Dynamic versus static phonotactic constraints in prosodic morphology

Daniel Silverman
University of Illinois at Urbana-Champaign
dan@uiuc.edu

1.

Dynamically-imposed complementary distribution:	Static/lexical complementary distribution:
-a consequence of dynamically-imposed phonotactic constraints as morphemes combine -involves allophonic/allomorphic alternation	-a consequence of static/lexical phonotactic constraints within morphemes -no alternations are involved

- Due to the distinct properties of dynamic versus static complementary distribution—imposed by dynamic versus static phonotactic constraints—one might predict that the sounds engaged in these two sorts of relationships possess distinct phonological properties.

- Prosodic morphological processes such as truncation and reduplication provide a unique testing ground for this prediction.

- Dynamically-imposed phonotactics should induce alternations even upon truncation or reduplication, provided the relevant phonotactic context is present

- Lexically static phonotactic patterns should remain non-alternating in these contexts, *even if lexical phonotactic regularities come to be "violated" in the derived form.*

1.

a. Standard approach:		b. Present approach:	
Static complementary distribution:	Dynamically-imposed complementary distribution:	Static complementary distribution:	Dynamically-imposed complementary distribution:
Under-, over-, or regular application is determined by rule ordering, or constraints ranking		No alternations are induced (identity is maintained)	Alternations are induced (identity is lost)

New York Truncation

1. æ → æ̟ / __ C]$_\sigma$ (where C= voiced obstruents, voiceless fricatives, anterior nasals) (Benua 1995)

1. New York alternations (sic):

a.	manage	[ˈmænəd̟ʃ]	b.	man	[ˈmæ̟n̪]
	Janice	[ˈd̟ʃænɪs]		plan	[ˈpl̟æ̟n̪]
	cafeteria	[ˈkʰæfəˈtʰiɹiə]		laugh	[ˈlæ̟f̪]
	cannibal	[ˈkʰænəbɬ̩]		mandible	[ˈmæ̟n̪dəbɬ̩]
	planet	[ˈpl̟ænɪʔ]		plan it	[ˈpl̟æ̟n̪ɪʔ]

2. Constraints:
   a. æ-TENSING: *æC]$_\sigma$ (where C= voiced obstruents, voiceless fricatives, anterior nasals)
   b. *TENSE-low: "no tense low vowels"
   c. IDENT-IO[tense]

   Ranking: æ-TENSING >> *TENSE-low, IDENT-IO[tense]

Input: /plæn/$_x$ or /plæ̟n̪/$_y$	æ-TENSING	*TENSE-low	IDENT-IO[tense]
a. [ˈpl̟æn]	***!**		***$_y$**
b. ☞[ˈpl̟æ̟n̪]		*	***$_x$**

3. New York non-alternations:

Janice	[ˈd̟ʃænɪs]	Jan-	[ˈd̟ʃæn]	(*[ˈtʃæ̟n̪))
cafeteria	[ˌkʰæfəˈtʰiɹiə]	caf-	[ˈkʰæf]	(*[ˈkʰæ̟f̪))
Massachusetts	[ˌmæsəˈtʃʰusɪts]	Mass-	[ˈmæs]	(*[ˈmæ̟s̪))

- Base-truncatum (BT) identity constraints, which demand identity between a base form and its truncatum.

4. BT-Identity >> æ-TENSING >> *TENSE-low >> IO-Faith

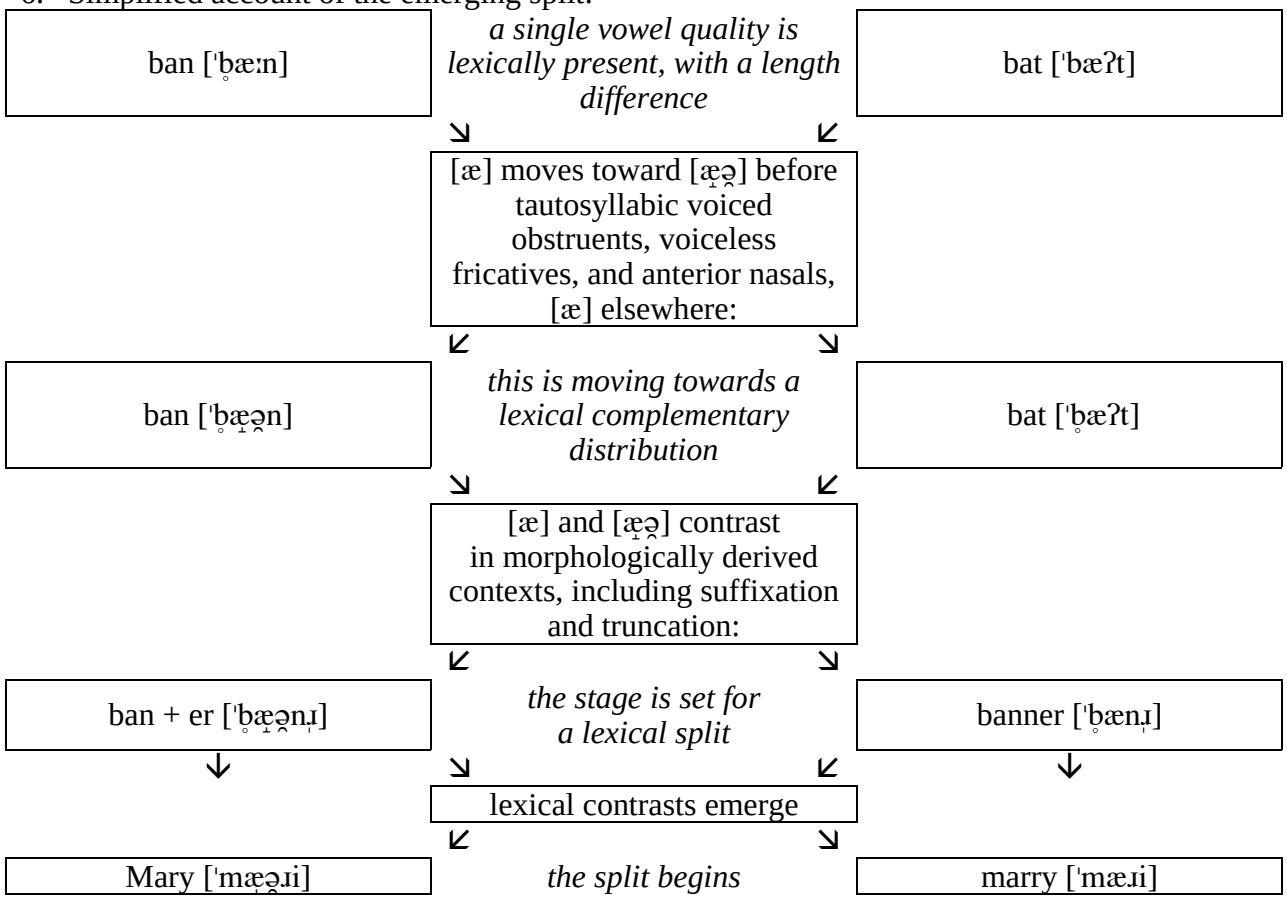
Base: [ˈd̟ʃænɪs]	IDENT-BT	æ-TENSING, etc.
a. ☞ [ˈd̟ʃæn]		*
b. [ˈd̟ʃæ̟n̪]	***!**	

- The correct generalization regarding the distribution of [æ] and [æ̟] in New York is that the two never alternate with each other. Instead, the relationship between [æ] and [æ̟] may be characterized as one of static complementary distribution in underived contexts

5. Derived contrasts:

	contrasts with
banner [ˈb̥ænɻ] (pennant)	banner (ban+er) [ˈb̥æ̱ɐ̯nɻ] (one who bans)
adder [ˈædɻ] (species of snake)	adder (add+er) [ˈæ̱ɐ̯dɻ] (one who adds)
have [ˈhæv̥]	halve [ˈhæ̱ɐ̯v̥] (denominal of ‘half’)
Harry [ˈhæɹi] truncates to Har- [ˈhæɹ]	hairy [ˈhæ̱ɐ̯ɹi] hair [ˈhæ̱ɐ̯ɹ]
camera [ˈkʰæmɹə] truncates to (steady-) cam [ˈkʰæm]	Camden [ˈkʰæ̱ɐ̯mdn̩] cam (-engine) [ˈkʰæ̱ɐ̯m]
Larry [ˈlæɹi] truncates to Lar- [ˈlæɹ]	 lair [ˈlæ̱ɐ̯ɹ]
Janice truncates to Jan- [ˈd̥ʃæn]	Janny [ˈd̥ʃæ̱ɐ̯ni] (from “Jan”) Jan (full name) [ˈd̥ʃæ̱ɐ̯n]
Cabbott [ˈkʰæbət] truncates to Cab- (Calloway) [ˈkʰæb̥]	cabbie [ˈkʰæ̱ɐ̯bi] cab [ˈkʰæ̱ɐ̯b̥]
Marilyn [ˈmæɹələn] truncates to Mar- [ˈmæɹ]	Mary [ˈmæ̱ɐ̯ɹi] truncates to Mar- [ˈmæ̱ɐ̯ɹ]

6. Simplified account of the emerging split:



- There is no *active* relationship between the two vowels; there are no actively imposed phonotactic constraints by which alternations arise as a consequence of morphological derivation, truncatory or otherwise.

- In fact, non-identity upon truncation is the obvious and well-attested result when the relevant phonological relationship is dynamic.

7.

	allophonically alternates with	we don't see	because X~Y is phonologically *active*
Patricia [pʰəˈtʃ̬ɹɪʃə]	Pat- [ˈpʰæʔ]	*[ˈpʰætʰ] *[ˈpʰətʰ] *[ˈpʰəʔ]	tʰ ~ ʔ citation [ˌsajˈtʰejʃn̩]- cite [ˈsajʔ] ə ~ æ schema [ˈskiməˌ] - schematic [skəˈmæɾɪʔk] grammar [ˈkɹæmɹ̩] – [kɹəˈmæɾɪkɬ̩]
Cabbott [ˈkʰæbət]	Cab- [ˈkʰæb̥]	*[ˈkʰæb]	b ~ b̥ clubbing [ˈkl̥ʌbɪŋ] - club [ˈkl̥ʌb̥]
Melanie [ˈmɛləni] Philip [ˈfɪləp]	Mel- [ˈmɛɬ] Phil- [ˈfɬ]	*[ˈmɛl] *[ˈfɪl]	l ~ɬ falling [ˈfɔliŋ] - fall [ˈfɔɬ]

8. a.

Janice [ˈd̥ʃænɪs] + truncation	D-PHONO	S-PHONO *[æ] ~ [æ̝̈ə̯]
☞[ˈd̥ʃæn]		
[ˈd̥ʃæ̝̈ə̯n]		*

b.

Philip [ˈfɪləp] + truncation	D-PHONO [lV] ~ [Vɬ]	S-PHONO
☞[ˈfɬ]		
[ˈfɪl]	*	

Akan Reduplication

(Schachter and Fromkin 1968, McCarthy and Prince 1995)

9. /kɛ/ → [tçɛ] divide
   /ɡɛ/ → [dʒɛ] receive
   /wi/ → [ɥi] nibble
   /hɪ/ → [çɪ] border

- Marantz (1982): there are no cases in Akan of velar-palatal alternation.

- Akan has a process of partial reduplication in which a root-initial syllable is copied with prespecified vowel height.

1. [si–siʔ] stand [bu–bu(ʔ)] bend
   [fɪ–fɪʔ] vomit [sʊ–sʊ(ʔ)] carry on the head
   [si–seʔ] say [su–soʔ] seize
   [sɪ–sɛʔ] resemble [sʊ–sɔʔ] light

- The lexical distributional generalization is "violated" in just this instance: upon reduplication, velars (and [h]) are free to precede the front vowel.

2. [ki–kaʔ] bite (*[tçi–kaʔ])
   [hɪ-hawʔ] trouble (*[çɪ-hawʔ])

- Note especially that it is exactly due to this lack of alternation that *over*-application is not found here (*[tçi–tça?], *[çɪ-çawʔ]).

- Identity *per se* does not seem to be the driving force behind the maintenance of velars in reduplicants, but instead, it is the static nature of the phonotactic itself.

0.

[kaʔ] base for "bite"	D-PHONO	S-PHONO *[k] ~ [tç]
☞[ki–kaʔ]		
[tçi–kaʔ]		*
[tçi–tçaʔ]		**

Madurese Reduplication

(Stevens 1968, McCarthy and Prince 1995)

0. Nasalization and Reduplication in Madurese

	/neat/	→	[j̃ãt-nẽj̃ãt]	intentions
	/moa/	→	[w̃ã-mõw̃ã]	faces
	/maen–an/	→	[ẽn-mã(ʔ)ẽn-ãn]	toys
	/ŋ-soon/	→	[ɔ̃n-nɔ̃ʔɔ̃n]	request (verb)
cf.	/soon/	→	[ɔn-sɔʔɔn]	request (noun)

- Upon reduplication in Madurese, nasal vowels find themselves in a context in which they are otherwise *never* found, either morpheme-internally or upon derivation, that is, without a preceding nasal stop. Since there are no alternations *in this context*, such vowels copy from the base, and no actively imposed phonotactic constraint exists to alter them. To fully clarify, upon copy of the final syllable, nasality finds itself present word-initially, without a preceding nasal stop. As copied nasality (and *only copied nasality*, but not other nasalized vocoids) finds itself in a context where there are *never alternations* triggered by leftward nasals which induce its presence or absence, there is no reason for alternation to be induced here.

1.

Nasality on this morpheme engages in alternation, due to the presence or absence of leftward nasality	[sɔ̲ʔɔ̲n] - [n+ɔ̲̃ʔɔ̲̃n]
Nasality on this morpheme in not sensitive to the presence or absence of leftward nasality; it is nasalized in either case	[ɔ̲̃n+nɔ̃ʔɔ̃n]

2.

base: [nẽj̃ãt]	D-PHONO	S-PHONO *[(non-nasals)…Ṽ] ~ [(non-nasals)…V]
☞[j̃ãt-nẽj̃ãt]		
[jat-nẽj̃ãt]		*
[jat-nẽjat]		**

Malay Reduplication

(Onn 1976, repeated in McCarthy and Prince 1995)

3.	hamə	ɦãmə-ɦãmə	‘germ/germs’
	waŋ̰i	wãŋ̰i-wãŋ̰i	‘fragrant/(intensified)’
	aŋãn	ãŋãn-ãŋãn	‘reverie/ambition’
	aŋẽn	ãŋẽn-ãŋẽn	‘wind/unconfirmed news’

4. i. base: waŋ̰i
   ii. copy: waŋ̰i-waŋ̰i
   iii. spread: waŋ̰i-wãŋ̰i
   iv. copy: wãŋ̰i-wãŋ̰i

- In the non-serial approach of optimality theory, once again, overapplication is subsumed under the high ranking of the BR identity constraint, in conjunction with various phonotactic and faithfulness constraints on the distribution of nasality.

1.

/waŋi – RED/	IDENT-BR(nas)	*NV$_{oral}$	*V$_{nas}$	IDENT-IO(nas)
a. ☞ wãŋ̰i-wãŋ̰i			******	***
b. waŋ̰i-waŋ̰i		* !	**	*
c. waŋ̰i-wãŋ̰i	** !		****	*

- But there is no principled optimality-theoretic reason why underapplication (*[waŋ̰i-waŋ̰i]) is not found, nor for that matter, is there a principled reason why BR identity should be active at all here (*[waŋ̰i-wãŋ̰i]).

1.

early form:	nasality spreads rightward:	the pattern conforms with other reduplicated forms:
**[waŋ̰i-waŋ̰i]	*[waŋ̰i-wãŋ̰i]	[wãŋ̰i-wãŋ̰i]

1.

base: [waŋ̰i]	D-PHONO *[NV]	S-PHONO *[(non-nasals)…Ṽ] ~ [(non-nasals)…V]
☞[wãŋ̰i-wãŋ̰i]		
[waŋ̰i-wãŋ̰i]		*
[waŋ̰i-waŋ̰i]	*	*
[wãŋ̰i-waŋ̰i]	*	

Other patterns, other explanations

Japanese Reduplication (Kim 1999)

- Mimetic reduplication does not engage in elsewhere-attested [ɡ] - [ŋ] alternation.

1. ɡaɾa-ɡaɾa ‘rattle’ (*ɡaɾa-ŋaɾa)
   ɡeji-ɡeji ‘centipede’ (*ɡeji-ŋeki)
   ɡeɾa-ɡeɾa ‘laughing’ (*ɡeɾa-ŋeɾa)

- Alternation is found in bound forms:

2. stem + derivative suffix: sam-ŋaru verb. to be cold
   inflexives: tomodatʃi-ŋa friend-NOM
   stem + bound stem: doku-ŋa poison fang

- No alternation is found in free forms.

3. derivative prefix +stem: o-ɡeŋki healthy
   fu-ɡjoojoo misconduct
   fu-ɡjoogi bad manners
   fu-ɡookaku disqualification
   stem + free stem: kootoo-ɡakkoo high school
   nipːon-giŋkoo Bank of Japan
   sin-gidʒuku new technology

- Kim further reports, *pace* Murasugi (1988), that mimetic reduplication does not consist of two independent words, as the components cannot stand freely. Therefore, we should expect alternation to take place here. However, Kim further finds that the alternation is found at weaker morpheme boundaries, but not at stronger morpheme boundaries.

4. weaker boundaries: ɡe-ŋe lowest
   ɡa-ŋa rugged
   stronger boundaries: ɡuu-ɡuu snoring
   ɡoo-ɡoo strong windy sound
   ɡatsu-ɡatsu starving

- Kim concludes that identity here is a consequence of the strong boundary between copy and base, and has nothing to do with BR identity.

Southern Paiute Reduplication
(Gurevich 1999, 2000)

- In Southern Paiute word initial [w] is realized as [ŋʷ] intervocalically if it finds itself in such an environment upon morphological concatenation (data [and transcriptions] are from Sapir 1930).

1. Southern Paiute [w] ~ [ŋʷ] Alternations:

waʼaŋi	tiˑˈŋʷaʼaŋi	to shout/to give a good shout
waix̯a-	nɪaˑˈvɪŋʷaix̯apˑɪ	to have a council/council (of chiefs)

- However, if [w] ends up in intervocalic position due to reduplication, it does not alternate with [ŋʷ].

2. Southern Paiute Reduplication

waɣi-	wawaˈxˑɪpi̯ɣa‘	several enter/all entered
wi̯nˑnai-	wi̯wi̯ˈnʼnai-	to throw/several throw down
wi̯nɪ-	wi̯wi̯nʼni̯qˑu-	to stand/to stand (iterative)

- McCarthy and Prince (1995) argue that [w]'s alternation with [ŋʷ] is blocked here in order to maintain base-reduplicant identity. However, Gurevich notes that upon reduplication, such [w]s are geminated, and thus are not strictly intervocalic: VwwV. Since the are not in the proper context for alternation, Gurevich shows that the alternation is not *blocked* here, but simply that it is never *triggered* here; BR identity thus has no bearing on the issue.

- McCarthy and Prince provide one form that seems to back-copy derived nasality.

3. wi̯nɪ- ya- ŋʷɪˈ- ŋʷi̯nɪx̯a‘ ‘to stand/while standing and holding’

- Here, the copied consonant finds itself in intervocalic position, and thus appears as [ŋʷ]. Now, in order to maintain BR identity, the base itself appears with [ŋʷ], and thus nasality seems to copy back to the stem. However, Gurevich reports that the form in question is not reduplicative in nature, but instead is a compound of two distinct roots.

4. yaŋʷɪ + wi̯nɪ ‘to carry’ + ‘to stand’

- As root-initial [w] finds itself in intervocalic position upon compounding, the phonotactic condition induces the expected alternation. Since the form is a simple compound of distinct morphemes, BR identity plays no role whatsoever in its patterning.

- In sum, Gurevich shows that there remains no evidence at all in favor of BR identity constraints in Southern Paiute reduplication.

Conclusion

- Data from patterns of truncation and reduplication suggest that an approach to phonology which recognizes the distinction between static phonotactics and dynamically-imposed phonotactics is able to, in essence, explain away certain problems that remain ill-understood within the purview of standard structuralist and generative theories. Thus, in standard approaches, whether regular-, over- or under-application is found in any given reduplication or truncation process cannot be predicted; any of these strategies might be observed, with BR or BT identity constraints being higher-ranked only when identity is indeed observed, and lower-ranked in cases of non-identity. Instead, upon recognizing the dynamic versus static relations among sounds, and incorporating internal reconstructive hypotheses which these morphological processes suggest, a theory of reduplication and truncation is more accurately constrained, more accurately predictive, and more readily testable.

References

Archangeli, Diana (1984). Underspecification in Yawelmani phonology and morphology. Ph.D. Dissertation, Massachusetts Institute of Technology.

___ (1988). Aspects of underspecification theory. Phonology 5:183-208.

Aronoff, Mark (1988). Head operations and strata in reduplication: a linear treatment. Yearbook of Morphology 1:1-15.

Beckman, Jill N., Laura Walsh Dickey, and Suzanne Urbanczyk, eds. (1995). Papers in optimality theory. University of Massachusetts Occasional Papers 18, GLSA : UMass, Amherst.

Benua, Laura (1995). Identity effects in morphological truncation. In Jill N. Beckman et al., eds.

Bloch, Bernard, and George L. Trager. (1942). Outline of linguistic analysis. Linguistic Society of America, Waverly Press : Baltimore.

Choi, Han-Sook (1999). Klamath reduplication. Manuscript., UIUC.

Chomsky, Noam, and Morris Halle. (1968). The sound pattern of English. New York: Harper & Row.

Churchyard, Henry (1998). (untitled internet critique of Laura Benua's analysis of Tiberian Hebrew as it appears in her 1997 UMass dissertation).

Frisch, Stefan (1996). Similarity, frequency, and constraint interaction in phonology. Ph.D. dissertation, Northwestern University.

Frisch, Stefan, Michael Broe, and Janet B. Pierrehumbert (1997). Similarity and phonotactics in Arabic. Manuscript, Northwestern University.

Frisch, Stefan (1999) The psychological reality fo OCP-place in Arabic. Manuscript, University of Michigan, Lernout and Hauspie Speech Products, Inc.

Gurevich, Naomi (To appear). Reduplication in Southern Paiute and correspondence theory. Proceedings of WCCFL 2000.

Halle, Morris (1962). Phonology in a generative grammar. Word 18:54-72.

Ito, Junko and Armin Mester (1996). Correspondence and compositionality. Rutgers Optimality Archive.

Kenstowicz, Michael and Charles Kisseberth (1977). Topics in phonological theory. New York: Academic Press.

___ (1979). Generative phonology. New York : Academic Press.

Kim, Heejin (1999) Reconsideration of the BR-Identity constraint in Japanese reduplication. Manuscript, UIUC.

Kiparsky, Paul (1968). How abstract is phonology? in Osamu Fujimura, ed., Three dimensions of linguistic theory. Tokyo : Taikusha.

___ (1988). Phonological change. In F.J. Newmeyer, ed., Linguistics: the Cambridge series v.1, Foundations, 363-415.

___ (1996). The phonological basis of sound change, in J.A. Goldsmith, ed., The handbook of phonological theory. Cambridge MA : Blackwell.

Labov, W. (1981). Resolving the neogrammarian controversy. Language 57:267-308.

___ (1994). Principles of linguistic change, internal factors. Oxford, Blackwell.

MacWhinney, Brian (ed.), (1998). The emergence of language. Mahwah, New Jersey: Lawrence Erlbaum.

Marantz, Alec (1982). Re reduplication. Linguistic Inquiry 13:483-545.

McCarthy, John J., and Alan Prince (1993). Generalized alignment. Manuscript, University of Massachusetts, Amherst, and Rutgers University.

McCarthy, John J., and Alan S. Prince (1995). Faithfulness and reduplicative identity. In Jill N. Beckman et al., eds.

Munro, Pamela, and Peter John Benson (1973). Reduplication and rule ordering in Luiseño. Inernational Journal of American Linguistics 39:15-21.

Murasugi, Kumiko A. (1988). Lexical Phonology Approach to Rendaku and Velar Nasalization in Japanese. Cahiers-linguistiques-d'Ottawa:16, May, 53-80.

Orešnik, Janez (1978a). The age and importance of the modern Icelandic type *klifr*. The Nordic languages and modern linguistics 3, J. Weinstock, ed., reprinted in M. Pétursson, ed., Studies in the phonology and morphology of modern Icelandic: a selection of essays. Hamburg : H. Buske (1985).

Prieto, Monica (1999). Axininca Campa reduplication and correspondence theory. Manuscript, University of Illinois at Urbana-Champaign.

Sapir, Edward (1933; reprinted 1949) The psychological reality of phonemes. In D.G. Mandelbaum (ed.) Selected writings of Edward Sapir in language, culture, and personality. Berkeley: University of California Press.

Schachter, Paul and Victoria A. Fromkin (1968). A phonology of Akan: Akuapem, Asante, Fante. UCLA Working papers in phonetics 9.

Silverman, Daniel (1993). "Reduplication in Kihehe: the asymmetrical enforcement of phonological and morphological principles," Linguistic Journal of Korea 18:165-178.

Silverman (to appear) Dynamic versus static constraints in prosodic morphology. Proceedings of WCCFL 2000.

Sproat, Richard, and Osamu Fujimura (1993). Allophonic variation in English /l/ and its implications for phonetic implementation. Journal of Phonetics 21:291-311.

Stevens, Alan M. (1968). Madurese phonology and morphology. New Haven: American Oriental Society.

Swadesh, Morris (1934). The phonemic principle. Language 10:117-129.

Trager, George L. (1930). The pronunciation of 'short *a*' in American Standard English. American Speech V:396-400.

___ (1934). What conditions limit variants of a phoneme? American Speech IX:313-315.
___ (1940). One phonemic entity becomes two: the case of ‘short a’. American Speech XV:255-258.
Twaddell, W.F. (1935). On defining the phoneme. Language monograph number 16.
Wilbur, Ronnie (1973). The phonology of reduplication. Ph.D. dissertation, University of Illinois at Urbana-Champaign.