

A subsegmental correspondence approach to contour tone (dis)harmony patterns

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0 INTRODUCTION

- Long-standing question: are “contour tones” (e.g. LH, 35) single units or sequences?
- Related long-standing question: are “contour segments” (e.g. *nd, f*) single units or sequences?
- These questions derive from behavioral duality:
 - Contours sometimes behave as units,
 - and at other times their parts act independently.

This talk: ABC+Q

- This paper: Q-theory, a new subdivided, *quantized* representation that allows contour duality to be referenced.
- Embedding Q-theory into Agreement by Correspondence (ABC+Q) yields a grammatical theory of the behavior of contours.
- ABC+Q marries the representational strength of previous approaches (e.g., Autosegmental Phonology, Aperture Theory, Articulatory Phonology) with the locality and similarity design features of ABC, to capture the unity and internal complexity of segments.
- Focus of this paper: tone (but analysis applicable to segments as well; see Inkelas & Shih 2013a)
- Advantage: reunites treatment of tone and segmental phonology.

1 Q-THEORY: QUANTIZED SEGMENTAL SUBDIVISIONS

- (1) Segments are subdivided into temporally-ordered, quantized subsegments:

Segment → subsegments	Vowels with triple tone contours:	
Q → Q(q ¹ q ² q ³)	V(à á à)	Mende <i>mbà</i> ˆ ‘companion’ (Leben 1987)
	V(í î ï)	Changzhi <i>ti₅₃₅</i> ‘bottom’ (Duanmu 1994)
	V(é è ē)	Iau <i>bé</i> ˆ ‘tree fern’ (Hyman 2009)
	cf. Segmental contours (Sagey 1986):	
	C(n ¹ t ² ʃ ³)	<i>ndʒ</i> (prenasalized affricate)
	C(t ¹ ʃ ² h ³)	<i>tʃʰ</i> (aspirated affricate)
	V(ɛ ¹ a ² ɪ ³)	Romanian <i>ci_{ɛai}</i> ‘read.IND.IMPERF.2SG’ (Dindelegan 2013)

- (2) Quantized subsegments *q* are coarsely phonetically grounded:

q¹ = Onset, q² = Target, q³ = Release (cf. “landmarks” in Gafos 2002: 271;
‘tonal complexes’ of Akinlabi & Liberman 2001)

(3) Maximum of 3 q subsegments per Q

- 2- and 3-tone contours occur on single Q .
- 4-tone contours (e.g., LHLH or HLHL) are typologically rare (e.g., Qiyang: see Hu 2011; or Korean *aegyo* markers; Moon, in prep) and apparently accompanied by phonological lengthening of the host segment (Zhang 2001, et seq.).
- 2- and 3- q segments occur, but not 4- q segments. (Possible exception: Mazatec [ⁿtʰ]: Pike & Pike 1947; Steriade 1994; but cf. Golston & Kehrein 1998 for an alternative analysis.)

(4) More evidence for tripartite q structure

- In Dinka, alignment of HL tonal contours are contrastive (Remijsen 2013)

Fall: [+late-aligned] HL contour on vowel
 Low^{Fall}: [-late-aligned] HL contour on vowel

- In terms of Q theory: Fall = Q(H¹ H² L³); Low^{Fall} = Q(H¹ L² L³)

(5) Points of contact with Autosegmental Theory (Leben 1973; Goldsmith 1976), Articulatory Phonology (Browman and Goldstein 1989, et seq.; Gafos 2002; a.o.), Aperture Theory (Steriade 1993, 1994), proposals for multiple docking sites on TBU (e.g., Morén and Zsiga 2006).

Aperture Theory:

A ₀ A _{max}	A _{max}
nasal oral	nasal
/ ⁿ d/	/ã/

- Similar to Aperture Theory and Articulatory Phonology in positing phonetically-grounded temporal subdivisions with different featural makeup for (some) segments.
- Similar to Autosegmental Theory and Aperture Theory in allowing independent featural representations for the different portions (subsegments) of a single segment.

(6) Some differences:

- Notion of ‘segment’ explicit in Q theory (vs. Aperture Theory).
- All segments, not just obvious contour segments, have subdivisions (q subsegments) in Q theory (vs. Aperture, Autosegmental Theory)
- Maximum number of subdivisions is 3 in Q theory (vs. 2 in Aperture Theory).
- q subsegments are featurally uniform: no multiple associations (vs. Autosegmental Theory).
- Q theory covers vowels as well as consonants—and tone as well as ‘segmental’ features.

2 BEHAVIOR OF CONTOURS: A WORKING TYPOLOGY

(7) Examples of tone contour duality:

	Whole segment: Q	Subsegment: q
<i>Harmony</i>	a. Changzhi whole contour tone copying (Duanmu 1994, a.o.): /kuə ₂₁₃ -tə ² ₅₃₅ / → [kuə ₂₁₃ -tə ² ₂₁₃] ‘pan, dim.’	c. Yoruba partial assimilation (Akinlabi and Liberman 2001): /rárà/ → [rárâ] ‘elegy’
<i>Disharmony</i>	b. Pingyao: whole contour dissimilation (Chen 1992, Yip 2002): /hai ₃₅ bing ₃₅ / → [hai ₅₃ bing ₃₅] ‘become ill’	d. Tianjin: subsegments dissimilate across σ boundary (Chen 1985; a.o.): /fei _L -ji _L / → [fei _{LH} .ji _L] ‘airplane’

→ *Conclusion: schizoid behavior:*

- Contours act as units
- Contours don't act as units: their constituent subsegmental *q*'s interact with one another

(8) Analogs to (7) in the segmental domain (see Inkelas and Shih 2013a):

	Whole segment: <i>Q</i>	Subsegment: <i>q</i>
<i>Harmony</i>	a. Ngbaka: ^N C can't co-occur with N or C, but ^N C... ^N C, N...C etc. are OK; nasals agree in overall contour status (Hansson 2001, Rose & Walker 2004) [^m bεè ^m bε] 'snail', [nanè] 'today'; *[^m bεè ^m ε]	c. Samala (Ineseño Chumash): sibilant subsegments agree in anteriority (Applegate 1972; Hansson 2001) /s-api-t ^h o-it/ → [ʃapit ^h olit] 'I have a stroke of good luck'
<i>Disharmony</i>	c. Gurindji: ^N C contours dissimilate (McConvell 2000, Rose & Walker 2004) /wɪpɲi-ŋka/ → [wɪpɲika] 'spring-LOC'	d. Basque: stop/affricate dissimilates to fricative preceding a stop (Hualde 1987) /hits + tegi/ → [histegi] 'dictionary'

3 THEORETICAL APPROACHES TO CONTOURS IN HARMONY

Two approaches to harmony and contours:

(9) Autosegmental representations: driven by individual features or feature bundles

- A feature or tone spreads to adjacent timing slots.
- Correctly predicts assimilation to create or be triggered by parts of contours.
- Has trouble with whole contour behavior (e.g., (7); Duanmu 1994; cf. Yip 1989). Contours are not units in standard autosegmental theory .

/C ^Y C ^V / → [C ^Y C ^V]	/C ^V C ^V / → [C ^V C ^V]
simple spreading easily produces partial assimilation (cf. (7c))	simple spreading cannot produce total assimilation of contours (cf. (7a))

(10) Agreement by Correspondence (ABC): original formulation is based on segments as units

- Corresponding local segment pairs of segments, under conditions of similarity and proximity (CORR-XX), are required to be identical (IDENT-XX) in some respect.
 - consonant harmony (Walker 2000; Hansson 2001; Rose and Walker 2004; a.o.)
 - vowel harmony (Sasa 2009; Walker 2009; Rhodes 2010/2012; a.o.)
 - dissimilation (cf. Bennett 2013 (ABC but no similarity scales))
 - **tone** (esp. consonant tone interactions: Shih 2013)
- Correctly predicts whole segment (dis)harmony, including between contours.
- Has trouble with partial contour behavior. Partial assimilation does not produce overall segment identity, therefore won't satisfy identity constraints on corresponding segments.

$/C\acute{V}C\grave{V}/ \rightarrow [C\acute{V}C\hat{V}]$	$/C\hat{V}CV/ \rightarrow [C\hat{V}C\hat{V}]$
CVC \hat{V} does not satisfy CORR & IDENT	C \hat{V}_x C \hat{V}_x satisfies CORR, IDENT
segmental correspondence, segmental identity can't produce partial assimilation (cf. (7c))	segmental correspondence, segmental identity easily produce total assimilation (cf. (7a))

- (11) Needed: Theoretical framework where contours are accessible to operations in part *and* whole
 Proposal: ABC+Q (=ABC with enhanced representations)

4 QUANTIZED SEGMENTS IN HARMONY

4.1 Q (SEGMENTAL) CORRESPONDENCE

- ABC deals naturally with whole segments/contours participating in harmony.
- Correspondence and agreement targets segments, Q.

- (12) $Q_x(q\ q\ q) \dots Q_x(q\ q\ q) \dots$ Pair of corresponding segments
 CORR-Q($q\ q\ q$) \leftrightarrow Q($q\ q\ q$) *ABC constraint, establishes correspondence between whole segments meeting a certain threshold of similarity.**
Correspondence enforced locally on closest eligible pairs
 Ident-QQ-[F] *ABC constraint, enforces identity (in [F]) among corresponding segments.*

*Note of clarification: we follow Hansson 2001, Rose & Walker 2004 in assuming that each “Q” instantiates a natural class of segments, e.g. CORR-CC or CORR-VV or CORR-SS (“S” = sibilant); cf. McCarthy 2010, who uses a similar but more restrictive system in which “Q” can only instantiate the entire (consonant) inventory.

- (13) Changzhi: tone contours copy as unit (see Yip 1989; Bao 1990; data from Duanmu 1994) (= (7a))

a.	$/ku_{213} -t\acute{\alpha}_{535}/$	\rightarrow	$[ku_{213} -t\acute{\alpha}_{213}]$	‘pan-DIM’
b.	$/s\acute{\alpha}\eta_{24} -t\acute{\alpha}_{535}/$	\rightarrow	$[s\acute{\alpha}\eta_{24} -t\acute{\alpha}_{24}]$	‘rope-DIM’
c.	$/ti_{535} -t\acute{\alpha}_{535}/$	\rightarrow	$[ti_{535} -t\acute{\alpha}_{535}]$	‘bottom-DIM’
d.	$/k^h u_{44} -t\acute{\alpha}_{535}/$	\rightarrow	$[k^h u_{44} -t\acute{\alpha}_{44}]$	‘pants-DIM’
e.	$/t\acute{\alpha}u_{53} -t\acute{\alpha}_{535}/$	\rightarrow	$[t\acute{\alpha}u_{53} -t\acute{\alpha}_{53}]$	‘bean-DIM’

- (14) CORR-V \leftrightarrow V *Entire vowels correspond*
 IDENT-VV([tone] [tone] [tone]) *Corresponding vowels are tonally identical*
 IDENT-IO-V([tone] [tone] [tone]) *Vowels are tonally identical in input, output*

(15) /kuə₂₁₃ -tə²₅₃₅/ → [kuə₂₁₃ -tə²₂₁₃]

	/kuə ₂₁₃ -tə ² ₅₃₅ /	IDENT-VV-V([tone] [tone])	CORR-VV	IDENT-IO-V([tone] [tone])
<i>Correspondence, identity not enforced</i>	a. / V _x (2 1 3)...V _x (5 3 5) /	W1		L
<i>Correspondence, identity enforced</i>	☞ b. / V _x (2 1 3)...V _x (2 1 3) /			1
<i>No correspondence, identity not enforced</i>	c. / V _x (2 1 3)...V _y (5 3 5) /		W1	L

- Duanmu (1994) uses Changzhi to illustrate a distinction between copying versus harmony/spreading. In ABC, note that there is no formal distinction between these processes.

4.2 q (SUBSEGMENTAL) CORRESPONDENCE

(16) q_x...q_y.....*Pair of corresponding subsegments*

CORR-q↔q.....*ABC constraint, establishes correspondence between local pairs of q's meeting a certain similarity threshold*

Ident-qq-[F].....*ABC constraint, enforces identity (in [F]) among corresponding segments*

(17) Yoruba: partial assimilation creates contour tone (Akinlabi and Liberman 2001) (= (6c)). (For a similar tone pattern, see Chiquihuitlán Mazatec (Jamieson 1977; Yip 2002))

- a. H L → H HL /rárà/ → [rárá] ‘elegy’
- b. L H → L LH /àlá/ → [àlì] ‘dream’

(18) CORR-q[V] :σ: q[V].....*Vocalic q's across a syllable boundary must correspond*
 IDENT-qq-[tone].....*Corresponding q's should be tonally identical*

(19) /rárà/ → [rárá]

	/ V(H H H) ... V(L L L) /	IDENT-qq-[tone]	CORR-q[V]:σ:q[V]	IDENT-IO-q[tone]	
a.	V(H H H _x) ... V(L _x L L)	W1		L	<i>Correspondence, no identity</i>
☞ b.	V(H H H _x) ... V(H _x L L)			1	<i>Correspondence, identity</i>
c.	V(H H H) ... V(L L L)		W1	L	<i>No correspondence</i>
d.	V(H _x H _{xv} H _{vz}) ... V(H _{za} H _{ab} H _b)			W3	<i>Unnecessary correspondence</i>

- (20) Hakha-Lai partial contour tone agreement (Hyman and VanBik 2002). Adjacent halves of contours must agree across syllable boundaries (as realized after the proclitic *ka-* ‘my’).

a.	<u>LH</u> - <u>HL</u>	/thlaän-zuû/	→	[thlaän zuû]	‘grave beer’
	<u>HL</u> - <u>LH</u>	/tlaân-tsaän/	→	[tlaân tsaän]	‘mountain time’
	<u>L</u> - <u>LH</u>	/koom-tsaän/	→	[koom tsaän]	‘corn time’
	<u>HL</u> - <u>L</u>	/tlaân-saa/	→	[tlaân saa]	‘mountain animal’
	<u>L</u> - <u>L</u>	/koom-saa/	→	[koom saa]	‘corn animal’
b.	<u>HL</u> - <u>HL</u> → <u>HL</u> - <u>L</u>	/tlaân-zuû/	→	[tlaân zuu]	‘mountain beer’
	<u>L</u> - <u>HL</u> → <u>L</u> - <u>L</u>	/koom-zuû/	→	[koom zuu]	‘corn beer’
	<u>LH</u> - <u>LH</u> → <u>LH</u> - <u>HL</u>	/thlaän-tsaän/	→	[thlaän tsaän]	‘grave time’
	<u>LH</u> - <u>L</u> → <u>L</u> - <u>L</u>	/thlaän-saa/	→	[thlaän saa]	‘grave animal’

5 DISHARMONY

- ABC+Q analysis can extend to disharmony.
 - Bennett (2013): dissimilation occurs when correspondence is too costly.
 - e.g., violates a high-ranking constraint such as CC-Edge: corresponding segments may not be separated by a syllable boundary. (Or IDENT-XX)
- Tonal dissimilation occurs between *Q*’s and between *q*’s.

- (21) Tianjin whole contour *Q* dissimilation and partial contour *q* dissimilation (Chen 1985; Yip 1989: 163; 2002: 51, 179)

Adjacent whole tones (*Q*) **dissimilate** via contour simplification (a) or contour creation (b).
Adjacent subsegments (*q*) across a syllable boundary also **dissimilate**, by the same methods (b,c):

a.	LH.LH → H.LH	*HL.LH	/xi _{LH} /	→	[xi _H .lian _{LH}]	‘wash one’s face’
	HL.HL → L.HL	*LH.HL	/jing _{HL} /	→	[jing _L .zhong _{HL}]	‘net weight’
b.	L.L → LH.L	*HL.L,	/fei _L /	→	[fei _{LH} .ji _L]	‘airplane’
		*L.LH				
c.	HL.L → H.L					

- (22) Dissimilation analysis of Tianjin, à la Bennett 2013:

CORR-Q↔Q[tone]	Tonally identical segments correspond
QQ-Edge-(s)	Corresponding segments may not be in adjacent syllables
IDENT-QQ[tone]	Corresponding segments must be tonally identical
CORR-q:σ:q [tone]	(Adjacent) tonally identical subsegments across a syllable boundary must correspond
IDENT-qq[tone]	Corresponding subsegments must be tonally identical

(23) / fei_L.ji_L/ → [fei_{L,H}.ji_L]

/ V(L L L) ... V(L L L) /	CoRR-Q↔Q-[tone]	QQ-EDGE-(σ)	IDEN-T-QQ-[tone]	CoRR-q:σ.q[tone]	qq-EDGE-(σ)	IDEN-qq[tone]	IDEN-IO	
a. V _a (L L L _x) ... V _a (L _x L L)		W1			W1		L	<i>Q and q correspondence, faithful</i>
b. V _a (L L L _x) ... V _a (L _y L L)		W1		W1			L	<i>Q correspondence only, faithful</i>
c. V _a (L L L _x) ... V _b (L _x L L)	W1				W1		L	<i>q correspondence only, faithful</i>
d. V _a (L L L _x) ... V _b (L _y L L)	W1			W1			L	<i>No correspondence, faithful</i>
e. V _a (L L H _x) ... V _a (L _x L L)		W1	W1		W1	W1	1	<i>Q and q correspondence, dissimilation</i>
f. V _a (L L H _x) ... V _a (L _y L L)		W1	W1				1	<i>Q correspondence only, dissimilation</i>
g. V _a (L L H _x) ... V _b (L _x L L)					W1	W1	1	<i>q correspondence only, dissimilation</i>
h. V _a (L L L _x) ... V _b (L _x L H)					W1		1	<i>q correspondence only, dissimilation</i>
i. V _a (L L L _x) ... V _b (L _y L H)				W1			1	<i>No correspondence, dissimilation</i>
☞ j. V _a (L L H _x) ... V _b (L _y L L)							1	<i>No correspondence, dissimilation</i>

5.1 Q/q INDEPENDENCE IN DISHARMONY

- Q's and q's can behave independently in dissimilation and agreement.

(24) Pingyao whole contour *Q* dissimilation and partial contour *q* agreement (Chen 1992; data from Yip 2002: 196). (cf. Tianjin (21))

Adjacent whole tones **dissimilate**.

Adjacent *q*'s agree across syllable boundaries (see also Hakha Lai for a similar pattern).

- a. hai₃₅ bing₃₅ → [hai₅₃ bing₃₅] 'become ill'
 b. er₅₃ ruan₅₃ → [er₃₅ ruan₅₃] 'ear soft, i.e. gullible'

6 ADVANTAGES OF AN ABC+Q APPROACH

- Major advantages of a ABC+Q approach to harmony (and disharmony) (contra a feature-spreading approach):
 1. Similarity basis for explicitly stating participant segments.
 2. Ability to capture both long distance and local (CV) phenomena.

6.1 THE SIMILARITY BASIS AND NON-LOCALITY

(25) Proximity and similarity as conditions on correspondence:

1. Proximity: adjacent Q's or adjacent *q*'s correspond. (e.g., Yoruba (17), Hakha Lai tone (20))
2. Featural Similarity: *q*'s with similar feature specifications correspond. (e.g. Tianjin (21), H tone plateauing in Luganda)

(26) Luganda: H tone plateauing between two lexically H morphemes in same word (a), vs. (b,c): (Hyman & Katamba 1993).

- a. bá-mu-láb-a → bá-mú-láb-à ‘they see him’
- b. bá-tu-sib-a → bá-tù-sib-à ‘they tie us’
- c. a-tu-láb-a → à-tù-láb-à ‘he sees us’

(27) CORR- $V_H \leftrightarrow V_H$ H toned vowels correspond
 CORR- $V::V$ Adjacent vowels correspond
 IDENT-VV [tone] Corresponding vowels are tonally identical
 IDENT-IO Input and output tone is identical

/ V(H H H) V(L L L) V(H H H) /	CORR- $V_H \leftrightarrow V_H$	IDENT-VV [tone]	CORR- $V::V$	IDENT-IO
a. $V_x(H H H) V(L L L) V_x(H H H)$			W2	L
b. $V_x(H H H) V_{xy}(L L L) V_y(H H H)$	W1	W2		L
c. $V_x(H H H) V_{xy}(H H H) V_y(H H H)$				1

6.2 THE SIMILARITY BASIS: LOCAL CV AND TONE INTERACTIONS

- Similarity basis for harmony patterns afforded by ABC allows direct reference to participating segments in harmony: especially useful for CV and tone interactions (Shih 2013).

(28) Nupe partial spread after L tones to create rising contour is licensed when the intervening onset is [+voice] or sonorant (George 1970; Yip 2002: 143–144).

- a. ètú ‘parasite’
- b. èdũ ‘taxes’
- /è-lé/ → [èlě] ‘past’
- /è-mí/ → [èmĩ] ‘I’ or ‘me’ (in the Kpada dialect; in other dialects = [mĩ])

(29) Nupe pattern can be modeled as (a) correspondence between sufficiently sonorous *q* subsegments across a segment boundary (“S”), using stringent sonority constraints from Shih (2013); and (b) agreement in tone specification:

CORR- $q\{V,R,N,D\}$ -S- $q\{V,R,N,D\}$, IDENT- $qq(\text{tone})$ »
 FAITH-IO $q(\text{tone})$ »
 CORR- $q\{V,R,N,K\}$ -S- $q\{V,R,N,K\}$

<i>Optimal candidate [èdũ]</i>
$(e_x e_x e_x) (d_x d_x d_x) (u_x u_y u_y)$ $[L][L][L] [L][L][L] [L][H][H]$

7 CONCLUSION

- Contour tones exhibit schizoid, “dualist” behavior:
 - Behave as whole contours,
 - Parts of contours can behave independently.

- ABC+Q:
 - Endows ABC with subsegmental architecture that can be targeted for correspondence relationships.
 - Allows for duality of contour behavior to be modeled, in tone and segmental domains.
 - Unites segments and tone under one treatment for harmony *and* disharmony.
- Advantages of ABC (versus (say) autosegmental spreading)
 - Similarity amongst participating segments is a design feature, not a stipulation.
 - ABC can capture not only similarity but also proximity effects that determine participating segments in harmony/disharmony.
- Main insight behind all ABC analyses (see e.g., Inkelas and Shih 2013b): **UNSTABLE SURFACE CORRESPONDENCE** is repaired.
 - Unstable surface correspondence = state of similarity and proximity which passes the threshold of interactivity but does not achieve stable identity or stable dispersion.
 - e.g., Yoruba: proximal segments are not similar enough and assimilate in tone to achieve stability.
 - e.g., Luganda plateaus: similar tones are not proximal enough and cause assimilation in tone to achieve stability.
 - Instability can target local and non-local phenomena (i.e., not limited in distance), and instability can target many levels: string, syllable, mora, **segment *Q***, **subsegment *q***.
 - Offers potential new insights to the extent and limitations of contour tone make-up and behavior: e.g., restrictions against contour tones with mid tones can be modeled as unstable tonal dispersion: *ML, *MH, *HM, *ML vs. ✓LH, ✓HL (see e.g. Yoruba: Akinlabi and Liberman 2004).

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8 REFERENCES

- Akinbiyi, Akinlabi, and Mark Liberman. 2001. Tonal complexes and tonal alignment, ed. by Minjoo Kim and Uri Strauss, *Proceedings of the North East Linguistics Society* 31:1–20.
- Applegate, Richard B. 1972. *Inseño Chumash grammar*. Ph.D. dissertation. University of California, Berkeley.
- Archangeli, Diane and Douglas Pulleyblank. 1987. Maximal and Minimal Rules: Effects of Tier Scansion. *Proceedings of NELS* 17. 16–35.
- Bao, Zhiming. 1990. *On the nature of tone*. Ph.D. dissertation. Massachusetts Institute of Technology.
- Banner-Inouye, Susan. 1989. The flap as a contour segment. *UCLA Working Papers in Phonetics*. 72. 40–81.
- Bennett, William G. 2013. *Dissimilation, consonant harmony, and surface correspondence*. Ph.D. dissertation. Rutgers.
- Browman, Catherine P. and Louis Goldstein. 1989. Articulatory Gestures as Phonological Units. *Phonology*. 6(2): 201–251.
- Chen, Matthew Y. 1985. *Tianjin tone sandhi: erratic rule application*. Ms. University of California, San Diego.
- Chen, Matthew Y. 1992. Tone rule typology. *Proceedings of the 18th Annual Meeting of BLS: Special Session on the Typology of Tone Languages*. 54–66.
- Dindelegan, Gabriela P. 2013. *The grammar of Romanian*. Oxford: Oxford University Press.
- Duanmu, San. 1994. Against contour tone units. *Linguistic Inquiry*. 25(4): 555–608.
- Gafos, Adamantios I. 2002. A Grammar of Gestural Coordination. *Natural Language and Linguistic Theory*. 20: 269–337.

- George, Isaac. 1970. Nupe Tonology. *Studies in African Linguistics*. 1: 100–122.
- Goldsmith, John. 1976. Autosegmental phonology. Ph.D. dissertation. Massachusetts Institute of Technology.
- Golston, Chris and Wolfgang Kehrein. 1998. Mazatec Onsets and Nuclei. *International Journal of American Linguistics*. 64(4): 311–337.
- Hansson, Gunnar Ólafur. 2001. Theoretical and typological issues in consonant harmony. Ph.D. dissertation. University of California, Berkeley.
- Hu, Wei. 2011. Production and perception of double contour tones in Qiyang Chinese. Paper presented at IchPhS XVII. 17–21 Aug 2011. Hong Kong.
<http://www.icphs2011.hk/resources/OnlineProceedings/RegularSession/Hu/Hu.pdf>
- Hyman, Larry M. and Kenneth VanBik. 2002. Tone and syllable structure in Hakha-Lai. *Proceedings of the 28th Annual Meeting of BLS*. 15–28.
- Inkelas, Sharon. 2008. The dual theory of reduplication. *Linguistics*. 46(2): 351–401.
- Inkelas, Sharon and Stephanie S Shih. 2013a. ABC+Q: Contour segments and tones in (sub)segmental Agreement by Correspondence. Paper presented at Manchester Phonology Meeting 2013. University of Manchester.
<http://stanford.edu/~stephsus/InkelasShih-mfm2013.pdf>
- Inkelas, Sharon and Stephanie S Shih. 2013b. Unstable surface correspondence as the source of local conspiracies. Paper presented at NELS 2013. University of Connecticut.
http://stanford.edu/~stephsus/InkelasShih_NELS_2013_handout.pdf
- Jamieson, Allan R. 1977. Chiquihuitlán Mazatec phonology. *SIL International Publications in Linguistics* 54. Texas: SIL and the University of Texas at Arlington. 93–105.
- Leben, William R. 1973. Suprasegmental phonology. Ph.D. dissertation. Massachusetts Institute of Technology.
- Li, Daoxiang; Xizhen Nie; and E-feng Qiu. 1986. 布朗语简志 [A sketch of the Blang language]. Beijing: Minzu Chubanshe.
- Lombardi, Linda. 1990. The nonlinear organization of the affricate. *Natural Language and Linguistic Theory*. 8: 375–425.
- McCarthy, John J. 2010. Agreement by Correspondence without CORR constraints. Ms. The Selected Works of John J. McCarthy. <http://works.bepress.com/john_j_mccarthy/106>
- Morén, Bruce and Elizabeth Zsiga. 2006. The lexical and post-lexical phonology of Thai tones. *Natural Language and Linguistic Theory*. 24: 113–178.
- Remijsen, Bert. 2013. Tonal alignment is contrastive in falling contours in Dinka. *Language*. 89: 297–327.
- Rhodes, Russell. 2010/2012. Vowel Harmony as Agreement by Correspondence. UC Berkeley Phonology Lab Annual Report. 138–168. <http://linguistics.berkeley.edu/phonlab/annual_report/annual_report_2012.html>
- Rose, Sharon and Rachel Walker. 2004. A typology of consonant agreement by correspondence. *Language*. 80(3): 475–531.
- Sagey, Elizabeth C. 1986. The representation of features and relations in non-linear phonology. Ph.D. dissertation. Massachusetts Institute of Technology.
- Sasa, Tomomasa. 2009. Treatment of vowel harmony in Optimality Theory. PhD dissertation. University of Iowa.
- Shih, Stephanie S. 2013/under review. Consonant-tone interaction as Agreement by Correspondence. Ms. Stanford University and University of California, Berkeley.
- Smith, N.V. 1967. The phonology of Nupe. *Journal of African Linguistics*. 6(2): 153–169.
- Spence, Justin. 2010. Long-distance nasal cluster dissimilation in Gurindji. Ms. University of California, Berkeley.
- Steriade, Donca. 1993. Closure, release and nasal contours. In Marie Huffman and Loren Trigo (eds.). *Phonetics and Phonology 5: Nasals, nasalization and the velum*. 401–470.
- Steriade, Donca. 1994. Complex onsets as single segments: the Mazateco pattern. In Jennifer Cole and Charles Kisseberth (eds.). *Perspectives in Phonology*. Stanford: CSLI Publications. 203–291.
- Suzuki, Keiichiro. 1998. A Typological Investigation of Dissimilation. Ph.D. dissertation. University of Arizona.
- Walker, Rachel. 1998. Nasalization, neutral segments, and opacity effects. *Outstanding Dissertations in Linguistics*. New York: Garland Publishing, Inc.
- Walker, Rachel. 2000. Yaka nasal harmony: Spreading or segmental correspondence? *Proceedings of the 26th Annual Meeting of the BLS: General Session and Parasession on Aspect*. 321–332.
- Walker, Rachel. 2009. Similarity-sensitive blocking and transparency in Menominee. Paper presented at the 83rd Annual Meeting of the Linguistic Society of America. 9 Jan 2009. San Francisco, CA. <<http://www-bcf.usc.edu/~rwalker/MenomineeLSAHdt.pdf>>
- Walker, Rachel and Fidèle Mpiranya. 2006. On triggers and opacity in coronal harmony. *Proceedings of the 31st Annual Meeting of the BLS*.
- Wordick, Frank. 1982. *The Yindjibarndi Language*. Canberra: Australian National University.
- Yip, Moira. 1989. Contour Tones. *Phonology*. 6(1): 149–174.
- Yip, Moira. 2002. *Tone*. Cambridge, UK: Cambridge University Press.