

CHAPTER 6

SUMMARY AND CONCLUSIONS

6.1 Summary

In the preceding chapters, I have presented analyses of interaction of prominence and foot structure based on patterns of prosody-dependent segmental alternations, with special attention to mismatches between prominence assignment and foot assignment principles.

Detailed case studies of several cases of prosody-sensitive segmental alternations, as well as a survey of such phenomena mentioned in the literature were the empirical basis for this study.

I have had three main goals in this dissertation. First, I have offered an empirically motivated proposal that constituency and prominence have to be separate entities in the grammar, since some segmental alternations cannot be accounted for without reference to foot boundaries, while others require reference to prominence.

My second goal, especially in Chapters 3 and 4, was to investigate whether foot structure and prominence influence the same types of segmental alternations the same way. I have found that, even though both prosodic entities affect the same range of segmental phenomena (vowel harmony and consonant fortition/lenition are the most frequently affected alternations), there are slight differences in the way prominence-dependent, on the one hand, and foot structure-dependent phenomena, on the other hand, are influenced. These typological generalizations should be useful both to those who accept and those who have reservations about the formal proposal developed in this work.

Developing the formal proposal of representation of prominence and foot structure and their interaction has been my third goal: based on the empirical data that prosody-sensitive alternations provide, I have proposed that the relationship between foot structure and prominence should be mediated by violable constraints relating the two entities.

6.2 Typological Conclusions

Typologically, segmental alternations affected by prominence and those affected by foot structure have a lot in common: the phenomena most frequently influenced by prosody are all types of vowel harmony and lenition and fortition of consonants.

However, there appear to be several points of typological dissimilarity between segmental alternations that are dependent on prominence and the ones that depend on foot structure of a language:

Table 1

Alternations analyzed with reference to prominence	Alternations analyzed with reference to foot structure
Caused by position of prominence (the alternating segment is followed or preceded by a stressed vowel, or is itself a stressed vowel)	Phenomenon is caused by a more general requirement (e.g. all intervocalic consonants are lenis), but restricted by foot structure (foot-initial consonants do not lenite)
Can produce non-contrastive alternates	Produce contrastive alternates
Optional, can occur at one register or rate of speech, but not the other	Obligatory, occur at any rate of speech and register no optionality in reflexes of alternations
Can produce optional alternates (e.g. [t] can optionally alternate with either [d] or [ð])	Alternates are not optional (e.g. [t] can only alternate with [d])

Both the typological similarities and the dissimilarities can be understood if we accept the following two premises: (a) prominence has phonetic correlates, while foot boundaries do not; and (b) all the alternations we have discussed started out as dependent on prominence.

If all the alternations that are influenced by prosody were originally prominence-dependent, it stands to reason that the same types of phenomena (vowel harmony and distribution of lenis and fortis consonants in particular) would still be sensitive to prosody. Since prominence is actually *audible* to speakers, segmental alternations that accompany them can just be another (optional) cue for speakers to determine the position

of stress, much like flapping and aspiration works in American English. If, however, prominence assignment pattern is changed, the segmental alternation can either disappear, or become contrastive and serve as evidence for speakers to determine the foot structure of the language. Foot-dependent alternations, therefore, are diachronically the older ones that utilized the grammatical notion of foot.

6.3 Theoretical Conclusions

As any other theory, it will have to undergo changes as more facts are looked at. There are reasons for optimism that the proposed theory of how prominence and foot structure interact is a step in the right direction.

First, the theoretical proposal is fairly straightforward: prominence and foot structure are separate entities in the grammar; prominence is represented by gridmarks on an autosegmental tier, while foot structure **is not built on the gridmarks**, but is a function of syllables grouped into higher-level constituents; the relationship between prominence and foot boundaries is mediated by violable constraints.

Furthermore, the proposal utilizes many of the previously motivated constraints that relate stress to constituents such as Phonological Word or morpheme edges. The new group of constraints, which I call **Prominence Alignment** constraints, regulates the relationship between prominence and foot structure. There are only two types of Prominence Alignment constraints, the first of which requires that there be a foot edge for every mark on the metrical grid, and the second type requires that for every foot edge there be a gridmark:

- (1)
- a. $\text{ALIGN-}\{L,R\}(\text{FT}, \text{GRID}_n)$
 $\forall \text{Level}_n \text{ gridmark } \exists \text{ a } \{L, R\} \text{ foot edge such that it is aligned with the gridmark.}$
 - b. $\text{ALIGN-}\{L,R\}(\text{GRID}_n, \text{FT})$
 $\forall \{L, R\} \text{ foot edge } \exists \text{ a Level}_n \text{ gridmark such that it is aligned with that edge.}$

Mismatches between foot structure and prominence assignment in a given language are caused, under the present theory, when one of the constraints that refer to prominence but

not to foot structure outranks a Prominence Alignment constraint. The factorial typology generated by such ranking is substantiated by the case studies throughout this dissertation.

Finally, since the Prominence Alignment constraints are violable and rerankable, we have to answer the question of what our model predicts if constraints like WEIGHT-TO-STRESS or MAX(Grid) outrank constraints on footing instead of constraints on Prominence Alignment. In such cases, we should not expect any misalignment between foot structure and prominence, but the footing should deviate from a “perfect” required by footing constraints. Koniag Aluutiq provides an example of ranking like this.

Koniag Aluutiq has binary rhythm, and assigns the prominence to the even syllables. Foot-initial consonants show tensing:

- (2) a. (tu.qús.)(**k**ə.ŋá:.)qa
 ‘the one I am killing’
 b. (**m**éχ.)(ta.qán)¹
 ‘if she fetches water’

There are certain suffixes (Leer’s (1985) ‘post-bases’) that are sometimes called ‘accent-advancing’ in their description. In short, these suffixes show up with stress on their second syllable.

(3)²

- a. /-sinaq-/ Augmentative, ‘big N’

(paá.)ja	‘pie’	
(paá.)(ja-á)	‘my pie’	
(paá.)ja.-(si.ná:.)q-a	‘my big pie’	* (paá.)(ja.-si.)(ná.q-a)

- b. /-ŋinaɕ-/ ‘not until, only when’

(án.)ci	‘go out’	
(án.)ci-(ŋiná:.)-(quá)	‘not until I go out’	* (án.)(ci-ŋí:.)naɕ-(quá)

¹ Initial CVC syllables are heavy in Aluutiq.

² Morpheme breaks are mine, though easily inferred from Leer’s (1985) descriptions.

The segmental alternation, tensing, shows us how words are parsed into feet, and that when a suffix with inherent prominence is concatenated with a stem that is not completely parsed into feet by itself, the unparsed material from the stem is unparsed on the surface, in violation of the Parse(σ , Ft) constraint:

Tableau 1

* /paaja/-/sinaq/-/a/ 'my big pie'	ALIGN-R (Lev _n Grid, Ft)	MAX(Grid)	PARSE(σ , Ft)
☞ a.(paá.)ja.-(si.ná:.)q-a			**
b.(paá.)(ja.-sí.)(na.q-á:)		*!	
c.(paá.)(ja.-si.)(ná.q-a)	*!		

The winning candidate (a) does not have any violations of the Prominence Alignment constraint (all its gridmarks are aligned with the right edge of a foot, or MAX(Grid) violations (the underlying gridmark shows up on the surface), and even though it violates lower-ranking footing constraint PARSE(σ , Ft), it still emerges as optimal.

The example above shows us that reranking Prominence Alignment constraints with respect to constraint(s) on footing does not overgenerate patterns that exist languages, but rather accounts for cases where there is no mismatch between prominence assignment and foot parsing.

I conclude, therefore, that the model developed in this dissertation generates all types of interaction between foot structure and prominence attested and does not generate unattested patterns.

6.4 Issues for Further Investigation

This thesis leaves quite a few issues that call for further investigation, ways in which the theory can be extended. The most obvious one is the question of how segmental alternation can inform us on metrical constituency beyond Phonological Word. Following work of Selkirk (1984, 1986) and Truckenbrodt (1995, 1999, 2007), among others, we can explore what segmental alternations tell us about interaction between phonological and syntactic domains.

Another significant area of research I have not touched on, apart from the cursory discussion of Alutiiq (diachronically) and Huariapano in Chapter 4, is quantitative segmental alternations (and not the qualitative ones I have concentrated on in this work).

Finally, more work on phonetic and psycholinguistic aspects of prosody-dependent alternations promises to be interesting.

REFERENCES

- Ackerman, Farrell, and Irina Nikolaeva. 1997. Similar forms and different functions: the person/number paradigm in Western Armenian and Northern Ostyak. In Butt, Miriam, and Tracy Holloway-King (eds.) *Proceedings of the LFG 97 conference*, CSLI Publications: Stanford, California
- Akinbiyi Akinlabi, and Eno E. Urua. 2002. Foot Structure in the Ibibio Verb. *Journal of African Languages and Linguistics*, 23, pp 119-160
- Alderete, John Damian. 1998. *Morphologically Governed Accent in Optimality Theory*. Doctoral dissertation. University of Massachusetts, Amherst.
- Anderson, Stephen. 1988. Morphological change. In F. Newmeyer (ed.) *Linguistics: The Cambridge Survey*, Cambridge, UK: Cambridge University Press.
- Archangeli, Diana, and Douglas Pulleyblank. 1994. *Grounded Phonology*. Cambridge, Mass.: MIT Press.
- Baker, Brett (1998). Edge-Crispness: Segment to Mora Isomorphism. In Curtis, Emily, Lyle, James, and Webster, Gabriel (eds.), *The Proceedings of West Coast Conference in Formal Linguistics 16*. Stanford, CA: Center Study Language & Information, 1998, pp. 33-47
- Baković, Erik (1996a). Foot Harmony and Quantity Adjustments. ROA #168
- Baković, Erik. (1996b). Quantitative Adjustment in Yupik. In *The Proceedings of West Coast Conference in Formal Linguistics 16*. pp. 17-32. Stanford: CSLI publications.
- Barreteau, D. 1987. Du vocalisme en Tchadique. In: Barreteau, D. (ed.) *Colloques et Séminaires: Langues et Cultures dans le bassin du lac Tchad*. Paris: ORSTOM.
- Beckman, Jill N. 1998. *Positional Faithfulness*. Doctoral dissertation. University of Massachusetts, Amherst.
- Blevins, Juliette. 2004. *Evolutionary Phonology: The Emergence of Sound Patterns*. Cambridge University Press.
- Buller, Barbara, Ernest Buller and Daniel Everett. 1993. Stress placement, syllable structure, and minimality in Banawá. *International Journal of American Linguistics* 59. pp. 280-93.
- Calabrese, A. (1983). Metaphony in Salentino. *Rivista di Grammatica Generativa*
- Chierchia, Gennaro. 1982. An autosegmental theory of raddoppiamento. In James Pustejovsky and Peter Sells (eds). *Proceeding of the North East Linguistics Society (NELS) 12*. University of Massachusetts at Amherst: Graduate Linguistic Student Association, pp. 49-62.
- Christmas, R. and Christmas, J. 1975. *Kupia phonemic summary*. Kathmandu: Summer Institute of Linguistics and Institute of Nepal and Asian Studies, Tribhuvan University.
- Chung, S. (1983). Transderivational Relationships in Chamorro Phonology. *Language* 59, pp. 35-66
- Codrington, Reverend. 1885. *The Melanesian Languages*. Oxford: Clarendon Press.
- Crosswhite, Katherine Margaret. 1999. *Vowel Reduction in Optimality Theory*. Doctoral Dissertation, University of California, Los Angeles

- Davaev S. Z., and D. V. Tsygankin. 1970. *Фонетика мордовских (мокшанского и эрзянского) литературных языков* [Phonetics of Mordovian (Mokša and Erzja) literary languages]. Saransk.
- De Lacy, Paul V. 1997. *Prosodic Categorization*. MA Thesis. The University of Aukland.
- De Lacy, Paul V. 2002. *The Formal Expression of Markedness*. Doctoral dissertation, University of Massachusetts Amherst.
- De Lacy, Paul V. 2004. Markedness Conflation in Optimality Theory. *Phonology* 21, pp. 1-55
- Delilkan, Ann. 2002. *Fusion and Other Segmental Processes in Malay: The Crucial Role of Prosody*. Doctoral dissertation. New York University.
- Dobrovolsky, Michael. 1999. The phonetics of Chuvash stress: implications for phonology. *Proceedings of the 14th International Conference of Phonetic Sciences*: 539-42.
- Ebert, K. 1974. Partial vowel harmony in Kera. *Studies in African Linguistics, Supplement 5*, pp 75-80.
- Elenbaas, Nine. 1999. *A Unified Account of Binary and Ternary Stress, considerations from Sentani and Finnish*. PhD Thesis, Utrecht University.
- Eñías-Ulloa, José. 2005. Variable syllable weight and quantity–insensitive allomorphy in Shipibo. In Leah Bateman and Cherlon Ussery (eds.), *Proceedings of the North East Linguistic Society (NELS) 35*. Amherst, MA: GLSA.
- Essien, Okon E. 1990. *A Grammar of the Ibibio Language*. University Press Limited, Ibadan.
- Feoktistov, A. P. 1993. Мокшанский язык. [Mokša language]. In: *Languages of the World: Uralic Languages*. Moscow: Nauka
- Flemming, Edward. 1993. The Role of Metrical Structure in Segmental Rules. MA thesis, University of California, Los Angeles
- François, Alexandre. 2000. Vowel Shifting and Cloning in Mwothlap: Historical Explanation vs. Formal Description. In Marian Klamer (ed.), *Proceedings of the Seventh Annual Congress of Austronesian Formal Linguistics Association*. Vrije Universitet, Amsterdam, pp 49-68.
- González, Carolina. 2002. The Effect of Prosody on Glottal Stop Deletion in Capanahua. In Mako Hirotani (ed.), *Proceedings of the North East Linguistic Society (NELS)*.
- González, Carolina. 2003. The effect of stress and foot structure in consonantal processes. Doctoral dissertation. University of Southern California.
- Gordon, Matthew. 2000. Re-examining default-to-opposite stress. In: *Proceedings of Berkeley Linguistics Society, 26*, Berkeley, CA
- Gordon, Matthew. 2003. A typology of quantity-insensitive stress. *Natural Language and Linguistic Theory*.
- Gouskova, Maria. 2003. Deriving Economy: Syncope in Optimality Theory. Doctoral dissertation. University of Massachusetts at Amherst
- Greenberg, Joseph H. 1963. *The Languages of Africa*. The Hague: Mouton and Co.
- Gregores, Emma and Jorge A. Suárez. (1967). *A Description of Colloquial Guaraní*. The Hague: Mouton

- Gulya, János. 1966. *Eastern Ostyak Chrestomathy*. The Hague-Bloomington: Indiana University Press
- Halle, Morris, and Jean-Roger Vergnaud. 1981. Harmony processes. In W. Klein and W. Levelt, (eds.), *Crossing the Boundaries in Linguistics*, pp. 1-22. Dordrecht: Reidel
- Halle, Morris, and William Idsardi. 1995. General Properties of Stress and Metrical Structure. *The Handbook of Phonological Theory*. Ed. John A. Goldsmith. Cambridge, Mass.: Blackwell: 403-443.
- Hammond, Michael. 1982. Foot-domain Rules and Metrical Locality. *Proceedings of WCCFL 1*: 207-218.
- Hansson, Gunnar Olafur. 2001. *Theoretical and Typological Issues in Consonant Harmony*. Doctoral dissertation. University of California, Berkeley.
- Harris, John. 2003. Release the captive coda: The foot as a domain of phonetic interpretation. *Laboratory Phonology 6*, 103-129
- Harris, John and Urua, Eno A. 2001. Lenition degrades information: consonant allophony in Ibibio. *Speech, Hearing and Language: Work in Progress 13*:72-105
- Hayes, Bruce. 1989. Compensatory lengthening in moraic phonology. *Linguistic Inquiry 20*: 253-306
- Hayes, Bruce. 1995. *Metrical Stress Theory: Principles and Case Studies*. Chicago: The University of Chicago Press.
- Hewitt, Mark S. 1992. *Vertical Maximization and Metrical Theory*. Doctoral Dissertation. Brandeis University.
- Hewitt, Mark S. 1994. Deconstructing Foot Binariness in Koniag Alutiiq. [ROA 12]
- Hyde, Brett D. 2001. Metrical and Prosodic Structure in Optimality Theory. Doctoral Dissertation, Rutgers University.
- Itkonen, Erkki. 1955. Über die Betonungsverhältnisse in den finnisch-ugrischen Sprachen. *Acta Linguistica Academiae Scientiarum Hungaricae 5*: 21-34.
- Ivanov, I. G. & G. M. Tuzharov. 1970. *Северо-западное наречие марийского языка*. [Northwest dialect of Mari language], Joshkar-ola.
- Jacobson, Steven A. 1984. The stress conspiracy and stress-repelling bases in the Central Yup'ik and Siberian Yupik Eskimo languages. *International Journal of American Linguistics 50*, pp. 312-324
- Jacobson, Steven A. 1985. Siberian Yupik and Central Yupik prosody. In Michael Krauss (ed.) *Yupik Eskimo prosodic systems: descriptive and comparative studies*. Alaska Native Center, Fairbanks.
- Kager, René. 1996. On affix allomorphy and syllable counting. In: U. Kleinhenz (ed.), *Interfaces in phonology*. *Studia grammatica 41*. Berlin: Akademie Verlag. pp. 155-171.
- Kasarhéroú, Jacqueline. 1962. Les changements vocaliques de trois préfixes en motlav. *Te reo 5*, 32-34
- Kaufman, Elaine M. 1968. *Ibibio Grammar*. Doctoral dissertation. University of California, Los Angeles.
- Kaun, Abigail Rhoades. 1995. *The Typology of Rounding Harmony: An Optimality Theoretic Approach*. Doctoral dissertation. University of California, Los Angeles.
- Kenstowicz, Michael. 1994. *Phonology in Generative Grammar*. Oxford: Blackwell Publications.

- Kenstowicz, Michael. 1994. Sonority Driven Stress. ROA-33
- Kiparsky, Paul. 1982. *Explanation in Phonology*. Publications in Language Sciences: 4. Dordrecht ; Cinnaminson, N.J. : Foris Publications.
- Kiparsky, Paul. 2001. *Paradigms and opacity*. Stanford, Calif. : CSLI Publications.
- Kiparsky, Paul. 2005. *Universals constrain change; change results in typological generalizations*. Ms, Stanford University.
- Kiparsky, Paul. 2006. The Amphichronic Program vs. Evolutionary Phonology. *Theoretical Linguistics* 32. pp. 217-236.
- Kirchner, Robert. 1998. An effort-based approach to consonant lenition. Doctoral dissertation, University of California, Los Angeles
- Kirchner, Robert. 2000. Geminate Inalterability and Lenition. *Language*, 76:3, pp. 509-545
- Kovgan, Elena. 1991. *Причастно–определятельные конструкции в северных диалектах хантыйского языка. [Participial relative constructions in northern dialects of Khanty]*. Doctoral dissertation. Novosibirskij Gosudarstvennyj Universitet.
- Lauriault, James. 1948. Alternate-mora timing in Shipibo. *International Journal of American Linguistics* 14, 22-24
- Loos, Eugene Emil. (1969). *The Phonology of Capanahua and its Grammatical Basis*. Doctoral dissertation, University of Texas, Austin. University of Oklahoma: Summer Institute of Linguistics Publication, 20
- Loos, Eugene Emil. 1999. The Amazonian Language. In: R. M. W. Dixon and Alexandra Aikhenvald (eds.), Cambridge: CUP, pp. 227-250.
- Lunt, Horace. (1973). Remarks on nasality: The case of Guaraní. In Stephen R. Anderson and Paul Kiparsky (eds.) *A Festschrift for Morris Halle*, pp. 131-139. New York: Holt, Reinhart and Winston.
- Majors, Tivoli Jane. 1998. *Stress Dependent Harmony: Phonetic Origins and Phonological Analysis*. Doctoral dissertation. University of Texas, Austin.
- McCarthy, John and Alan Prince. 1990. Foot and Word in Prosodic Morphology: The Arabic Broken Plural. *Natural Language and Linguistic Theory*, pp. 209-283.
- McCarthy, John and Alan Prince. 1995. Prosodic Morphology. In: Goldsmith, J. (ed.) *The Handbook of Phonological Theory*. Blackwell.
- McCarthy, John. 2007. *Hidden Generalizations: Phonological Opacity in Optimality Theory*. London, Oakville: Equinox
- Morén, Bruce Timothy. 1999. *Distinctiveness, Coercion and Sonority: A Unified Theory of Weight*. Doctoral dissertation. University of Maryland, College Park.
- Nespor, Marina and Irene Vogel. 1986. *Prosodic Phonology*. Foris, Dordrecht.
- Nikolaeva, Irina. 1995. *Обдорский диалект хантыйского языка. [Obdorsk dialect of Khanty]*. Mitteilungen der Societas Uralo-Altaica 15. Hamburg.
- Nivens, Richard. 1992. A lexical phonology of West Tarangan. In Donald A. Burquest and Wyn D. Laidig, (eds.) *Phonological Studies in Four Languages of Maluku*, pp. 127-227. Summer Institute of Linguistics, University of Texas, Arlington and Pattimura University.

- Orgun, C. O. 1995. Correspondence and identity constraints in two-level Optimality Theory. In: J. Camacho, L. Choueiri, and M. Watanabe (eds.), *Proceedings of West Coast Conference in Formal Linguistics 14*, pp. 399-413. Stanford: CSLI
- Parker, Steve. 1994. Coda epenthesis in Huariapano. *International Journal of American Linguistics* 60. 95-119.
- Parker, Steve. 1998. *Disjoint metrical tiers and positional markedness and Huariapano*. Generals Paper, University of Massachusetts, Amherst.
- Paster, Mary. 2005. Subcategorization vs. Output Optimization in Syllable-Counting Allomorphy. In John Alderete, Chung-Hye Han and Alexei Kochetov (eds.), *Proceedings of the West Coast Conference in Formal Linguistics 24*, Simon Fraser University, Vancouver, Canada. Cascadia Press.
- Pearce, Mary. 1998. *Consonants and Tone in Kera (Chadic)*. *Journal of West African Languages*, pp. 33-70
- Pearce, Mary. 2003. Vowel Harmony in Kera (Chadic). MA Thesis. University College London.
- Pearce, Mary. 2006. The interaction between metrical feet and tone in Kera. *Phonology* 23, 259-286
- Prince, Alan. 1980. A Metrical Theory of Estonian Quantity. *Linguistic Inquiry*, pp. 511-562
- Rice, Curtis Calvin. 1992. *Binarity and Ternarity in Metrical Theory: Parametric Extensions*. Doctoral dissertation. University of Texas, Austin.
- Rivas, Alberto M. (1975). Nasalization in Guaraní. *Proceedings of NELS 5*, Ellen Kaisse and Jorger Hankamer (eds.), pp. 134-143. Harvard University.
- Ristinen, Elain. 1960. *An East Cheremis phonology*. Bloomington: Indiana University Press.
- Ross, Malcolm. 1998. Proto Oceanic phonology and morphology. In: M. Ross, A. Pawley, and M. Osmond (eds.) *The lexicon of Proto Oceanic. Vol. 1: Material culture*. Canberra: Pacific Linguistics, C-152, pp 15-35
- Sebeok, Thomas and Francis Ingemann. 1961. *An Eastern Cheremis manual [Uralic and Altaic Series 5]*. Bloomington: Indiana University Press.
- Schteinitz, V. K. 1937. Хантыйский (остяцкий) язык. [Khanty (Ostyak) language]. In *Языки и письменность народов севера*. Leningrad, pp. 193-227.
- Selkirk, Elisabeth. 1984. *Phonology and syntax: The relation between sound and structure*. Cambridge, Mass.: MIT Press.
- Selkirk, Elisabeth. 1986. On derived domains in sentence phonology. *Phonology Yearbook* 3, pp. 371-405
- Shin, Mun-Seon. 2001. *Rules, Constraints and Prosodic Conditions in Phonology*. Doctoral dissertation. University of Wisconsin-Madison
- Tereshkin, N. I. 1961. *Очерки диалектов хантыйского языка: Ваховский диалект*. [Esseys on dialects of Khanty: Vach dialect]. Leningrad.
- Topintzi, Nina. 2008. On the existence of moraic onset geminates. *Natural Language and Linguistic Theory* 26, pp.147-184.
- Truckenbrodt, Hubert. 1995. *Phonological Phrases: Their relation to syntax, focus, and prominence*. Doctoral dissertation. Massachusetts Institute of Technology.
- Truckenbrodt, Hubert. 1999. On the Relation between Syntactic Phrases and Phonological Phrases. *Linguistic Inquiry*, 30:2 (Spring), pp.219-255

- Truckenbrodt, Hubert. 2007. The syntax-phonology interface. In *The Cambridge Handbook of Phonology*, Paul de Lacy (ed.), Cambridge: CUP, pp. 435-456.
- Urua, Eno E. 1999. Length and syllable weight in Ibibio. *Studies in African Linguistics* 28 (2): 241-266
- Walker, Rachel Leah. 1996. *Prominence-driven stress*. ms. University of California, Santa Cruz. [ROA-172, <http://rucss.rutgers.edu/roa.html>]
- Walker, Rachel Leah. 1998. *Nasalization, Neutral Segments, and Opacity Effects*. Doctoral dissertation. University of California, Santa Cruz.
- Wolff, E. 1981. Reconstructing vowels in Central Chadic. In Meyer-Bahlburg, H. and E. Wolff (eds.), *Studies in Chadic and Afroasiatic Linguistics*. Hamburg: Helmut Buske Verlag.
- Woodbury, A. 1987. Meaningful phonological processes: A consideration of Central Alaska Yupik Eskimo prosody. *Language*, 63:685-740
- Zec, Draga. 1988. *Sonority Constraints on Prosodic Structure*. Doctoral dissertation. Stanford University.
- Zoll, Cheryl. 1997. *Conflicting Directionality*. *Phonology* 14: 263-286
- Životikov, P. K. 1942. *Очерк грамматики хантыйского языка (среднеобский диалект)*. [An Essey on Grammar of Khanty (Middle Ob' dialect)]. Khanty-Mansijsk.