Contrast and transparency in three vowel harmony systems

Daniel Currie Hall
Associate professor, Program in Linguistics, Saint Mary's University
Affiliate member, Faculty of Graduate Studies, University of Victoria
incl.pl/dch

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Introduction

Observation: Harmony often ignores segments on which the harmonizing feature is not contrastive.

Claims:

1. The contrastive status of features is determined by language-particular hierarchies (Dresher 2009)
2. Non-contrastive features are absent—not just optionally ignored (*pace* Nevins 2015).

Languages:

1. Finnish (Finnic)
2. Votic (Finnic)
3. Uyghur (Turkic)

Finnish

The vowel system

	FRONT		BACK	
	UNRD	RD	UNRD	RD
HIGH	i	y		u
MID	e	ø		o
LOW	æ		ɑ	

Finnish vowel inventory

- Front harmonic: /y, ø, æ/
- Back harmonic: /u, o, ɑ/
- Neutral (transparent): /i, e/

Finnish

The harmony pattern

Front

(1) tyhmæ-stæ ‘stupid’+ILLATIVE

(2) løytæ-nyt ‘find’+PST.PTCP

Back

(3) tuhma-sta ‘naughty’+ILLATIVE

(4) halun-nut ‘want’+PST.PTCP

Front & neutral

(5) syyte-ttæ ‘accusation’+PARTITIVE

(6) væitel-lyt ‘dispute’+PST.PTCP

(7) grøtsi-næ ‘porridge’+ESSIVE

Back & neutral

(8) suure-tta ‘quantity’+PARTITIVE

(9) ajatel-lut ‘think’+PST.PTCP

(10) koti-na ‘home’+ESSIVE

(data: Ringen & Heinämäki 1999; Krämer 2002; D’Arcy 2004)

Finnish

The harmony pattern

	FRONT		BACK	
	UNRD	RD	UNRD	RD
HIGH	i	y		u
MID	e	ø		o
LOW	æ		ɑ	

Finnish vowel inventory

Jakobson, Fant & Halle (1952: 41):

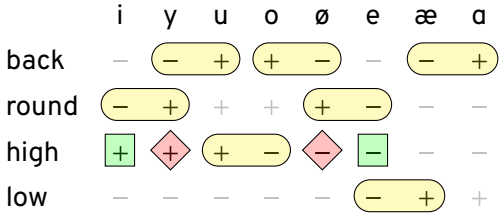
In Finnish those acute vowels which *ceteris paribus* are paired with grave vowels cannot belong to the same simple word-unit as the grave vowels [...], while the plain acute vowels /e i/, which have no plain grave counterparts, are compatible with any Finnish vowel.

Finnish

Identifying contrastive features: ‘Ceteris paribus’

Contrast by minimal pairs:

1. Start with full specifications.
2. Identify pairs of segments that differ in only one feature. Those feature specifications are contrastive.
3. All other feature specifications are redundant.



(Calabrese 1995; Nevins 2010)

Finnish

Identifying contrastive features: ‘Ceteris paribus’

What happens if you have too few vowels (or too many features)?

	i	a	u
back	−	+	+
round	−	−	+
high	+	−	+
low	−	+	−

Finnish

Identifying contrastive features: The Successive Division Algorithm

Contrast by successive division:

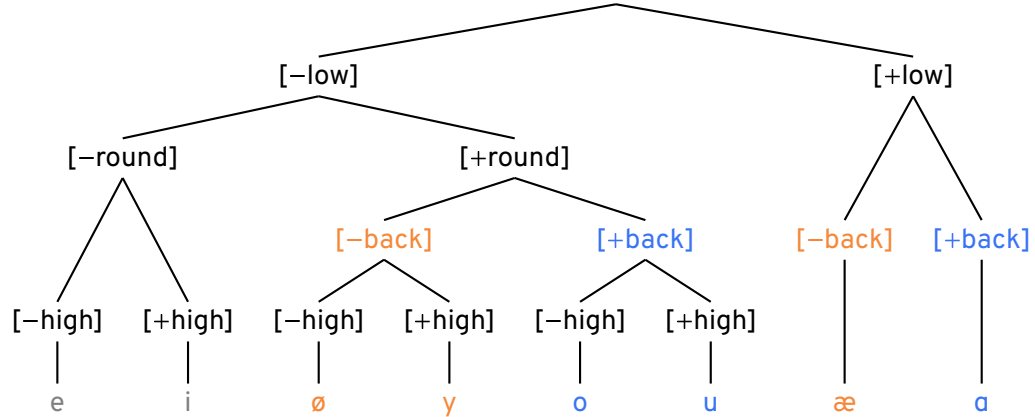
1. Start with no specifications.
2. Divide the inventory by assigning some feature for which at least some segments have different values.
3. Repeat this in each sub-inventory until all contrasting segments have been distinguished.

(Dresher 2009)

Finnish

Identifying contrastive features: The Successive Division Algorithm

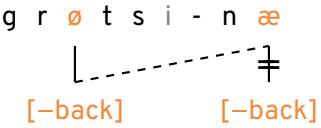
[±low] ≫ [±round] ≫ [±back] ≫ [±high]



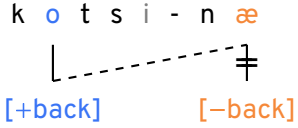
Finnish

Spreading across transparent vowels

(7) ‘porridge’+ESSIVE



(10) ‘home’+ESSIVE



Finnish

Do we need non-contrastive features, too?

Nevins (2015: 59): Harmony ignores [−back] on /i/, but assibilation doesn't:

(11) halut-a 'want'+INFINITIVE

(12) halus-i 'want'+PAST

- This assumes (following Calabrese 2005) that assibilation is palatalization.
- But assibilation changes only manner; there is no spreading of place from /i/ to /t/.
- And we don't need [−back] to identify /i/ as the trigger; $\begin{bmatrix} +\text{high} \\ -\text{round} \end{bmatrix}$ suffices.

Votic

- Spoken in four villages in Russia near the Estonian border
- Similar vowel inventory to Finnish, but /e/ has a back counterpart /ɘ/

Votic

/i/ is transparent to harmony

/i/ in front stem + ELATIVE

(13)	izæ-ssæ	‘father’
(14)	tæi-ssæ	‘louse’
(15)	pehmiæ-ssæ	‘soft’

Front stem + PL. /-i/ + ELATIVE

(19)	ʧivæ-i-ssæ	‘stones’
(20)	seemen-i-ssæ	‘seeds’
(21)	lyhy-i-ssæ	‘short’

/i/ in back stem + ELATIVE

(16)	siɬɬa-ssa	‘bridge, floor’
(17)	poiga-ssa	‘boy, son’
(18)	vəttimə-ssa	‘key’

Back stem + PL. /-i/ + ELATIVE

(22)	su-i-ssa	‘mouths’
(23)	ampa-i-ssa	‘teeth’
(24)	lintu-i-ssa	‘birds’

(data: Ahlqvist 1856; Ariste 1968; Blumenfeld & Toivonen 2016)

Votic

/l/ allophony

Blumenfeld & Toivonen (2016) point out a complication involving the distribution of clear [l] and dark [ɬ].

	[l] in front-harmonic words		[ɬ] in back-harmonic words		
(25)	leppæ	‘alder’	(30)	xɑːmoɬɑin	‘devil’
(26)	elæː	‘to live’	(31)	pəɬɬoɬə-ssɑː	‘field’+TERMIN.
(27)	ellytæn	‘I pamper’	(32)	poigɑ-ɬɬɑ	‘boy, son’+ADESS.
(28)	tʃylæ-llæ	‘village’+ADESS.	(33)	miɬtɑ	‘from me’ (1SG.ABL.)
(29)	miltinleːb̥	‘some kind of’	(34)	əɬud̥	‘beer’

(data: Ariste 1968)

Votic

/l/ allophony

Immediately before /i/, even in an otherwise back-harmonic word, /l/ is [ɫ]:

(35)	əlimmɑ	‘we were’
(36)	tɑppəlikkɔ	‘combative person’
(37)	tuli-i-sə:	‘fire’+PL.+ILLATIVE
(38)	lintu-i-ɬɬɑ	‘bird’+PL.+ALLATIVE

(data: Blumenfeld & Toivonen 2016: 1171; Ariste 1968)

[i] (here derived from word-final /ə/) also triggers palatalization of /k/ to [tʃ] :

	PARTITIVE	NOMINATIVE	
(39)	kurkə-a	kurtʃi	‘stork’
(40)	əɬkə-a	əɬtʃi	‘straw’
(41)	kahkə-a	kahtʃi	‘birch’

(data: Odden 2005: 100–101)

Votic

Accounting for the dual behaviour of /i/

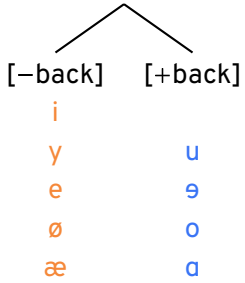
Blumenfeld & Toivonen's (2016) account:

- [−back] is 'weakly' (i.e. non-contrastively) specified on /i/.
- Harmony ignores weak specifications…
- …but /l/ allophony and /k/ palatalization don't.

Votic

Accounting for the dual behaviour of /i/

We could specify [−back] on /i/ even if it doesn't have a direct [+back] counterpart:



…but then we'd expect /i/ to harmonize.

In fact, /i/ does have a [+back] counterpart, at least marginally.

/ɨ/ occurs in loanwords from Russian:

(42) vɨʃifkɑ ‘embroidery’
< Russian вышивка /'vɨʃivka/ ['vɨʃɨfkə]

(43) rɨnkɔ-i-ɨɨɑ ‘marketplace’ + PL. + ADESSIVE
< Russian рынок /'rɨnok/ ['rɨnək]

(data: Ariste 1968; Harms 1987)

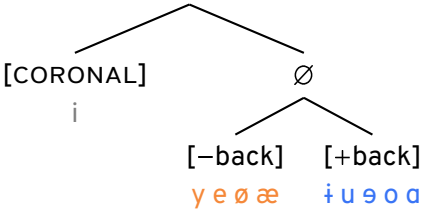
Votic

Accounting for the dual behaviour of /i/

	FRONT		BACK	
	UNRD	RD	UNRD	RD
HIGH	i	y	ɨ	u
MID	e	ø	ɘ	o
LOW	æ		ɑ	

Votic vowel inventory

Proposal: Frontness on /i/ is marked by a different feature.



Votic

Accounting for the dual behaviour of /i/

Two kinds of place features:

- Harmony spreads [±back] between specified vowels, and spreads [+back] onto /l/.
- [CORONAL] palatalizes /k/ and overrides velarization of /l/.

Any independent reason to think /i/ is [CORONAL]?

Černjavskij (n.d.: 8):

i (между гласными) → d’d’

i (between vowels) → d^{j}ː

Uyghur

This section is based on joint work with Avery Ozburn.

	FRONT		BACK	
	UNRD	RD	UNRD	RD
HIGH	i	y		u
MID	e	ø		o
LOW	æ		ɑ	

Uyghur vowel inventory

Uyghur

The harmony pattern

	Front stems plus causative /-dUr/			Back stems plus causative /-dUr/	
(44)	yn-dyr	‘sprout, appear’	(47)	sun-dur	‘break’
(45)	søk-tyr	‘take apart’	(48)	qop-tur	‘get up’
(46)	ʧʃæk-tyr	‘smoke’	(49)	bɑq-tur	‘raise’
(50)	iʃæn-dyr	‘believe’	(54)	ɑrtil-dur	‘have loaded on’
(51)	ʧʃiʃlæʃ-tyr	‘mesh, bite.RECIP’	(55)	zitʃlɑʃ-tur	‘become close’
(52)	ʤidællæʃ-tyr	‘quarrel’	(56)	bixlɑn-dur	‘germinate’
(53)	zæʔiplæʃ-tyr	‘weaken’	(57)	huʃsizlɑn-dur	‘lose consciousness’

(data: Hahn 1991; Schwarz 1992; Vaux 2000; D’Arcy 2004; Csató & Uchturpani 2010)

Uyghur

The harmony pattern

Front stems + /-imiz/ + /-GA/

(58) jyz-imiz-gæ ‘face’+‘our’+DAT.

(59) køl-imiz-gæ ‘lake’+‘our’+DAT.

Back stems + /-imiz/ + /-GA/

(60) pul-imiz-ʁɑ ‘money’+‘our’+DAT.

(61) jol-imiz-ʁɑ ‘road’+‘our’+DAT.

Uyghur

Two approaches

- **Underspecification** (D'Arcy 2004; Hall & Ozburn 2019): /i/ is not specified for place.
- **Variable visibility** (Halle, Vaux & Wolfe 2000): /i/ is specified for place, but that specification is identifiable as redundant, so it can be ignored by some rules.

We might implement the variable visibility approach by (metaphorically) painting redundant features purple.

- Some rules can see both contrastive features and redundant ones.
- Other rules can see contrastive features, but not redundant ones.

Uyghur

Derived transparency

A non-harmonizing suffix: diminutive/approximative/similative *-ʧæ*

(62) kitap-ʧæ ‘booklet’ (‘book’+*ʧæ*)

(63) uzun-ʧæ ‘longish’ (‘long’+*ʧæ*)

(64) ujʁur-ʧæ ‘Uyghur-like’ (‘Uyghur’+*ʧæ*)

(65) loji-lar-ʧæ ‘bureaucratic’ (‘bureaucrat’+PL.+*ʧæ*)

…spreads [−back] to subsequent suffixes:

(66) næj-ʧæ-m-dæ ‘in my little flute’ (‘flute’+*ʧæ*+1SG.POSS.+LOC.)

(67) kitap-ʧæ-m-dæ ‘in my booklet’ (‘book’+*ʧæ*+1SG.POSS.+LOC.)

(data: Hahn 1991; Schwarz 1992)

Uyghur

Derived transparency

In medial open syllables, low /æ/ and /ɑ/ raise to [i].

(68)	tø.pæ	‘peak’	tø.pi:lær	‘peak’+PL.	tø.pi:li.r-i ‘peak’+PL.+‘their’
(69)	sæ.pær	‘journey’	sæ.pi.r-im	‘journey’+‘my’	
(70)	bɑ.lɑ	‘child’	bɑ.li:lar	‘child’+PL.	
(71)	je.zɑ	‘village’	je.zi:dɑ	‘village’+LOC.	

(data: Hahn 1991)

Uyghur

Derived transparency

Raising makes *-ʧæ* transparent:

(72) næj-ʧʃi-dæ ‘in the little flute’ (‘flute’+*ʧæ*+LOC.)

(73) kitɑp-ʧʃi-dɑ ‘in the booklet’ (‘book’+*ʧæ*+LOC.)

Compare:

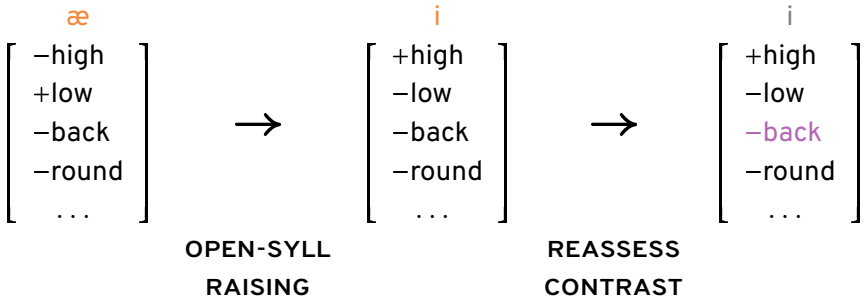
(67) kitɑp-ʧʃæ-m-dæ ‘in my booklet’ (‘book’+*ʧæ*+1SG.POSS.+LOC.)

(data: Hahn 1991)

Uyghur

Derived transparency

For the variable visibility approach, this means the contrastive or redundant status of [±back] has to be recomputed after raising applies:



Uyghur

Derived transparency

- Halle *et al.* (2000: 397–8): the underspecification approach requires "an ad hoc rule that deletes the [−back] specification of the *i*."
- But, as D'Arcy (2004) points out, this rule isn't so ad hoc.
- Raising is **reduction**: it reduces both sonority and formal structure.
- Raising is **neutralization**: it eliminates the contrast between /æ/ and /ɑ/.

Conclusions

Finnish: /i/ is transparent because its frontness is non-contrastive

Votic: /i/ is contrastively front, but marked by a different feature

Uyghur: /i/ is non-contrastively front, and raising to [i] eliminates [±back]

- Contrast is identified hierarchically.
- Non-contrastive features are simply absent.

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