically ruled out, as in candidate (d). Next, any candidates with syllables more than one mora, or affixes that are larger than a syllable, are eliminated, as in candidate (f). Existential MAX I-O requires that every element present in the input be present in the output. Since fixed segments are defined underlyingly, if they do not surface, the offending candidates are excluded, as in candidates (b), (c), and (g). Candidate (f) is interesting. In order to fair better in base-reduplicant correspondence, it copies the obstruent coda. It also assigns a mora to that coda, in order to obey Weight by Position. The candidate ultimately fails, however, since it crucially violates the higher ranked constraint *O_μ, not to mention the constraint limiting syllables to one mora. Two candidates are left in the running, (a) and (e). Candidate (e) also copies the coda, without weight, in order to better satisfy MAX B-R_{1,2,3}. It loses, however, since it incurs more violations of the higher ranked constraint WXP, due to its efforts to improve base-reduplicant symmetry. The winning candidate (a), satisfies all the highly ranked markedness constraints, as well as satisfying the input-output faithfulness constraint. Although it fairs worse than other candidates on MAX B-R_{1,2,3}, it has fewer violations where it counts, higher up in the constraint hierarchy. The ultimate surface output of the plural morpheme is /Ci-/. This is demonstrated in the tableau in (120).

(120) Plural Reduplication

input: /RED _{2/i/} ^a + mi ^b č + a ^a pa/	Align (RED, L, PrWd, L)	∃-MAX I-O	σ ≤ μ	AFFIX ≤ σ	RED = Afx	*Oμ	WXP	MAX B-R _{1,2,3}
☞ a. mi ^a _μ ·mi ^b _μ ·č-a ^a _μ ·pa _μ								****
b. mi ^a _μ ·mi ^a _μ ·č-a ^a _μ ·pa _μ		*!						****
c. mi ^b _μ ·mi ^b _μ ·č-a ^a _μ ·pa _μ		*!						****
d. mi ^b _μ ·mi ^a _μ ·č-a ^a _μ ·pa _μ	**!							****
e. ma ^a _μ ·mi ^b _μ ·č-a ^a _μ ·pa _μ		*!						****

In this tableau there is an example of the plural morpheme, concatenated to a root with the identical vowel, /i/. Each candidate shows co-indexation, to clarify whether the vowel is in correspondence with the base or the input. This is extremely relevant, since many of the candidates are homophonous. They are not theoretically the same at all, however. If the vowel is fixed due to its being underlyingly specified, the morpheme cannot sometimes surface with the fixed vowel and sometimes with a vowel corresponding to the root. The analysis predicts that the winning candidate will contain a vowel corresponding always to the input vowel in the plural morpheme. This is precisely what we see above. Candidate (b) has both vowels in the output corresponding to the reduplicant vowel in the input. This violates Existential MAX I-O since the underlying vowel of the root never surfaces. Likewise, candidate (c) has two surface realizations of the input root vowel, but none of the input reduplicant vowel. This is again a fatal violation of ∃-MAX I-O. Candidate (e) also does not contain an output vowel corresponding to the input reduplicant vowel. Candidate (d) is almost identical to the winning candidate. The crucial difference is that the reduplicant is moved inwards, and does not align with the left edge of the Prosodic Word. It therefore loses. The winning candidate is (a), which surfaces with the plural morpheme in the shape /Ci-/ , where the vowel corresponds to the reduplicant's specified input vowel. This analysis selects the attested output to surface. Below are two similar tableaux for the diminutive, demonstrating proper prediction of the outputs.

(121) Diminutive Reduplication

input: /RED _{3/a/} -gičəm/	Align (RED, L, PrWd, L)	∃-MAX I-O	σ ≤ μ	AFFIX ≤ σ	RED = Afx	*Oμ	WXP	MAX B-R _{1,2,3}
☞ a. ga ^a _μ ·gi ^a _μ ·čəm _μ								****
b. gi ^a _μ ·gi ^a _μ ·čəm _μ		*!						***
c. ga ^a _μ ·gi ^a _μ ·čəm _μ							*!	***
d. gi ^a _μ ·gi ^a _μ ·čəm _μ		*!					*	**

(122) Diminutive Reduplication

input: / RED _{3/a/} - $\acute{c}a^b$ daqəm /	Align (RED, L, PrWd, L)	\exists -MAX I-O	$\sigma \leq \mu$	AFFIX $\leq \sigma$	RED = Afx	*O μ	WXP	MAX B-R _{1,2,3}
a. $\acute{c}a^a_{\mu}$ - $\acute{c}a^b_{\mu}$ - da $_{\mu}$. qəm $_{\mu}$.								*****
b. $\acute{c}a^a_{\mu}$ d - $\acute{c}a^b_{\mu}$ - da $_{\mu}$. qəm $_{\mu}$.							*!	*****
c. $\acute{c}a^b_{\mu}$ - $\acute{c}a^a_{\mu}$ - da $_{\mu}$. qəm $_{\mu}$.	**!							*****
d. \acute{c} - $\acute{c}a^a_{\mu}$ - \acute{c} - $\acute{c}a^b_{\mu}$ - da $_{\mu}$. qəm $_{\mu}$.	*!							*****
e. \acute{c} - $\acute{c}a^a_{\mu}$ - da $_{\mu}$. qəm $_{\mu}$.	*!	*						*****
f. $\acute{c}a^b_{\mu}$ - $\acute{c}a^b_{\mu}$ - da $_{\mu}$. qəm $_{\mu}$.		*!						*****
g. $\acute{c}a^a_{\mu}$. da $_{\mu}$ - $\acute{c}a^b_{\mu}$ - da $_{\mu}$. qəm $_{\mu}$.				**!				****

An interesting implication of existential I-O correspondence arises when dealing with fixed segments. I will address this implication before returning to discussion of the /Cə-/ morpheme. Each of the specified vowels just discussed could surface anywhere to satisfy \exists FAITH I-O. This model only specifies that segments have to surface *somewhere* in the output. According to the theory, it is possible that the underlying /i/ of the plural morpheme could surface in the base, rather than the reduplicant without violating \exists -MAX I-O. Imagine an input, /RED_{V1}-CV₂C / surfacing as, [C-V₂C-V₁-C]. Every segment in the input is present in the output. This output, however, critically violates contiguity of the underlying segments. The Contiguity constraint is a member of the input-output faithfulness family. As such, it is subject to existential quantification.

(123) \exists -CONTIGUITY I-O (Struijke, 2000)

When two segments are adjacent in the input, some correspondent of each are adjacent in the output.

Violation of the constraint occurs when two adjacent segments in the input are not adjacent somewhere in the output. Adjacency may be met in the reduplicant or the base. Both spots will satisfy the constraints. Non-reduplicated forms will always be perfectly contiguous. For reduplication with specified segments this means that the root segments will not be allowed to “swap places” with the specified segments, since those segments are not in correspondence with each other. In other words, the specified vowel is not an existential branch of the input root vowel, and thus capable of satisfying existential contiguity.

“Swapping” violates the constraint. This is seen in the following tableau.

(124)

input: /RED _μ / + Ganu _μ /	∃-MAX I-O	$\sigma \leq \mu$	AFFIX $\leq \sigma$	RED _{1,2,3,4} = Afx	MAX B-R _{1,2,3}	∃-CONTIG I-O
a. G _μ - G _μ -nu _μ †.					****	
b. G -a _μ - G -i _μ -nu _μ †.					****	*!
c. G - G _μ -i _μ -nu _μ †.					*****!	*
d. G - G _μ -i _μ -nu _μ †.		*!			*****	*
e. G - G _μ -nu _μ †-i _μ .					*****!	
f. G - G _μ -nu _μ †.	*!				*****	
g. G -a _μ - G -nu _μ †-i _μ .					****	*!
h. G -i _μ -a _μ -nu _μ †.					****	*!

This gets a little bit complicated to evaluate since the specified reduplicant vowels are not technically associated with a segmental slot, since the reduplicant is not a CV template. Therefore, if that vowel “moves” it is not technically a contiguity violation in the reduplicant. Wherever the specified segment goes (and it has to go somewhere to satisfy ∃-MAX I-O) that is not prefixed, will force a contiguity violation elsewhere, making the candidate less prime than one that obeys contiguity. Candidate (b), which “swaps” two vowels does not fair worse than the attested candidate in terms of MAX B-R_{1,2,3}, since the specified vowel in the reduplicant is not in correspondence with the base anyways. It comes down to existential contiguity to decide the winner. Interestingly, “moving” the specified segment, rather than “swapping” positions with another vowel, as in candidates (c), (d), (e), does not automatically violate reduplicant size. Since the reduplicant is equal to an affix and affixes are *less than* or equal to a syllable, deleting the vowel, and thus the nucleus of a reduplicant syllable, is not a violation of those markedness constraints. It is a violation of the constraint against onset consonant clusters, however. Although this constraint is not included in the tableau, I assume it to be highly ranked and active in the language, and on this basis alone, those candidates would be eliminated. These same candidates also suffer more penalties on MAX B-R_{1,2,3} since they add a segment to the base, which does not correspond to anything in the reduplicant. Candidate (e) is worth signaling out. This candidate does not incur any contiguity violations. Existential contiguity inherently does not prevent deletion or epenthesis of segments at the edges, only in medial position (Struijke, 2000). As pointed out, however, it does create more imperfections in base-reduplicant correspondence, not to mention a prohibited onset consonant cluster. Contiguity of all input segments, including the specified vowel, is optimal.

Additional to the contiguity violations caused by “moving” the underlying vowel, is the resultant digression from perfect edge alignment, demonstrated clearly in (124h). If the underlying vowel of the reduplicant moves inward it does not need to copy a consonant from the base because ONSET is satisfied

by moving “inward”. This candidate will automatically be eliminated by virtue of highly ranked alignment, but it also violates the lower ranked CONTIGUITY. Additionally, K^wak^wala reduplicants adhere not only to the requirement for left edge alignment to the left edge of the prosodic word, but also to right edge alignment of the reduplicant to the left edge of the prosodic word. This is never violated in the language. Any positional “swapping” of the sort illustrated in candidates (b-g) of (124) will of course violate this alignment and be sub-optimal on those grounds in addition to the contiguity violations.

Introducing \exists -CONTIGUITY I-O into the analysis has crucial application to distributive reduplication. In imperfect B-R correspondence such as [qən-qas-*m*ut], existential contiguity is violated, given the UR /qans/. At no point in the output is /n/ adjacent to /s/. If \exists -CONTIGUITY I-O is determined to play a role in preventing pandemonious emergence locales for specified reduplicant vowels, the analysis must also account for why the constraint is violated in distributive reduplication. The behaviour is accounted for, if \exists -CONTIGUITY is ranked below MAX B-R_{1,2,3}. The following tableau demonstrates the impact and optimal violation of contiguity.

(125)

input: /RED + qans + <i>m</i> ut/	\exists -Max I-O	$\sigma \leq \mu$	Afx $\leq \sigma$	RED = Afx	\exists -IDENT I-O	MAX B-R _{1,2,3}	\exists CONTIG I-O	DEP B-R ₁ ¹⁴
a. qən _μ -qa _μ s- <i>m</i> u _μ t						****	*	*
b. qən _μ -qa _μ n _μ s- <i>m</i> u _μ t		*!				****		
c. qa _μ -qən _μ s- <i>m</i> u _μ t						*****!		
d. qa _μ -qa _μ s- <i>m</i> u _μ t	*!					****	**	
e. qən _μ -qən _μ s- <i>m</i> u _μ t					*!	****		
f. qa _μ -qən _μ - <i>m</i> u _μ t	*!					****	**	
g. qən _μ -qs- <i>m</i> u _μ .ta _μ						*****!	*	**
h. qa _μ s-qən _μ - <i>m</i> u _μ t						****	**!	

Contiguity is not violated by feature value displacement (Struijke, 2000), since the segment is still in correspondence with an input segment. Therefore, the only violation incurred by the attested candidate is that at no time in the output is /n/ adjacent to /s/ as in the input. This violation is irrelevant, however. Candidate (b), which fares better in contiguity, does not reduce the base vowel and therefore is eliminated on the grounds that it is overweight. Candidate (e), also fares better on contiguity but reduces both vowels and is rejected for not existentially satisfying identity. Candidate (c) does not violate contiguity at all. In fact, it satisfies all active constraints, except base-reduplicant correspondence. The presence of the full vowel in the reduplicant forces more violations between the base and reduplicant, since the resonant has to appear in the base to satisfy \exists -Max I-O. This crucially demonstrates that MAX B-R_{1,2,3}

¹⁴ I co-index this constraint just with RED₁, since the constraint has been shown to be relevant for distributive reduplication, but not for any of the other reduplicants seen so far.

critically dominates \exists CONTIG I-O. In this way, contiguity is optimally upheld in partial reduplication with fixed segmentism (plural, diminutive), and can be optimally violated in distributive partial reduplication.

4.4.3.2 'Too Much' /ə/

I now turn to discussion of the fixed segment in the 'too much' reduplicative morpheme. I propose that the underlying /ə/ of the 'too much' morpheme surfaces as a least marked vowel. The vowel is not underlyingly specified. I propose that schwa is the least marked for K^wa^kwala. In this account, I assume that schwa is featureless (Shaw, 1996; Shaw et al, 1999). Without affiliation to any feature, schwa cannot violate any constraints against articulatory positions associated with features. This assumes the Place-markedness Hierarchy (Lombardi, 2001), defined in (126).

(126) Place-markedness Hierarchy

*PL/LAB, *PL/DORS >> *PL/COR >> *PL/PHAR

This hierarchy is universal and applies to consonants as well as vowels. Given this hierarchy, every segment headed by features will violate one of the constraints. The segments violating the lowest ranked constraints are least marked. Schwa is featureless (Shaw, 1996; Shaw et. al, 1999). As such, it will not violate any of the place markedness constraints. These constraints must be ranked above B-R faithfulness, otherwise it would be more optimal to copy the base's vowel into the reduplicant. Here again we see the efficacy of co-indexation of base-reduplicant correspondence constraints. If there were only one MAX B-R, we would assume that all reduplicants would respond the same way. That is, either all reduplicants would surface with schwa (if the Place-markedness hierarchy constraints were ranked above MAX B-R), or all reduplicants would surface with a vowel corresponding to the root vowel (if MAX B-R were ranked above the place markedness constraints). This is especially relevant for distributive reduplication. The plural and diminutive morphemes have a vowel specified underlyingly and will always surface with that vowel to satisfy the more highly ranked existential input-output constraint. The distributive, however, is dependent on base-reduplicant correspondence for getting its vocalic output. As was shown above, MAX B-R_{1,2,3} is ranked higher than MAX B-R₄. Therefore, we can say that the Place-markedness Hierarchy constraints are ranked below MAX B-R_{1,2,3}, but above MAX B-R₄. In this way, distributive will always surface with a corresponding vowel from the base, while the 'too much' morpheme will always surface with a least marked schwa. Of course, \exists -MAX I-O must be higher ranked to account for all types of place features surfacing generally in the language, otherwise, every vowel could be /ə/. This is an Emergence of the Unmarked hierarchy (McCarthy & Prince, 1993; Alderte et. al, 1999) for the 'too much'

morpheme: \exists -MAX I-O \gg M \gg MAX B-R₄. In this way, the /ə/ in the ‘too much’ reduplicative morpheme /Cə-/ is accounted for as a least marked vowel, surfacing because it is least marked. The following tableau illustrates this. For the sake of space, I leave out the $Afx \leq \sigma$, RED = Afx, and contiguity constraints, and consider only candidates which satisfy these constraints.

(127)

input: / RED ₄ + mix + kən /	\exists -FAITH I-O	σ $\leq \mu$	*O _μ	WXP	MAX B-R _{1,2,3}	NO CODA	*PL/ LAB	*PL/ DORS	*PL/ COR	*PL/ PHAR	MAX B-R ₄
a. mə.-mi _μ x.-kən _μ .				*		**			*		*****
b. məx.-mix.-kən _μ .				**!		***			*		*****
c. mi _μ .-mi _μ x.-kən _μ .				*		**			**!		*****
d. mi _μ x.-mi _μ x.-kən _μ .				**!		***			**		***
e. mə.-məx.-kən _μ .	*!			*		**!					*****

Since the constraint mediating base-reduplicant correspondence for the ‘too much’ morpheme is ranked below the place markedness constraints, the reduplicant will surface with the least marked vowel in the language, schwa. The other vowels in the base will surface faithfully according to the input by virtue of the highly ranked existential input-output faithfulness constraint. In this account the fixed vowel of the ‘too much’ reduplicative morpheme is captured.

It is worth noting, that one could rank the base-reduplicant correspondence constraint governing RED₂ (plural), RED₃ (diminutive) and RED₄ (‘too much’) together at the bottom of the hierarchy and yield the same correct output as predicted in the ranking in (127) above. Since the plural and diminutive morphemes are specified underlyingly for their vowels, un-dominated existential faith I-O would require those vowels to surface, rather than the least marked schwa, even if the MAX B-R constraint governing them is ranked below the place-markedness constraints, along with MAX B-R₄. This would mean that NO CODA would also be ranked higher than MAX B-R_{2,3}, as it is for MAX B-R₄. This would predict that the optimal output would surface without any codas in the plural and diminutive forms, as is borne out in the data, and as is predicted in the ranking in (127). Therefore, ranking MAX B-R₂ and MAX B-R₃ along with either MAX B-R₁ or MAX B-R₄ in the constraint ranking generates the same predicted and attested output. At present there is no empirical evidence that favours one ranking over the other.

So far, the locus, size, shape and content of the distributive, plural, diminutive and ‘too much’ morphemes have all been accounted for under the approach outlined. I now turn to an account of the repetitive morpheme.

5. Total Reduplication

K^wak^wala utilizes another form of reduplication. This morpheme expresses the meaning of doing something again and again and manifests itself in a shape the mirror copy of the root. Regardless of the internal content of the root, total reduplication surfaces. I gloss the morpheme as ‘repetitive’ or ‘repRED’.

(128) Examples of ‘repetitive’ reduplication

- | | |
|--|--|
| a. q ^w iʔ-q ^w iʔ-a
repRED-unscrew-empty.sfx | to unscrew over and over/1268
(‘unscrew s.t.’ [q ^w iʔid]/1267) |
| b. ʔəmáx-ʔəmáx-æ
repRED-wind-empty.sfx | to wind repeatedly/1246 ¹⁵
(‘to wind’ [ʔəmákæ]/1245) |
| c. ʔəms-ʔəms-a
repRED-ring-empty.sfx | keep ringing; phoning or ringing/1244
(‘s.t. ringing’ [ʔəmsala]; Grubb, p.118) |
| d. λəníx-λəník-æ
repRED-lock-empty.sfx | to keep locking the door/1235
(‘to lock’ [λəníkʔi]/1234; Grubb, p.97) |
| e. ʔəx-ʔək-æ
repRED-wake.up-empty.sfx | to keep waking up/1232
(‘to wake up’ [ʔəxʔi]/1233) |
| f. míx-míx-a
repRED-sleep-empty.sfx | to sleep off and on/1231(Boas p.221 [mé:xmexa])
(‘to sleep’ [míxa]/414; Grubb, p. 128 /míxa/) |
| g. síx ^w -síx ^w -a
repRED-sail-empty.sfx | to sail again and again (off and on; switching between sailing and paddling)/1230 (‘to sail’ [síx ^w a]/1229;G.78) |
| h. d ^z əl ^w x-d ^z əl ^w x-a
repRED-run-empty.sfx | to run again and again/1228
(‘to run’ [d ^z əl ^w xa]/1227; Grubb, p.120) |
| i. dúx-duq ^w -a
repRED-look-empty.sfx | to look continuously/1226 ¹⁶
(‘to look’ [dúq ^w a]/1225) |
| j. náx-naq-a
repRED-drink-empty.sfx | drinking again and again/1223 (Boas p.233 [nəná:qəs])
(‘to drink’ [náqa]/1224; Grubb, p.65) |
| k. cáx ^w -cax ^w -a
repRED-drip-empty.sfx | continuously dripping, as in a leaking roof/1222
(‘dripping’ [cáx ^w a]/1221) |
| l. láx-la-k-a
repRED-go-?completive?-empty.sfx | to go repeatedly/615 (Boas p.221)
(Grubb, p.77 ‘to go’ /la/) |

¹⁵ In several of these examples, the reduplicant spirantizes the morpheme final coda consonant. From the data collected, the only cases of spirantization I can confirm are /k/ → /x/ and /q/ → /χ/, where the pairs share all features but differ for [±cont]. Every other account of this kind of reduplication already contains a fricative in root final coda position. This phonological change should be investigated further. At this point, I do not have substantive explanation for the shift, in light of the data as a whole, and leave it to further research.

¹⁶ Here, I would expect a phonological pairing of /χ^w/ for the root coda /q^w/. It is unclear why rounding was lost on the spirantized coda in the reduplicant.

- m. **hóm̩x**-həm-k-a to eat again and again, keep going back to nibble/614
 repRED-eat-?completive?-empty.suffix (Boas, p.221) (Grubb, p.66 'eat' /hemx7íd/)

Examples (128b) and (128d) explicitly show that this kind of reduplication is total and not just CVC or CVCC. It is the entire root that is copied into the reduplicant. Boas (1947) lists many additional examples of this type of reduplication.

- (129)
- | | | |
|----|-----------------------------------|------------------------------------|
| a. | qáx -qaxwa | to emerge now and then/ p. 273 |
| b. | yáx -yaka | to get back now and then/ p. 273 |
| c. | gánuʔ -ga'nuʔa | every night/p. 273 |
| d. | yáx -yaka | to give up now and then/ p. 273 |
| e. | náx -naka | every day/ p. 273 |
| f. | ténox^u -ténokwa | to pole canoe now and then/ p. 273 |
| g. | tséx -tseka | to draw water/ p. 273 |
| h. | kwəmólx -kwəmólka | to char now and then/p. 273 |
| i. | hánt -hanʔa | to shoot repeatedly /p. 221 |

Boas (1947, p.246) categorizes this kind of reduplication as a type of plural morpheme. He notes that these words are formed via duplication of the whole stem, plus a terminal /a/ at the end of the whole word, when the stem ends in an obstruent, as in (a) through (c). If the stem ends in a vowel or a resonant, or glottalized resonant, a suffix /-k/ is added to the root, and this suffix is included in the reduplicant too, as in (d) through (i). This is also his analysis of (128.l) and (128.m). In the case of example (129i), I assume that Boas assumes some kind of phonological change between the suffix /-k/ and the surface affricate /-ʔ/ in the root. The analysis below accounts for total reduplication of the forms above.

5.1 *Account of the Repetitive*

Like the reduplicants previously seen, alignment of the 'repetitive' morpheme always coincides with the left edge of the Prosodic Word. This position is never violated. There are no other competing constraints which succeed in forcing the reduplicant inwards, confirming that left edge alignment is

undominated. For this reason, I leave the constraint out of the tableaux in this section, and all candidates considered here will exhibit perfect left edge alignment.

Total reduplication is the result of satisfaction of maximal base-reduplicant correspondence. The active constraint responsible for militating the relationship between base and reduplicant is B-R MAX, as was seen in the partial reduplication section. This morpheme has its own base-reduplicant constraint governing it. I repeat the definition of this constraint here.

(130) MAX B-R₅ (McCarthy & Prince, 1995)

Every element of S₁ has a correspondent in S₂.

As we see, every element of S₁, the base, has a correspondent in S₂, the repetitive reduplicant. At least, every element from the root in the base has a correspondent in the reduplicant. This suggests that the size of the reduplicant is equal to a root. In chapter 3 and 4, the reduplicants were seen to be governed by the constraints RED = Affix and $Afx \leq \sigma$. These constraints dominate the base-reduplicant correspondence constraints governing those morphemes. For this reason, distributive, plural, diminutive and 'too much' reduplication in K^wa^kwala are predicted to always be less than, or equal to the size of one syllable, regardless of the size of the base, or the root. In total reduplication, the reduplicant is sometimes the size of one syllable, if the root in the base is also one syllable, but the reduplicant may also be more than one syllable. If the root in the base is two syllables long, the reduplicant will contain both those syllables; root material is never truncated in the repetitive morpheme. For this reason, I propose that this morpheme is not governed by the constraint RED = Affix. Rather, I propose that this morpheme, indexed as RED₅, is governed by the constraint RED₅ = Root, defined below.

(131) RED₅ = ROOT

A reduplicant is equal to the size of a root

A violation is incurred only if the reduplicant does not conform to the size of a root. Since the size of roots is completely language dependent, this effectiveness of the constraint hinges on the constraint responsible for root size in the language.

RED₅ = Root is either ranked above or below B-R MAX₅. This will determine how much of the base is copied. It is either the entire thing, or it will be limited according to the constraints on root size in the language. What are the limitations on root size in K^wa^kwala? Overwhelmingly, it seems that the majority of roots are mono-syllabic. That is, CV, CəR, CəRO, CVO, CVOO. Boas (1947) also notes this generalization (pg. 216). Based on this, I posit a constraint on root size for K^wa^kwala; Root = σ .

(132) Root = σ

A root is equal to the size of one syllable.

A violation is incurred for every syllable greater than one in the root alone. Additional suffixes obviously do not effect the evaluation of this constraint¹⁷.

There are roots, however, that are more than one syllable long. Take, for example, / $\lambda\text{ənik}$ / from (128d) or / $\text{ganu}\lambda$ / from (129c) above. I cannot find a further breakdown of either of these roots, into a smaller root plus a suffix. How would forms such as this surface, given the constraint on root size? Since each of the segments in these forms would be present in the underlying form of the words, \exists -FAITH I-O would ensure that each segment would surface in the output form of an unduplicated word. Existential input-output correspondence predicts that the segments have only once chance to surface to satisfy the highly ranked constraint. Therefore, since \exists -MAX I-O is ranked above Root = σ , the whole root will surface, satisfying the faithfulness constraint, at the expense of violating the optimal root size.

(133)

input: / $\lambda\text{ənik}$ /	\exists -MAX I-O	Root = σ
a. $\lambda\text{ə.ni.k-}\text{æ}$		*!
b. $\lambda\text{ə.n-}\text{æ}$	**!	

In reduplicated forms, however, there would be two chances for each underlying segment to surface. \exists -MAX I-O does not force both the base and reduplicant to have corresponding segments to each of the input segments. The markedness constraint would direct the output size of the morphemes. Since both the base, and the reduplicant are subject to the root size constraint, Root = σ , each will try to be maximally one syllable, by truncating the input material. If both the base and the reduplicant delete segments to surface with only one syllable, input-output faithfulness will suffer, and the candidate will be eliminated. One or the other must contain segments corresponding fully to the input. Existential

¹⁷ A note must be said here about the word final ending /-a/ (which sometimes surfaces as [-æ]). This suffix is attached to roots in their 'basic' form. The exact function of the suffix is uncertain. Recall from chapter 2 my proposition that degenerate feet are disfavored in $K^w\text{ak}^w\text{ala}$. The /-a/ suffix may be employed in order to fulfill an optimal bi-syllabic foot requirement (minimal word) (McCarthy & Prince, 1999). It is also possible that it serves as grammatical function. At first glance, it may seem like the suffix is some kind of infinitival marker (Bach, 1975). Translations offered, however, suggest that roots plus this suffix do not merely mean 'to X'. Frequently, the translation offered was 'X-ing'. Furthermore, not just verbs receive this /-a/ suffix. A few examples of adjectives and nouns are below.

- | | | | | |
|----|---|-----------------|-----|---|
| a. | $\text{t}\acute{\text{o}}\text{n}\chi\text{-a}$ | green/1208 | | |
| b. | $\lambda\acute{\text{a}}\text{k}^w\text{-a}$ | red/? | but | $\lambda\acute{\text{a}}\chi^w\text{-stu}$ its red/1207 |
| c. | $\text{q}^w\text{ət-}\acute{\text{a}}$ | ocean wave/1210 | | |

Boas (1947) calls this segment a "connective" (p.257), or just a "terminal" suffix (p.273). Although his precise meaning of this is unclear, it is clear that he does not assume that it serves a grammatical or morphological purpose. Since no absolute function can be associated with the suffix /-a/, I label it as an 'empty suffix', morphologically. I include it in all of the output candidates, since it consistently surfaces, even though a thorough exegesis of why is not possible at present.

faithfulness does not show preference for which morpheme is more faithful to the input. Either the base can be more faithful, or the reduplicant. Therefore, with just these two constraints, there is conflicting satisfaction of the high ranked faithfulness constraint; either the base or the reduplicant can emerge unmarked with just one syllable to satisfy $ROOT = \sigma$. Two candidates will tie. A \otimes denotes an attested candidate which is not predicted to win. A \bullet^* denotes an unattested candidate predicted to surface.

(134)

input: /RED + $\lambda\acute{e}nik$ /	\exists -MAX I-O	ROOT = σ	RED ₅ = ROOT
\otimes a. $\lambda\acute{e}.nix.-\lambda\acute{e}.ni.k-\acute{e}$.		**!	
\bullet^* b. $\lambda\acute{e}n.-\lambda\acute{e}.ni.k-\acute{e}$.		*	
\bullet^* c. $\lambda\acute{e}.nix.-\lambda\acute{e}.n-\acute{e}$		*	
d. $\lambda\acute{e}n.-\lambda\acute{e}.n-\acute{e}$.	**!		

These constraints alone do not predict the correct output. In fact, the attested output for which we want to account, is eliminated by virtue of the fact that it violates the restriction on root size twice. This candidate demonstrates perfect correspondence between the base root, and the reduplicant. Since this is the attested output, we can garner that B-R MAX₅ is ranked above the constraints limiting root size; \exists -MAX I-O \gg B-R MAX₅ \gg ROOT = σ , RED = ROOT. Furthermore, B-R DEP₅ must also be active, since unattested candidate (c) $*[\lambda\acute{e}.nix.-\lambda\acute{e}.n-\acute{e}]$ also exhibits every element from the base in the reduplicant. Ideally, we want perfect correspondence between the base and reduplicant, but also between the reduplicant and base. The constraint B-R DEP₅ ensures this.

(135) B-R DEP (MCCARTHY & PRINCE, 1995)

Every element of S_2 has a correspondent in S_1 .

Effectively, this constraint militates against truncation of the base, in favour of existential perfection in the reduplicant. A violation is incurred for every segment present in the reduplicant that is not present in the base. With the activation of this constraint, the correct output is selected.

(136)

input: /RED + $\lambda\acute{e}nik$ /	\exists -MAX I-O	B-R MAX ₅	B-R DEP ₅	ROOT = σ	RED ₅ = ROOT
\otimes a. $\lambda\acute{e}.nix.-\lambda\acute{e}.ni.k-\acute{e}$.		*		**	
b. $\lambda\acute{e}n.-\lambda\acute{e}.ni.k-\acute{e}$.		***!		*	
c. $\lambda\acute{e}.nix.-\lambda\acute{e}.n-\acute{e}$		*	**!	*	
d. $\lambda\acute{e}n.-\lambda\acute{e}.n-\acute{e}$.	**!	*			

This constraint will not effect the analysis of partial reduplication, since the base-reduplicant faithfulness constraints are ranked below the markedness constraints governing affix size, and RED_{1,2,3,4} = Affix.

Total reduplication of mono-syllabic roots is also accounted for in this analysis.

(137)

input: /RED + q ^w iʔ/	∃-MAX I-O	B-R MAX ₅	B-R DEP ₅	ROOT = σ	RED ₅ = ROOT
a. q ^w iʔ.-q ^w i.ʔ-a.		*			
b. q ^w i.-q ^w i.ʔ-a		**!			
c. q ^w iʔ.-q ^w i.-a		*	*!		
d. q ^w i.-q ^w i.-a	*!	*			

As pointed out by Boas (1947), some of the roots have an additional suffix added, /-k/. This suffix is not part of the root, yet gets copied in the reduplicant. The present analysis captures this behaviour. The assessment of whether the reduplicant conforms to the size of a root, or not, is based on the constraint monitoring root size in the language in general. It is not dependent on how big the root is in the base. Let's say, hypothetically, that a language permits roots to be CVCC. Now, let's say that there is a root in the base, which is CVC. If there is an additional suffix /-C/, this could be copied, to give a reduplicant of the shape /CVCC/, a perfectly permissible size according to the language's requirements. This scenario is exactly the case for K^wak^wala. If a root is only CVC, or CV, an additional /-C/ suffix would also get copied into the reduplicant. As long as the resultant reduplicant is maximally one syllable, which in turn is maximally one mora, as we have seen, there are no violations to prohibit the candidate from surfacing.

(138)

input: /RED + həm + k/	∃-MAX I-O	σ ≤ μ	B-R MAX ₅	B-R DEP ₅	ROOT = σ	RED ₅ = ROOT
a. həm _μ x.-hə _μ m.-k-a _μ			*			
b. hə _μ m _μ x.-hə _μ m-a _μ			*	*!		
c. hə _μ m _μ -hə _μ m _μ -k-a _μ			**!			
d. hə _μ m _μ -hə _μ m-a _μ	*!		*			

This analysis predicts that a resonant coda following a full vowel would never get copied into the reduplicant since it would violate $\sigma \leq \mu$, although it doesn't violate $\text{ROOT} = \sigma$. But this analysis predicts that such a situation would never even present itself, since a syllable CVR would never even exist in the base as a potential for reduplication, since it also violates the mono-moraic syllable restriction. This analysis also predicts that if there were a suffix that were a resonant, it would not get copied into the reduplicant. It would surface in the base since the consonant could act as an onset to the word final /-a/, and would not violate the restrictions on root size or syllable size. This /-a/ is not copied into the reduplicant however. Technically, copying the resonant into coda position of the reduplicant would not violate the mono-syllabic restriction; CVCR, or even CəRR, is still only one syllable. However, this violates the highly ranked constraint limiting syllables to one mora: *CV_μCR_μ or *CəR_μR_μ. At the

moment, there are no examples of reduplicated words with an additional resonant suffix to test this prediction.¹⁸

5.1.1 Obstruent Codas in the Reduplicant

An additional issue to address in total reduplication is the emergence of obstruent codas in the reduplicant. In the account presented above, highly ranked base-reduplicant correspondence adequately accounts for the mapping of all codas into the reduplicant. The positional ranking of MAX B-R₅ must be viewed in light of the previous account of partial reduplication. There, it was seen that markedness constraints, *O_μ >> WXP, outranked base-reduplicant faithfulness 1, 2, 3, and 4. This accounted for the duplication of resonant codas into the reduplicant in distributive, while restricting obstruent codas from surfacing in all reduplicants. If the markedness constraints *O_μ >> WXP were above B-R MAX₅ obstruent codas would never be permitted in the reduplicant.

(139)

input: /RED + q ^w iʔ/	∃-MAX I-O	*O _μ	WXP	B-R MAX ₅	B-R DEP ₅	ROOT = σ	RED ₅ = ROOT
⊗ a. q ^w i _μ ʔ.-q ^w i _μ ʔ.-a _μ .			*!	*			
⊙* b. q ^w i _μ ʔ.-q ^w i _μ ʔ.-a _μ .				**			
c. q ^w i _μ ʔ.-q ^w i _μ ʔ.-a _μ .			*!	*	*		
d. q ^w i _μ ʔ.-q ^w i _μ ʔ.-a _μ .	*!			*			
e. q ^w i _μ ʔ.-q ^w i _μ ʔ.-a _μ .		*!	*	*			

If these constraints were re-ranked below base-reduplicant faithfulness 5 (the repetitive morpheme), there would be no problem with codas in the reduplicant.

¹⁸ A glaring problem with this analysis is to account for the /-a/ in the base and not in the reduplicant. This 'suffix' lacks clear morphological properties or motivation (see footnote 10). This fact is insignificant given the definition of 'base'. I assume that the base is the string to which the reduplicant is attached. This is the string that is present in the output and not in the input. Some constraint drives the emergence of the ending /-a/ so that it is consistently present in the forms above. Since it is always surfaces as part of the base, it must be counted in the evaluation of base-reduplicant correspondence. Therefore, every winning candidate will incur at least one B-R MAX violation, since the /-a/ is in the base but not in the reduplicant. It would be much better according to the analysis if the /-a/ did not surface at all *[hóm.xa.-hóm.-k.], or surfaced in both the base and reduplicant *[hóm.xa.-hóm.-k.a.]. Neither of these possibilities violates the highly ranked σ ≤ μ constraint. The fact that /-a/ only surfaces in the base could be the result of the ROOT = σ and RED₂ = ROOT constraints. If the /-a/ were to have a correspondent in the reduplicant, then the reduplicant would be more than one syllable. This would violate the markedness constraints on root size. In order to ensure that this violation were fatal, ROOT = σ and RED₅ = ROOT would have to be ranked above B-R MAX₅. Such a ranking would predict the emergence of the unmarked, and the reduplicant would surface without the /-a/. This is obviously problematic, since it was seen that B-R MAX₅ must be ranked above the markedness constraints to allow for total reduplication of base roots containing more than one syllable. The only way to fully elucidate this conundrum is to establish the constraint responsible for the surfacing of the /-a/. If the /-a/ were not present in the input, there would be no pressure for it to surface due to existential faithfulness. Some other markedness constraint, M, is responsible for its existence. This constraint would have to be ranked below RED₅ = ROOT, which ensures that the reduplicant is the optimal one syllable root size. Otherwise, the reduplicant would also be forced to contain the /-a/, due to its raison d'être that causes it to surface in the base and un-reduplicated forms. The M must be ranked above ROOT = σ, so that it is optimal for the /-a/ to surface at the expense of exceeding the one syllable maximum for the root. With the ranking RED₅ = ROOT >> M >> ROOT = σ, the reduplicant will surely not take the /-a/, while the base can. However, since the phonological form of the 'suffix' is consistent, and not least marked schwa (as demonstrated in chapter 4), it is most likely present in the underlying representation. Unfortunately, this problem cannot be fully resolved until further research is done to determine the purpose of the final /-a/.

(140)

input: /RED + q ^{wi} t/	∃-MAX I-O	B-R MAX ₅	B-R DEP ₅	*O _μ	WXP	ROOT = σ	RED ₅ = ROOT
a. q ^{wi} t.-q ^{wi} t.-a _μ .		*			*		
b. q ^{wi} t.-q ^{wi} t.-a _μ .		**!					
c. q ^{wi} t.-q ^{wi} t.-a _μ .		*	*!		*		
d. q ^{wi} t.-q ^{wi} t.-a _μ .	*!	*					
e. q ^{wi} t.-q ^{wi} t.-a _μ .		*		*!			

Here again we see that the constraints mitigating base-reduplicant correspondence for each reduplicant class is unique. The set of base-reduplicant_{1,2,3, and 4} constraints are ranked below the markedness constraints *O_μ and WXP, and governs only RED_{1,2,3,4} reduplication, guaranteeing that reduplicants will not surface with obstruent codas, as seen in the partial reduplication account in chapters 3 and 4. Meanwhile, the set of base-reduplicant₅ constraints is ranked above the markedness constraints, as in (140), guaranteeing that any codas will surface in the reduplicant.

In this way, the locus, size, shape and content of repetitive total reduplication in K^wa^kwala is accounted for. One phonology is present in the language. Each reduplicative morpheme is governed by its own set of unique and individually ranked base-reduplicant correspondence constraints. It may be that various morphemes' constraints are equivalently ranked (and are therefore co-indexed in my tableaux). But overall, the unique ranking of reduplication governing constraints, interacting with ∃-I-O constraints and various markedness constraints on the prosody and phonology of the language accounts for each of the surface forms of reduplication in the language.

6. Conclusion

In this thesis, I looked at the morpho-phonological process of reduplication in the consultants' dialect of K^wa^kw^ala. Data from current field sessions confirmed at least five types of reduplication in the language. One reduplicative morpheme, distributive, demonstrated unique allomorphic variation, dependent on the base. The surface form was either CV [wá-wap-stola] 'watery eyes'/586, or CəR [k^wəl-k^wəl-χ-stu] 'grey/light eyes'/587, 820. This pattern of reduplication also exhibited unique patterns of base-reduplicant-input correspondence. Three reduplicative morphemes utilized partial reduplication with fixed segmentism: plural, [pí-pəspəʔyu] 'ears'/103; diminutive [bá-bəg^wənən] 'small boy'/446; and 'too much' [mə-míx-kən] 'I over-slept'/418. Finally, one reduplicative morpheme utilized total reduplication: [təmáx-təmak-æ] 'to wind repeatedly'/1246. The goal of the thesis was to provide a theoretical account of these reduplicative patterns.

In chapter 1, I outlined the basic tenets of Optimality Theory and Correspondence Theory (McCarthy & Prince, 1994, 1995, 1999), upon which I framed my analysis. I briefly discussed the inadequacies of the traditional model of correspondence and the definition of input-output correspondence, and introduced the adapted view of existential input-output correspondence (Struijke, 1998, 2000). The chapter concluded with a brief look at previous research done on K^wa^kw^ala. Here, I highlighted the points of convergence and divergence between my analysis and the previous research.

My analysis of reduplication was heavily dependent upon the analysis of the prosodic system. In chapter 2, I explored the various, relevant prosodic features of the language. Based on the behaviour of stress, I concluded that schwa was not moraic, that resonant codas were moraic, but not obstruent or glottalized resonant codas. Very importantly, and against most previous analyses, I proved that stress is trochaic in the language. Based on this crucial point, I captured the generalization that syllables are never more than one mora in weight, conforming to the desire for even trochees, abiding by the RH Contour for trochees. I also established that WSP outranked trochaic FOOT FORM. The result is that a syllable with a full vowel, or /əR/ sequence, will optimally get stress over just a schwa, even at the expense of preserving trochaic feet.

Based on these conclusions and prosodic hypotheses, I turned to the analysis of distributive reduplication in chapter 3. Here, I descriptively outlined the behaviour of the morpheme. In addition to allomorphic variation of the morpheme, there was also enigmatic deletion of a resonant coda in some bases. The behaviour of the reduplicative forms, with and without deletion, and also the behaviour of non-reduplicative forms, was captured through a specific ranking of markedness constraints, prosodic constraints, and existential correspondence constraints. This chapter definitively showed the inadequacies of traditional CT to handle the K^wa^kw^ala data. Since the segmental string (ie. the base) corresponding to the traditional definition of 'output' is the same in both reduplicated and non-

reduplicated forms, both are expected to behave the same way in the output. Any segmental differences forced by markedness constraints are expected in the reduplicant only (the emergence of the unmarked). It is not expected that a non-reduplicated base would surface differently from a reduplicated one. But this is exactly what we find in K^wa^kwala. Existential input-output Faithfulness, where an input is in correspondence with an entire output (base and reduplicant) allows for this phenomenon.

I turned to an account of partial reduplication with fixed segmentism in chapter 4. Here, I illustrated the various morphemes in this class of reduplication: plural, diminutive, and 'too much'. I demonstrated how the morphemes, were governed by constraints on reduplicant size, and affix size (RED = AFX, AFX = σ). The ranking of these constraints in relation to individually ranked base-reduplicant constraints (each governing its own indexed morpheme) accounted for the surface shape of the partial reduplicants. I then turned to an account of the fixed segments. I showed that /i/ of the plural /Ci-/ and the /a/ of the diminutive /Ca-/ morphemes were specified, while the /ə/ of the 'too much' /Cə-/ surfaced as a result of schwa being the least marked vowel.

In chapter 5, I discussed 'repetitive' total reduplication. I explored how one phonology is able to govern two different patterns of reduplication. Total reduplication is obviously not mediated by the same constraint as the partial reduplicants (RED = AFX), but is rather governed by RED = RT. This constraint is responsible for total root copying, and not just partial correspondence. I confirmed that there are five "classes" of reduplicants in the language corresponding to each morpheme. The different classes are governed by different, and independently ranked, generalized template constraints (RED_{1,2,3,4} = AFX, RED₅ = RT). The total reduplication data provided further evidence that there are five unique sets of base-reduplicant correspondence constraints each individually ranked in the K^wa^kwala constraint hierarchy, and each governing their own reduplicant class. Through this approach, the emergent shape of the various forms of reduplication were captured.

A comprehensive account of the phonology of K^wa^kwala is still in the making. I hope that efforts will continue to illuminate more of this fascinating language. I hope to have contributed a small part, however, through my elucidation of the confirmed patterns of reduplication witnessed in the current field data. One moving thing that I have learned through this process is that people laugh more when they speak K^wa^kwala. They smile more. Their ways, their past, their culture, their world, their beauty - the people themselves- persist, through the language. To K^wa^kwala is to enter into a sacred relationship with the community. My hope is that this work (which is not really my work, but a collaborative result of all that my friends have shared with me (not just linguistic)), will turn around and bless their community efforts in helping the language thrive. Like some ancient portal through which they are connected to their ancestors, their identity lives and breathes in the speakers through the language. Let their breath go with you. *χelakasla*.

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Appendix

Comparison of Orthographic Conventions

Consonants:

NA (this thesis):	p	t	c	χ	k	k ^w	q	q ^w	ʔ
Boas:	p	t	ts	L	k	k ^u	q	q ^u	ε
Grubb:	p	t	ts	tl	k	kw	<u>k</u>	<u>kw</u>	ʔ
U'mista:	p	t	ts	tʰ	k	kw	<u>k</u>	<u>kw</u>	ʔ

NA (this thesis):	b	d	d ^z	λ	g	g ^w	G	G ^w	
Boas:	b	d	dz	L	g	g ^u	g	g ^u	
Grubb:	b	d	dz	dl	g	gw	g	gw	
U'mista:	b	d	dz	dʰ	g	gw	g	gw	

NA (this thesis):	p̣	ṭ	c̣	χ̣	ḳ	ḳ ^w	q̣	q̣ ^w	
Boas:	p!	t!	ts!	L!	k!	k! ^u	q!	q! ^u	
Grubb:	p'	t'	ts'	tl'	k'	kw'	<u>k'</u>	<u>kw'</u>	
U'mista:	p̣	ṭ	tṣ	ṭʰ	ḳ	ḳ ^w	<u>ḳ</u>	<u>ḳ^w</u>	

NA (this thesis):		s		ʃ	x	x ^w	χ	χ ^w	h
Boas:		s		ʃ	x	x ^u	χ	χ ^u	h
Grubb:		s		lh	x	xw	<u>x</u>	<u>xw</u>	h
U'mista:		s		ʃ	x	xw	<u>x</u>	<u>xw</u>	h

NA (this thesis):	m	n		l	y	w			
Boas:	m	n		l	y	w			
Grubb:	m	n		l	y	w			
U'mista:	m	n		l	y	w			

NA (this thesis):	ṃ	ṇ		ḷ	ỵ	ẉ			
Boas:	^ε m	^ε n		^ε l	^ε y	^ε w			
Grubb:	ṃ	ṇ		ḷ	ỵ	ẉ			
U'mista:	^ε m	^ε n		^ε l	^ε y	^ε w			

Vowels:

NA (this thesis):	i	e	a	o	u	ə
Boas:	i	e	a	o	u	ɤ/ε
Grubb:	i	e	a	o	u	e
U'mista:	i	e	a	o	u	<u>a</u>