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A typological approach to discover vowel harmony

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Introduction

- "Similarity of Hungarian and Turkish because of vowel harmony"
- Is the mere presence of vowel harmony sufficient for two languages to be similar?
- Certainly not, every language has its own special mechanism, but types can be outlined

- Not a typological research but a framework
- Comparing some Uralic and Turkic languages and searching for types of vowel harmony
 - What kind of types do we find?
 - What are the similarities and the differences?



About vowel harmony in general

- A phonotactical tendency of vowels to be similar in a certain domain
- Language specific properties of vowel harmony mechanisms:
 - Domain (radical, affixal)
 - Direction (progressive, regressive)
 - Dimension (backness, roundness, height, tongue root position, nasality, tenseness, length, etc.)
 - Hierarchy
 - Harmonic oppositions (doublets, triplets, etc.)
 - Special segments (neutral vowels, consonants; transparency, opacity, anti-harmony; strong disharmony; affixes with one allomorph)



Hungarian

Trigger	Permissible following vowels
a →	a, á, o, ó, u, ú, é, i, í
e →	a, á, e, é, i, í, ö, ő, ü, ú
o →	a, á, o, ó, u, ú, é, i, í
ö →	e, é, i, í, ö, ő, ü, ú
u →	a, á, o, ó, u, ú, é, i, í
i →	a, á, o, ó, u, ú, e, é, i, í, ö, ő, ü, ú
ü →	e, é, i, í, ö, ő, ü, ú

- *cseléd* 'servant' ~ *család* 'family', *magyar* 'Hungarian' ~ *megyer* 'name of a tribe'
- *almá-val* 'apple-INS', *almá-ból* 'apple-ELA', *almá-nál* 'apple-ADE'
- *körté-vel* 'pear-INS', *körté-ből* 'pear-ELA', *körté-nél* 'pear-ADE'
- *kő-höz* 'stone-ALL', *tör-tök* 'break-PRS.PL2'
- *tó-hoz* 'lake-ALL', *lát-tok* 'see-PRS.PL2'
- *lé-hez* 'liquid-ALL', *men-tek* 'go-PRS.PL2'
- *lány-hoz* 'girl-ALL', *jár-tok* 'walk-PRS.PL2'
- *maci-val* 'teddy-INS', *hagyaték-kal* 'legacy-INS', *mágnés-sal* ~ *mágnés-sel* 'magnet-INS', *körté-hez* 'pear-ALL', *híd-dal* 'bridge-INS', *cél-lal* 'aim-INS', *amőba* 'amoeba', *sofőr* 'driver', *lát-ni* 'see-INF', *alma-ként* 'apple-ESS', *öt-kor* 'at five', *sün-i-m...?* 'hedgehog-DIM-SG1'



Domain	Radical	Yes	
	Affixal	Yes	
Direction	Progressive	Yes	
	Regressive	(No)	Historically
Dimension	Backness	Yes	
	Roundness	Yes	
	Height	No	
Hierarchy		Yes	Backness > Roundness
Harmonic oppositions	Backness	4 ~ 6	a ~ e, á ~ é, o ~ ö, ó ~ ő, u ~ ü, ú ~ ű
	Roundness	1 (2)	e ~ ö, (e ~ o)
	Height	0	
Neutral vowels	Transparent	Yes	(e), é, i, í
	Opaque	(No)/Yes?	Under certain conditions
Consonants		No	
Affixes with one allomorph		Yes	Not only with neutral vowels
Anti-harmony		Yes	
Strong disharmony		Yes	



Meadow Mari

Trigger	Permissible following vowels
a →	a, u, ê, e, i
o →	a, o, ê, e
ê →	a, ê, e
e →	a, ê, e
ö →	a, ê, e, ö
u →	a, o, u, ê, e
i →	a, ê, e, i
ü →	e, ö, ü, ê

- *kol-žo* 'fish-SG3', *škol-əšto* 'school-LOC'
- *kit-še* 'hand-SG3', *jəlmə-šte* 'language-LOC'
- *kü-žö* 'stone-SG3', *üj-əštö* 'butter-LOC'
- *kužu* 'long'
- *čüčü* 'uncle'
- *ola-šte* 'city-LOC', *joškar-ge* 'red-PRED'
- *monča-šte* 'bath-LOC', *pölem-əšte* 'room-LOC', *murə-zə-žo* 'song-PROF-SG3', *kugurak* 'big-COMP', *jol-ge* 'foot-ADV', *šinča-lək* 'eye-NOM', *radio* 'radio'

Domain	Radical	Yes	
	Affixal	Yes	
Direction	Progressive	Yes	
	Regressive	No	
Dimension	Backness	Yes	
	Roundness	Yes	
	Height	No	
Hierarchy		Yes	Roundness > Backness
Harmonic oppositions	Backness	2	o ~ ö, u ~ ü
	Roundness	1 (2)	e ~ ö, (e ~ o)
	Height	0	
Neutral vowels	Transparent	Yes	ê
	Opaque	Yes	a, e
Consonants		No	
Affixes with one allomorph		Yes	
Anti-harmony		No	
Strong disharmony		Yes	



Finnish

Trigger	Permissible following vowels
a →	a, o, u, e, i
ä →	ä, ö, y, e, i
o →	a, o, u, e, i
e →	ä, ö, y, e, i, a, o, u
ö →	ä, ö, y, e, i
u →	a, o, u, e, i
i →	ä, ö, y, e, i, a, o, u
y →	ä, ö, y, e, i

- *tul-la* 'come-INF', *tul-koon* 'come-IMP.SG3', *tul-lut* 'come-PST.PTCP', *omena-ssa* 'apple-INE'
- *men-nä* 'go-INF', *men-köön* 'go-IMP.SG3', *men-nyt* 'go-PST.PTCP', *päärynä-ssä* 'pear-INE'
- *tul-et-ko* 'come-PRS.SG2-INT', *banaani-ssa* 'banana-INE', *maa-han* 'ground-ILL', *jää-hän* 'ice-ILL', *suo-hon* 'swamp-ILL', *tee-hen* 'tea-ILL', *vyö-hön* 'belt-ILL', *puu-hun* 'tree-ILL', *koi-hin* 'moth-ILL', *syy-hyn* 'reason-ILL', *ver-ta* 'blood-PART', *mer-ta* 'sea-PART', *fööna-ta* 'dry one's hair-INF', *analyttinen* 'analytic', *manööveri* 'maneuver', *afääri* 'affair', *kala-ksi* 'fish-TRANS', *kala-lle* 'fish-ALL'



Domain	Radical	Yes	
	Affixal	Yes	
Direction	Progressive	Yes	
	Regressive	No	
Dimension	Backness	Yes	
	Roundness	No	
	Height	No	
Hierarchy		No	
Harmonic oppositions	Backness	3	a ~ ä, o ~ ö, u ~ y
	Roundness	0	
	Height	0	
Neutral vowels	Transparent	Yes	e, i
	Opaque	(No)	Under special conditions
Consonants		Yes	Transguttural harmony
Affixes with one allomorph		Yes	
Anti-harmony		Yes	Very few cases
Strong disharmony		Yes	



Nganasan

Trigger in the last syllable	Permissible following vowels
a →	a, u, j
o →	a, u, j
ə →	a, u, j
e →	a, u, j
u →	a, u, j
j →	a, u, j
i →	i, ü
ü →	i, ü

- *ɲua-raa* 'only a door'
- *koli-riɑ* 'only a fish'
- *d'eli-ria* 'only a sound'
- *biə-ɟi* 'wind-SG3'
- *ban-tu* 'dog-SG3'
- *d'eńsi-ɟi* 'price-SG3'
- *hoɟür-tü* 'letter-SG3'
- *bahi* 'wild reindeer', *hirəmiaŋku* 'small hill'
- *biə-ɟi* 'wind-SG3', *kümaa-ɟu* 'knife-SG3', *bahi-ɟü* 'wild reindeer-SG3', *kəə-''lükü* 'rather short', *anə-''likü* 'rather big', *bəlua-jka* 'very angry', *hirəgə-jkia* 'very high', *ni-mə* 'woman-SG1'

Domain	Radical	No	
	Affixal	Yes	
Direction	Progressive	Yes	
	Regressive	No	
Dimension	Backness	Yes	
	Roundness	(Yes)	Historically, depends on word class
	Height	(Yes)	Historically, depends on word class
Hierarchy		Yes	Word class > Backness
Harmonic oppositions	Backness	2	j ~ i, u ~ ü
	Roundness	(2)	j ~ u, i ~ ü
	Height	(2 (3))	a ~ j, (a ~ i), a ~ ia
Neutral vowels	Transparent	No	
	Opaque	Yes	a, ə, ua, ia
Consonants		No	
Affixes with one allomorph		Yes	
Anti-harmony		Yes	Because of word classes
Strong disharmony		No	



Turkish

Trigger	Permissible following vowels
a →	a, ı
e →	e, i
o →	a, u
ö →	e, ü
ı →	a, ı
u →	a, u
i →	e, i
ü →	e, ü

- *için* (üçin, içün, üçün) 'for'
- *yol-da* 'road-LOC', *masa-dan* 'table-ABL'
- *ev-de* 'house-LOC', *deve-den* 'camel-ABL'
- *al-sın* 'get-IMP.SG3', *tat-lı* 'taste-ADJ', *masa-sı* 'table-SG3'
- *ol-sun* 'be-IMP.SG3', *tuz-lu* 'salt-ADJ', *konu-su* 'topic-SG3'
- *gel-sin* 'come-IMP.SG3', *şeker-li* 'sugar-ADJ', *deve-si* 'camel-SG3'
- *döv-sün* 'beat-IMP.SG3', *gül-lü* 'rose-ADJ', *ütü-sü* 'iron-SG3'
- *gol-ler* 'goal-PL', *fevk-ı-nda* 'top-SG3-LOC', *çamur* 'mud', *tavuk* 'hen' (*kamış* 'reed'), *kitap* 'book', *elma* 'apple', *lüzum* 'need', *gel-iyor* 'come-PRS.SG3', *çocuk-ken* 'during the childhood', *yarın-ki* 'tomorrow-ADJ'



Domain	Radical	Yes	
	Affixal	Yes	
Direction	Progressive	Yes	
	Regressive	(No)	Historically
Dimension	Backness	Yes	
	Roundness	Yes	
	Height	No	
Hierarchy		No	
Harmonic oppositions	Backness	4	a ~ e, o ~ ö, ɪ ~ i, u ~ ü
	Roundness	2	ɪ ~ u, i ~ ü
	Height	0	
Neutral vowels	Transparent	No	
	Opaque	No	
Consonants		Yes	
Affixes with one allomorph		Yes	
Anti-harmony		No	
Strong disharmony		Yes	



Kyrgyz

Trigger	Permissible following vowels
a →	a, i, o, u
e →	e, i, o, u
o →	o, u, o, u
ö →	ö, ü, o, u
ï →	a, i, o, u
u →	a, u, o, u
i →	e, i, o, u
ü →	ö, ü, o, u

- *üčün* (*üčin, ičün, ičin*) 'for', *ilō* 'packhorse'
- *ǰıldiz-dū* 'star-ADJ', *kanat-tū* 'wing-ADJ', *altō* 'the six', *irtō* 'singing'
- *ǰemiš-tū* 'fruit-ADJ', *kerek-tū* 'need-ADJ', *ekō* 'the two', *ištō* 'working'
- *taš-ta* 'stone-LOC', *alti-nči* 'six-ORD', *muz-da* 'ice-LOC'
- *tō-do* 'mountain-LOC', *toguz-unču* 'nine-ORD'
- *ečki-de* 'goat-LOC', *bir-inči* 'one-ORD'
- *tō-dö* 'camel-LOC', *tört-ünčü* 'four-ORD', *üy-dö* 'house-LOC'
- *albette* 'of course', *alippe* 'alphabet', *kadimki* 'early, old', *familiya* 'surname'

Domain	Radical	Yes	
	Affixal	Yes	
Direction	Progressive	Yes	
	Regressive	(No)	Historically
Dimension	Backness	Yes	
	Roundness	Yes	
	Height	No	
Hierarchy		No	
Harmonic oppositions	Backness	4 ~ 6	a ~ e, o ~ ö, i ~ i, u ~ ü, ō ~ ȫ, ū ~ ǖ
	Roundness	4	a ~ o, e ~ ö, i ~ u, i ~ ü
	Height	0	
Neutral vowels	Transparent	No	
	Opaque	No	
Consonants		No	
Affixes with one allomorph		No	
Anti-harmony		No	
Strong disharmony		Yes	



Uzbek

Vowel	Permissible following vowels
a →	a, â, e, o, u, i
â →	a, â, e, o, u, i
e →	a, â, e, o, u, i
o →	a, â, e, o, u, i
u →	a, â, e, o, u, i
i →	a, â, e, o, u, i

- *ayt-mâq* 'say-INF', *âl-mâq* 'get-INF', *ye-mâq* 'eat-INF', *bol-mâq* 'be-INF', *kut-mâq* 'wait-INF', *ič-mâq* 'drink-INF', *yer-da* 'place-LOC', *tush-lik* 'noon-NOM, lunch', *kor-iš-a-miz* 'see-RCP-PRS-PL1'
- a ~ ä, o ~ ö, i ~ j, u ~ ü
- *qol* 'arm, hand', *qul* 'servant', *kol* 'lake', *kul* 'ash', *qiš-i* 'winter-SG3', *kiši* 'person', *suz-mâq* 'filter-INF' or 'swim-INF'

Domain	Radical	No	
	Affixal	No	
Direction	Progressive	No	
	Regressive	No	
Dimension	Backness	No	Historically
	Roundness	No	Historically
	Height	No	
Hierarchy		No	
Harmonic oppositions	Backness	0	
	Roundness	0	
	Height	0	
Neutral vowels	Transparent	No	
	Opaque	No	
Consonants		(No)	Vowel allophones influenced by consonants
Affixes with one allomorph		Yes	
Anti-harmony		No	
Strong disharmony		No	



Yakut

Trigger	Permissible following vowels
a →	a, i, ia
e →	e, i, ie
o →	o, u
ö →	ö, ü
ï →	a, i, ia
u →	a, u, uo
i →	e, i, ie
ü →	e, ü, üö

- *aġa-ni* 'father-ACC', *aÿi-ni* 'sin-ACC', *aġa-lar* 'father-PL', *aÿi-lar* 'sin-PL', *murun-nar* 'nose-PL'
- *kinige-ni* 'book-ACC', *kihi-ni* 'person-ACC', *kinige-ler* 'book-PL', *kihi-ler* 'person-PL', *ün-ner* 'bridle-PL'
- *oġo-nu* 'child-ACC', *murun-u* 'nose-ACC', *oġo-lor* 'child-PL'
- *börö-nü* 'wolf-ACC', *ün-ü* 'bridle-ACC', *börö-lör* 'wolf-PL'
- *xoluoda* 'log', *oskuola* 'school', *centralñay* 'central'



Domain	Radical	Yes	
	Affixal	Yes	
Direction	Progressive	Yes	
	Regressive	No	
Dimension	Backness	Yes	
	Roundness	Yes	
	Height	No	
Hierarchy		No	
Harmonic oppositions	Backness	4	a ~ e, o ~ ö, i ~ i, u ~ ü
	Roundness	4	a ~ o, e ~ ö, i ~ u, i ~ ü
	Height	0	
Neutral vowels	Transparent	No	
	Opaque	No	
Consonants		No	
Affixes with one allomorph		No	
Anti-harmony		No	
Strong disharmony		Yes	



Chuvash

Trigger	Permissible following vowels
a →	a, ä, u, i
e →	e, ě, ü, i
ä →	a, ä, u, i
ě →	e, ě, ü, i
ï →	a, ä, u, i
u →	a, ä, u, i
i →	e, ě, ü, i
ü →	e, ě, ü, i

- *šarka* 'nit'
- *šältär-da* 'star-LOC', *kay-ră-m* 'go-PST-SG1', *iväl-u* 'son-SG2', *šir-u* 'write-NOM'
- *šiměš-re* 'fruit-LOC', *kil-tě-m* 'come-PST-SG1', *xěr-ü* 'daughter-SG2', *pěl-ü* 'know-NOM'
- *šäši-ren* 'mouse-ABL', *päri-ren* 'spelt-ABL', *adres-äm* 'address-SG1', *slovar-ëm* 'dictionary-SG1', *biblioteka* 'library', *kino-ra* 'cinema-LOC', *iväl-ě* 'son-SG3', *ulm-i* 'apple-SG3', *pulă-sem* 'fish-PL'

Domain	Radical	Yes	
	Affixal	Yes	
Direction	Progressive	Yes	
	Regressive	(No)	Historically
Dimension	Backness	Yes	
	Roundness	No	
	Height	No	
Hierarchy		No	
Harmonic oppositions	Backness	4	a ~ e, ä ~ ë, i ~ i, u ~ ü
	Roundness	0	
	Height	0	
Neutral vowels	Transparent	No	
	Opaque	Yes	i, only in the non-first syllable
Consonants		Yes	
Affixes with one allomorph		Yes	Not only with i
Anti-harmony		No	
Strong disharmony		Yes	



Domain	Radical	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes
	Affixal	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Direction	Progr.	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
	Regr.	(No)	No	No	No	(No)	(No)	No	No	(No)
Dimens.	Backness	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
	Roundn.	Yes	Yes	No	(Yes)	Yes	Yes	No	Yes	No
	Height	No	No	No	(Yes)	No	No	No	No	No
Hierarchy		Yes	Yes	No	Yes	No	No	No	No	No
Harmonic opp.	Backness	4 ~ 6	2	3	2	4	4 ~ 6	0	4	4
	Roundn.	1 (2)	1 (2)	0	(2)	2	4	0	4	0
	Height	0	0	0	(2 (3))	0	0	0	0	0
Neutral vowels	Transp.	Yes	Yes	Yes	No	No	No	No	No	No
	Opaque	(No)	Yes	(No)	Yes	No	No	No	No	Yes
Consonants		No	No	Yes	No	Yes	No	(No)	No	Yes
Affixes w. one allom.		Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes
Anti-harmony		Yes	No	Yes	Yes	No	No	No	No	No
Strong disharmony		Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes
		Hung.	M. Mari	Finnish	Nganasan	Turkish	Kyrgyz	Uzbek	Yakut	Chuvash

Remarks

- Only Nganasan is lacking radical harmony despite having affixal harmony
- Generally progressive direction, regressivity is not productive, but still important in some languages historically
- Backness harmony is dominant, but roundness harmony is important, too, however, triggers and targets may differ considerably
- Nganasan preserves a lexically coded height harmony
- No other dimensions are featured (tongue root position, tenseness, nasality, etc.)
- Hierarchy is present in Hungarian, Meadow Mari and Nganasan with a different order in each
- Backness and roundness harmony are hierarchically equal in Turkic languages



Remarks (cont.)

- The most common opposition is $u \sim \ddot{u}$ which can be found in every language (except for Uzbek)
- The merger of oppositions led to a loss of vowel harmony in Uzbek
- Uralic languages have a large range of neutral vowel types, while Chuvash is the only Turkic language with a single positionally bound neutral vowel
- Consonants play a role in some Turkic languages, while Finnish has a special type
- There are affixes with one allomorph almost everywhere
- Anti-harmony is a more common feature in Hungarian and Nganasan, Finnish has it marginally
- Every language with some kind of vowel harmony has examples of strong disharmony (except for Nganasan)



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