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1. Background

In the world's languages we can find languages with disyllabic or bimoraic minimum size requirements in morphology. Among these languages, we can also find diverse strategies to keep words over the minimum size. Some of the examples are blocked apocope in Estonian (Prince 1980), appendices and blocked truncation in Lardil (Wilkinson 1988), vowel lengthening in Bengali (Cole 1990), prothesis in Choctaw (Lombardi & McCarthy 1991), Iraqi (Broselow 1982), and Mohawk (Broselow 19 82), appendices in Axininca Campa (Spring 1988, McCarthy & Prince 1993), epenthesis, cliticization and consonant gemination in Mayo (Hagberg 1992), and glide deformation in Mexican Spanish (Crowhurst 1992). Prosodic minimality and its related effects can also be found in Eastern Bantu languages, such as Luganda (Hyman & Katamba 1990), Kihehe (Odden & Odden 1985, Odden 1996a), Shona (Myers 1987), Chichewa (Kanerva 1990), Siswati (Kiyomi & Davis 1992, Herman 1996), Kikerewe (Odden 1996b), Runyankore (Poletto 1996), etc. In Swahili, the special behavior of monosyllabic verbs has been treated as a grammatical exception, but can be better explained by the notion of the morphological requirement (Nurse & Hinnebusch 1993, Park 1995).

This study will, first, present various disyllabic minimum requirements which govern Swahili morphology from synchronic and diachronic points of view, and then will analyze parts of them in constraint-ranked optimality theory (McCarthy & Prince 1993, 1995 among others). This study is the first comprehensive study on prosodic minimality in Swahili and its application to optimality theory.

2. Disyllabic Requirement in Swahili Morphology

Swahili exhibits various morphophonological phenomena which are affected by disyllabic minimum requirement in the language. First of all, in declarative statements in Swahili, monosyllabic verb

stems require the infinitive marker *ku*, as in (1a), while multi-syllabic (i.e., disyllabic or bigger) stems do not, as seen in (1b).

(1) a. *sp- pres- inf-vs*
*Ni- na- [la].
Ni- na- [ku- la]. 'I am eating.'
b. *sp- pres- inf- vr ob*
Ni- na- [soma] barua.
*Ni- na- [ku- soma] barua 'I am reading a letter.'

This suggests that a disyllabic requirement exists for Swahili verb stems. This phenomenon is also found in imperative, negative past, and conditional sentences.[1]

We can find the disyllabic requirement also in reduplication. Example (2) shows that in the reduplication of multi-syllabic verb stems, only the verb stems reduplicate, excluding prefixes.

(2)	a.	inuka-inuka	inuka	'rise up'
		rudia-rudia	rudia	'go'
	b.	ji-pinda-pinda	ji-pinda	'be fold'
		m-binya-binya	m-binya	'pinch him'

However, in the reduplication of monosyllabic verb stems, as example (3) shows, the prefixes *ku* or *m(w)* is followed by a monosyllabic verb.

(3)	a.	ku-ja-kuja	*ja-ja	ja	'come'
	b.	m-pe-mpe	*m-pe-pe	m-pa	'give him'
	c.	mw-ona-mwona	*mw-ona-ona	mw-ona	'see her/him'

The special behavior of monosyllabic verbs, unlike that of longer verbs, requires that the syllable before the verb root, such as an infinitive or an object prefix, also be copied so that the reduplicated part can be disyllabic.[2]

The regular Swahili passive morpheme is *w* as in (4a), but monosyllabic verbs require an epenthetic vowel *i* or *e* in addition to

[1]In subjunctive and present negative structures, the *ku* is not required, and this could be due to some pragmatic or functional reason.
[2]The reduplicative parts in *te-temeka* 'tremble (verb)' and *nyeusi ti-ti-ti* 'pitch black (ideophone)' are not disyllabic.

the passive morpheme *w* as in (4b). This epenthesis is motivated not by phonotactics but by the fulfillment of the disyllabic requirement for verb stems.

(4)		stem	passive	
	a.	nepa	nepwa	‘sag’
		acha	achwa	‘give up’
		danganya	danganywa	‘deceive’
		pika	pikwa	‘cook’
	b.	pa	pewa	‘give’
		cha	chewa	‘dawn’
		nya	nyewa	‘drip’
		la	liwa	‘eat’

The disyllabic minimal requirement is also responsible for exceptions in some historical changes. A voiceless prenasalized or a plain voiceless consonant in Swahili diachronic phonology, as seen in (5a).

(5)	a.	mpaka	>	p^haka	‘cat’
		ntembo	>	t^hembo	‘elephant’
		nsimba	>	simba	‘lion’
	b.	nta /n.ta/		*t^ha	‘wax’
		nca /n.ca/		*c^ha	‘tip’
		nswi /n.swi/		*swi	‘fish’

The words in (5b), however, fail to undergo the nasal deletion in voiceless prenasalized consonants. The reason is that deletion of the nasal class prefix would result in a violation of the disyllabic minimal word, since the nasal before a monosyllabic noun stem contributes to syllabicity by way of resyllabification.

Another type of evidence for disyllabic minimality of Swahili words comes from nouns in class 11, which have the prefix *u*. In (6a), the prefix *u* is removed in plural formation. On the other hand, in the plural forms in (6b) the *u* does not drop; rather, the class prefix *N* is added to retain nouns with two syllables.

(6)	sing.(cl.11)	plural (cl.10)		
a.	ukuta	_k^{h}uta	(<Nkuta)	'wall'
	ufagio	_f^{h}agio	(<Nfagio)	'broom'
	upande	_p^{h}ande	(<Npande)	'side'
b.	ufa	nyufa	*Nfa/*fa	'crack'
	ushi	nyushi	*Nshi/*shi	'eyebrow'
	uta	nyuta	*Nta/*t^{h}a	'bow'

The absence of the class prefix in plural forms in (6a) is due to the diachronic *N* deletion described in (5). It apparently affects the intermediate forms. Keeping the *u* in the plural formation of nouns in (6b) is a type of disyllabic minimum requirement for Swahili nouns. *N.CV* forms are another possibility for the plural forms, but they are not actual forms. There could be some disfavor toward word-initial voiceless prenasalized consonants in Swahili. The easiest way to avoid that structure is to keep the available singular prefix *u*.

Cliticization is one of the ways in which the size of a form can be augmented. Cliticization of the emphatic copula and a pronominal clitic, both of which are monosyllabic, removes potentially monosyllabic words from the Swahili lexicon. In example (7), *ndi* is the monosyllabic emphatic copula, and *mi, si, ... yo* are pronominal elements, either of person or other classes.

(7) a.	Classes (personal)	1 (sg.)	2 (pl.)	
	1st	ndi-mi	ndi-si	'It' is I/we!'
	2nd	ndi-we	ndi-nyi	'It' is you!'
	3rd	ndi-ye	ndi-o	'It' is he/she/they!'
b.	Other Classes			
	3/4	ndi-o	ndi-yo	'It's that/those!(cl.3/4)'
	5/6	ndi-lo	ndi-yo	'It's that/those!(cl.5/6)'
	–	–	–	–

Optional cliticization also exists in Swahili morphology. They are the negative copula *si* plus an optional clitic, or the conjunction *na* and an optional clitic, as seen in (8). The final vowels, *o* and *e* in *sio*, *sie* and *nao*, are optional elements. The negative copula *si* and the conjunction *na* are function words and they are not necessarily disyllabic, but the optional cliticization also makes these words disyllabic.

(8) a. Kanama sio muradi...(<- *si* 'is not') 'But lo! it is no use..'
b. Mimi sie mwivi...(<- *si* 'is not') 'I am not the thief...'
c. Kambe nao watambule...(<- *na* 'and') 'Speak and let them understand ...'

The remnants of a lost Swahili prefix system are found in disyllabic words. Swahili nouns are classified among sixteen classes, depending on the overt or covert prefixes and meanings. Previously, more noun classes existed than now, and some of them have been lost. One of the lost is class prefix 12 *ka*. The agreement system of noun class 12 has been lost in Swahili morpho-syntax, but a few nouns with *ka* have been retained.

(9) a.	kale	ka-le	(cl.12-that)	'once there'	ku-le
b.	kanywa	ka-nywa	(cl.12-drink)	'beverage'	ki-nywa
c.	kawe	ka-we	(cl.12-stone)	'pebble'	ki-ji-we
d.	kamwe	ka-mwe	(cl.12-one)	'one'	moja

The class 12 prefix *ka* is no longer productive in Swahili and is a historical remnant of the former agglutination for the sake of disyllabicity of the monosyllabic stems *le*, *nywa*, *we* and *mwe*. Most of the nouns found with class 12 *ka* are maximally disyllabic, and their usage is restricted. In many cases they are replaced by the forms in the last column. This means that the *ka* has been retained for the purpose of the fulfillment of the disyllabic minimality requirement.

We can also find stems with epenthesis, double affixes, and frozen elements to monosyllabic stems. The affixes can hardly be detached from the stems to which they are affixed. The affixed bases, rather than the original base forms, are found in the Swahili lexicon.

(10) a.	wa-nne	ne	(cl.2-cl.9-four)	'four'
b.	fa-a	f(w)a	(fit-epenth.)	'fit'
	f-an-an-a	f(w)a	(fit-rcp-rcp)	'resemble'
c.	ki-vita	ta	(cl.7-cl.8-throw)	'battle'
	ku-kuta	ta	(cl.15-cl.15-throw)	'come upon'
	ku-kutana	ta	(cl.15-cl.15-throw-rcp)	'meet'
d.	ki-lifu	fu	(cl.7-cl.5-stomach)	'stomach'

e.	chi<u>ni</u>	chi	(ground-<u>locative</u>)	'under'
	pwa<u>ni</u>	pwa	(dry up-<u>locative</u>)	'(on the) coast'
f.	manuka<u>to</u>	(n)to	(smell-<u>good</u>)	'perfume'
	nyama<u>fu</u>	fu	(meat-<u>dead</u>)	'dead animal'
	kamili<u>fu</u>	fu	(exact-<u>complete</u>)	'perfectly'

The reason that they attract affixes as frozen forms is that they are too small, and they are always found with some affixes. The form with an affix has been taken for the new base stem. In (a), *ne*, the original stem for 'four', is found as *n-ne* in counting, and it is mistaken for the original stem. The class 2 prefix *wa* is affixed to the new frozen disyllabic stem *n.ne*, which results in *wa-nne*. For (b,c), the verb *fwa* and *ta* are found only in the forms above. These two verbs are so small that they are augmented with epenthesis or affixation. Again, the augmented forms are counted as base forms and they can obtain an affix, which creates forms with double affixes. The same principle applies to example (d). In (e), *ni* is the locative marker and is affixed to a monosyllabic stem. It cannot be removed nor replaced by the preposition *katika*. For example, *chi<u>ni</u>* 'under' and *pwa<u>ni</u>* 'in the coast' cannot be replaced by *<u>katika</u> chi* and *<u>katika</u> pwa*; *darasa<u>ni</u>* 'in the classroom' can be replaced by *<u>katika</u> darasa*. In addition, the *ni* in *pwani* is not normal, since the locative is for nouns; *pwa* is a verb here. The stem *pwa* is also found with epenthesis or with a class prefix, as in *pwa<u>a</u>* or *<u>ma</u>pwa*. The monosyllabic adjectives in (f), the underlined parts, have been frozen only to these words and are hardly found with other words. This phenomenon reduces the number of productive monosyllabic adjective stems, all of which are also found with other prefixes for a disyllabic requirement.

Another piece of evidence supporting the disyllabicity requirement in Swahili morphology is found in nouns. We find a significant number of words composed of two syllables, in which each syllable is phonemically identical. Monosyllabic reduplication in Swahili produces common nouns and pronouns as in (11), and they constitute an integral part of the Swahili nominal vocabulary, unlike some other languages, where these types of words are found in baby-talk. This type of reduplication yields only disyllabic forms, except for some ideophonic words.[3]

[3]There are a few abbreviated names with the first two syllables, such as

(11)	nyanya	'tomato'	lulu	'pearl'
	papa	'shark'	popo	'bat'
	mimi	'I'	wewe	'you (sg.)'

Another piece of evidence for the disyllabic requirement can be found in abbreviated names in Swahili. In the standard (Unguja or Zanzibar) dialect, abbreviated names are from the last two syllables of the source words as in (12).

(12)	full name	abbr. name	full name	abbr. name
	Abdallah	Dula	Abdulla	Dula
	Fatuma	Tuma	Hamisi	Misi
	Khadija	Dida	(Moh)amedi	Edi

From all these pieces of evidence, a disyllabic minimal word can be proposed for Swahili, which is schematized in (13).

(13) Minimal Word = Foot (Min-Wd)
Lexical words are minimally disyllabic feet.

3. Constraints in Verbs

This section will show how an optimality analysis is applicable in accounting for the minimality effect in Swahili morphology. The interaction between the Min-Wd constraint and other constraints will be the main issue. To begin with the conclusion, the minimal word of disyllabicity can serve as a constraint which is hardly violated in Swahili morphology.

The first thing to account for is the optimization of the monosyllabic verbs with a required prefix, which were described in (1)[4]. As is shown in constraint table (14), multi-syllabic verbs do not need the infinitive marker *ku*, and if it is added it will violate the constraint called Dep-IO, which states that output elements should come from (be dependent on) input elements; any outside element is not allowed. Both candidates observe the Min-Wd constraint.

Abdu for *Abdullah*. In a Kenyan Swahili dialect, abbreviated forms are more commonly from the first two syllables of the source words.

[4]The data cited in sections 3 and 4 are from section 2, and they are given reference numbers. *W* in constraint tables indicates optimal (winning) candidates.

(14) ninasoma 'I am reading' (1b)

	/nina-soma/	Min-Wd	Dep-IO
a. W	nina-soma		
b.	nina-ku-soma		*!*

The example in (15), however, requires *ku*. The reason is that the verb stem *la*, by itself, violates the minimum size, Min-Wd. In spite of its violation of Dep-IO, the form with the prefix is the winning candidate since it observes the higher-ranked Min-Wd.

(15) ninakula 'I am eating' (1a)

	/nina-la/	Min-Wd	Dep-IO
a.	nina-la	*!	
b. W	nina-kula		**

In this constraint table we can see the ranking of Min Wd over Dep-IO. In this ranking epenthesis can be expected to occur to meet the disyllabic minimum requirement.

The effect of the minimal word constraint is also found in reduplication. Multi-syllabic verb stems do not copy the prefix in reduplication in (16). If the prefix *ji* also reduplicates, then it will violate the reduplicant size constraint called RED≤Stm, meaning that reduplicants should be the same as or smaller than the stem. There is no need of incorporating the prefix since the stem is big enough to meet the Min-Wd constraint.

(16) jipindapinda 'fold and fold' (2b)

	/ji-pinda-RED/	Min-Wd	RED≤Stm
a. W	ji-pinda-pinda		
b.	ji-pinda-jipinda		*!

The optimal form (16a) does not violate any of the above constraints, while the wrong form violates the reduplicant size constraint.

The ranking between Min-Wd and RED≤Stm will emerge in the following constraint table. In the reduplication of monosyllabic verb stems, a prefix is employed in order to make the reduplicant minimally disyllabic.

(17) mpempe ‘Give him/her!’ (3b)

	/m-pe-RED/	Min-Wd	RED≤Stm
a.	m-pe-pe	*!	
b. W	m-pe-mpe		*

In this constraint table, the ranking of Min-Wd over RED≤Stm is manifested. This ranking allows the prediction that when the stem is too small, it can be augmented, even though it makes the reduplicant bigger than the stem. Candidate (17a) is the losing candidate since it violates the higher-ranked constraint Min-Wd.

In addition to the constraints Min-Wd, Dep-IO and RED≤Stm, the onset requirement serves as an important constraint in reduplication. In reduplication of multi-syllabic verb stems, a prefix is incorporated when it is working as the onset of a syllable. For instance, an object prefix *mw* reduplicates in the reduplication of multi-syllabic verb stems, as in (18).

(18) mwonamwona ‘see her/him’ (3c)

	/mw-ona-RED/	Min-Wd	Onset	RED≤Stm
a.	mw-ona-ona		*!	
b. W	mw-ona-mwona			*

In this constraint table, both observe Min-Wd, but candidate (18b) violates the lowest-ranked constraint, while candidate (18a) violates the higher-ranked constraint Onset. The optimal form (18b) is the candidate which does not violate any higher-ranked constraint.

Another possible constraint is Max-Stm, which states that an onsetless vowel can stay by itself; it cannot be removed. In the following constraint table, the onsetless syllable in a multi-syllabic verb stem does not acquire an onset nor lose the onsetless vowel. To explain this phenomenon, we need a constraint called Max-Stm, which states that stem elements cannot be deleted. All three candidates observe Min-Wd.

(19) inukainuka ‘rise up and up’ (2a)

	/inuka-RED/	Min-Wd	Max-Stm	Dep-IO	Onset
a. W	inuka-inuka				**
b.	inuka-_nuka		*!		*
c.	inuka-kw-inuka			*!	*

Vowel-initial verbs reduplicate themselves and do not lose the initial vowel, as in candidate (19b) nor add an onset consonant, as in candidate (19c).[5] Constraint Onset is lowest-ranked, and the double violation of this constraint in candidate (19a) does not harm its wellformedness. The ranking of Onset in other languages is different from that of Swahili. For example, initial onsetless syllables are removed in Axininca Campa reduplication, e.g., *osampi-_sampi*, while they get an onset in Siswati reduplication, e.g., *osha-yosha*. As additional information, we do not see any ranking between Max-Stm and Dep-IO in the above.

The epenthesis in the passive formation of monosyllabic verbs can also be analyzed by the constraints introduced so far. The ranking of Min-Wd over Dep-IO, and that of Dep-IO over Onset, have been decided in (15) and (19), respectively. Candidate (20a) violates the minimal word constraint, and the rest violate Dep-IO since they have epenthesis. Candidates (d-f) also violate the Onset constraint. Candidate (b) doubly violates Dep-IO, but candidate (c) violates the Dep-IO constraint only once.

(20) pewa 'be given' (4a)

	/pwa/	Min-Wd	Dep-IO	Onset
a.	pwa	*!		
b.	kupwa		**!	
c. W	pewa		*	
d.	pwaa		*	*!
e.	pwea		*	*!
f.	apwa		*	*!

From the constraint tables from (14)-(20), we can propose the following ranking among the constraints in Swahili verbal morphology.

(21) Min-Wd >> Max-Stm, Dep-IO >> Onset >> RED≤Stm

[5] *kw* is arbitrarily chosen for an onset, which is from the glidization of the infinitive marker *ku*.

4. Constraints in Nouns

In addition to general constraints, some special constraints are required in the analysis of Swahili nouns. The Min-Wd constraint is also important in nouns. First of all, the diachronic *N*-loss in nouns of classes 9 and 10 can be analyzed in the ranking of constraints. In multi-syllabic noun stems, the homorganic and prenasalized consonant loses its nasal part. Losing the *N* in these stems does not affect their violation of the Min-Wd constraint, since without *N* they still retain the same number of syllables. In constraint table (22), candidate *a* violates constraint NoNC^{-vd}, which can state that voiceless prenasalized consonants are not allowed. Candidate *c* violates Dep-IO.

(22) paka 'cat' (5a)

	/Npaka/	Min-Wd	Dep-IO	NoNC^{-vd}	Align-L
a.	Npa.ka			*!	
b. W	pa.ka				*
c.	Na.pa.ka		*!		

Candidate *b* meets the first three constraints, and its violation is the lowest-ranked Align-L, which states that a prosodic word should align its left edge with the left edge of the stem. This constraint disallows insertion or deletion to the left edge of the prosodic word. In multi-syllabic words, Min-Wd is always met; thus NoNC^{-vd} is another crucial constraint in Swahili.

Table (23) reveals dialectal differences with regard to monosyllabic nouns with a voiceless prenasalized consonant. All these candidates are found as actual forms in dialects (Nurse & Hinnebusch 1993). The current ranking is for candidate *a*, which is found in the standard dialect.

(23) nswi 'fish' (5b)

	/Nswi/	Min-Wd	Dep-IO	NoNC^{-vd}	Onset
a. W	N.swi			*	
b.	swi	*!			
c.	Nswi	*!		*	
d.	Ni.su		*!		
e.	si.i		*!		*
f.	i.Nswi		*!	*	*

The first two constraints are sufficient to determine the optimal form in the standard dialect, but for others we have to rerank, add or delete constraints, depending on the dialect, as can be seen in the following:
If the winner is:

a, then the ranking is Min-Wd, Dep-IO >> NoNC^{-vd}. It is found in such dialects as Unguja (standard), Mwiini, Pate and Siu.[6]

b, Dep-IO, NoNC^{-vd} >> Min-Wd. Found in Makunduchi, Vumba, Mtang'ata and Pemba.

c, Dep-IO >> NoNC^{-vd} >> Min-Wd. Additionally, it requires Align$^{\sigma}$ over NoNC^{-vd} to win candidate *a*, and requires Align-L over Min-Wd to win candidate *b*. Found in reconstructed Common Bantu.[7]

d, Min-Wd, NoNC^{-vd}, Onset >> Dep-IO. Found in Upper Pokomo.

e, Min-Wd, NoNC^{-vd} >> Dep-IO >> Onset. Additionally, requires Align-L over Onset to win candidate *f*, and requires Align$^{\sigma}$ over Dep-IO to win candidate *d*. Found in the Elwana dialect.

f, Min-Wd, NoNC^{-vd} >> Dep-IO >> Onset. Additionally, it requires Align-R over Onset to win candidate *e*, and requires Align$^{\sigma}$ over Dep-IO to win candidate *d*. Found in the Mwani dialect.

The interaction between the Min-Wd constraint and NoNC^{-vd} is also found in the plural formation of nouns with class prefix 11 *u*. First, an analysis of the augmentative plural formation in monosyllabic noun stems with *N* is found in constraint table (24).[8]

[6]The Comoros dialect has *mfi* as the output. The inclusion of this form will require another constraint, such as Ident-Feature, which states that the output features should be identical to the input features.

[7]Align$^{\sigma}$: disallows resyllabification at the edge of the stem. It is *Align* in McCarthy & Prince (1993).

[8]The reason that the input form has *u* in parenthesis is that *u* is a class prefix, like *N*, and it is visible in plural formation. The same principle applies to (25).

(24) Nufa ‘cracks’ (6b)

	N(u)fa	Min-Wd	NoNC^{-vd}	Onset
a.	Nfa	*!	*	
b.	N.fa		*!	
c.	fa	*!		
d. W	Nu.fa			
e.	u.Nfa		*!	*

In the above constraint table, candidates *a* and *c* violate the Min-Wd constraint, and candidates *a*, *b* and *e* violate the no-voiceless-prenasalized-consonant constraint. Candidate *e* violates Onset too. The optimal candidate *Nufa* in (24d) does not violate any of the three constraints above, but it has two noun class prefixes, which could be a possible violation of a constraint; this will be clear in the next constraint table.

Constraint NoNC^{-vd} is a crucial constraint also in the analysis of the subtractive plural formation of nouns with multi-syllabic stems. The candidates (25a,b,c) observe both Min-Wd and Onset. Relatively higher-ranked NoNC^{-vd} eliminates candidates *a* and *b* in the competition for optimization. Candidate *d* can be removed by an additional constraint, called NoDCP, which states that no double class prefix is allowed. As additional information, the winning candidate’s possible violation is Align-L.

(25) kuta ‘walls’ (6a)

	N(u)kuta	Min-Wd	NoNC^{-vd}	Onset	NoDCP	Align-L
a.	Nku.ta		*!			
b.	N.ku.ta		*!			
c. W	ku.ta					**
d.	Nu.ku.ta				*!	
e.	u.ku.ta			*!		

In the optimization of candidate *c* in this constraint table, we can see the rankings of NoNC^{-vd}, Onset and NoDCP over Align-L.

From the constraint tables in (22)-(25), we can propose the following constraint ranking for Swahili nominal morphology.

(26) Min-Wd>> Dep-IO>> NoNC^{-vd}>> Onset >> NoDCP>> Align-L

5. Conclusion

The exceptional behavior and the dialectal variation in historical and synchronic Swahili phonology and morphology can be accounted for by the imposition of a simple disyllabic minimum requirement, along with a set of ranked constraints as in optimality theory.

References

Broselow, E (1982). "On Predicting the Interaction of Stress and Epenthesis." *Glossa* 16, 115–132.
Cole, J (1990). "The Minimal Word in Bengali." *WCCFL* 9, 157–170.
Crowhurst, M (1992). "Diminutives and Augmentatives in Mexican Spanish: A Prosodic Analysis." *Phonology* 9, 221–253.
Hagberg, L (1992). "Syllabification of Long Vowels in Mayo." *CLS* 26, 159–173.
Herman, R (1996). "Prosodic Structure of Siswati." *OSU Working Papers in Linguistics* 48, 31–55.
Hyman, L. and F. Katamba (1990). "Final Vowel Shortening in Luganda." *Studies in African Linguistics* 21, 1–59.
Kanerva, J (1990). *Focus and Phrasing in Chichewa Phonology*. Ph.D. Diss., Stanford University.
Kiyomi, S. and S. Davis (1992). "Verb Reduplication in Swati." *African Languages and Cultures* 5, 113–124.
Lombardi, L. and J. McCarthy (1991). "Prosodic Circumscription in Choctaw Morphology." *Phonology* 8, 37–71.
McCarthy, J. & A. Prince (1993). *Prosodic Morphology I: Constraint Interaction and Satisfaction*. Ms, U. Mass. & Rutgers U.
McCarthy, J. & A. Prince (1995). "Faithfulness and Reduplicative Identity." *UMPO* 18, 249–384.
Myers, S (1987). *Tone and the Structure of Words in Shona*, Ph.D.Diss., U. of Mass, Amherst.
Nurse, D. and T. Hinnebusch (1993). *Swahili and Sabaki: A Linguistic History*. Berkeley & Los Angeles: U. of California Press.
Odden, D (1996a). "Patterns of Reduplication of Kikerewe." *OSU Working Papers in Linguistics* 48, 111–148.
Odden, D (1996b). "Minimality in Kikerewe." Paper presented at Mid-Continental Workshop on Phonology, U. of Illinois, Urbana-Champaign.
Odden, D. & M. Odden (1985). "Ordered Reduplication in Kihehe." *Linguistic Inquiry* 16, 497–503.
Park, J.-I (1995). "Minimality Effects in Swahili," in Akinbiyi Akinlabi, ed., *Theoretical Approaches to African Linguistics*, Trenton, NJ: Africa World Press, 295–312.

Poletto, R (1996). "Base-Identity Effects in Runyankore Reduplication." *OSU Working Papers in Linguistics* 48, 183–210.
Prince, A (1980). "A Metrical Theory for Estonian Quantity." *Linguistic Inquiry* 17, 207–263.
Spring, C (1988). "How Many Feet per Language?" *WCCFL* 9, 493–507.
Wilkinson, K (1988). "Prosodic Structure and Lardil Phonology." *Linguistic Inquiry* 19, 325–334.

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