

## Vowel harmony in contact-induced systems: the case of Cappadocian and Silly\*

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**Summary.** The Cappadocian and Silly dialects of Greek display two patterns of vowel assimilation that look superficially like the vowel harmony that is familiar from Turkish. In this talk, we discuss these patterns and show that they are not to be analyzed as vowel harmony of the Turkic type. In particular, we argue that two disyllabic domains can be identified, one at the beginning of the word and one at the end. ‘Harmony’ within these two domains obeys different principles. Initial-domain harmony is sonority-driven and relates to data patterns attested in other (Southern) Greek dialects. Final-domain harmony is non-sonority driven and relates (more) to the harmony pattern of Turkish.

### 1. Introduction

Consider the following examples from a number of Asia Minor dialects:

Note: in our examples ‘Standard Greek’ refers to the standard language as it is currently spoken. When different from the standard language, the underlying representation of the dialectal form is provided within slashes /.../.

#### (1) ‘harmony’ in various Asia Minor dialects

STANDARD FORM	DIALECT FORM	GLOSS	DIALECT - SOURCE
a   ónoma	ónama	‘name’	Silly, Ko33
b   koskin-ó	koskun-ó	‘sieve-1SG.PRES’	Silly, Ko31
c   /é-ze-s-a/	ézasa	‘live-1SG.PAST’	Farasa, An48:20
d   zerv-á	zavrá	‘left’	Livisi, An61:32
e   evðomáð-a	ovdomája	‘week’	Axo, MK9
f   miruðjá	murudjá	‘smell’	Axo, MK111

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Sources: Axo (Dawkins 1916, Mauroxalyvidis & Kesisoglou 1960), Silly (Kostakis 1968), Farasa (Andriotis 1948), Livisi (Andriotis 1961), Ulaghatsh (Dawkins 1916, Kesisoglou 1951)

It is not completely clear whether this ‘harmony’ was still a fully active phonological process at the moment these data were recorded, or whether it reflects a diachronic process which had applied at an earlier stage. We assume that, even if the latter is the case, this change of underlying forms still needs an explanation in terms of phonological theory.

✓ Vowel harmony processes are not as widespread in Greek dialectology as they are in Turkish.

(2) *harmony in Turkish*

	NOM.SG	GEN.SG	NOM.PL	GEN.PL	
a	/iʃ/	/iʃin/	/iʃler/	/iʃlerin/	‘name’
b	/ev/	/evin/	/evler/	/evlerin/	‘house’
c	/kuuz/	/kuuzun/	/kuuzlar/	/kuuzlarun/	‘girl’
d	/jol/	/j olun/	/jollar/	/jollarun/	‘road’
e	/gyl/	/gyl yn/	/gyller/	/gyllerin/	‘rose’
f	/gœl/	/gœlyn/	/gœller/	/gœllerin/	‘lake’
g	/tas/	/tasun/	/taslar/	/taslarun/	‘pot’

At first sight, it may therefore seem plausible to assume that the Cappadocian<sup>2</sup> forms in (1) have simply adopted the Turkish process and incorporated it in their otherwise Greek phonology. This is indeed the standard view in contact linguistics at least since the work of Thomason and Kaufman (1988) (see also Winford 2003 for an alternative view of the Asia Minor contact situation).

In this talk, we will show that things have not been as simple as that. The Cappadocian processes are very different from those in Turkish (§2); rather they seem extensions of processes we also find in other Southern Greek dialects, such as Karpathos (§3). We will see how this has developed into a very interesting system in its own right in Cappadocian, and briefly discuss what the possible role of language contact might have been in §4.

## 2. Cappadocian and Turkish vowel harmony

There are some interesting differences between Cappadocian and Turkish Vowel Harmony (VH)

- Harmony in Cappadocian does not always involve features; usually, the whole vowel is copied:

(2) *vowel copying in word final position*

	STANDARD FORM	DIALECT FORM	GLOSS	DIALECT - SOURCE
a	ánem-os ðáskal-os	ánomos ðáskolos	‘unlawful’ ‘teacher’	Axo, MK9 Farasa, A48:20

<sup>2</sup> We use the term Cappadocian to refer not only to the Cappadocian dialects (Axo, Ulaghatsh, etc.) but also to other Asia Minor dialects examined here such as Farasa, Silly and Livisi.

b	ónoma pandeleímon-as	ónama pandeleímanas	‘name’ ‘name of a saint’	Silly, Ko33 Silly, Ko151
c	/ektóte/ fílak-s-e erxó-maste íp-e /é-ðok-en/	ektéte fílekse erúmeste épe ðéken	‘since’ ‘guard-3SG.PAST’ ‘come-1PL.PRES’ ‘say-1SG.PAST’ ‘give-3SG.PAST’	Axo, MK8 Axo, MK188 Axo, MK190 Ulaghatsh, Ke142 Ulaghatsh, D308

## (3) vowel copying in word initial position

	STANDARD FORM	DIALECT FORM	GLOSS	DIALECT-SOURCE
a	kateváz-i meɣarízo-o sevast-í	kataváz maɣarízo savastí	‘put down-3SG.PRES’ ‘mess up-1SG.PRES’ ‘name’	Axo, MK192 Axo, MK8 Axo, MK8
b	velón-i embrós methópor-o	volóni ombró moxóporo	‘needle’ ‘in front’ ‘fall’	Axo, MK9 Axo, MK216 Axo, MK9
c	lizmon-ó evðomáð-a fover-ós	zolmonó ovdomája fovoró	‘forget-1SG.PRES’ ‘week’ ‘frightening-ACC.SG’	Axo, MK9 Axo, MK9 Axo, MK9
d	miruð-já pipér-i	murudjá pepér	‘smell’ ‘pepper’	Axo, MK111 Axo, MK116

- Sonority plays an important role, much more than in Turkish, where there is only an effect of vowel height in labial harmony:

See ex. in (3)

- It is not sensitive to morphological structure:

## (4)

	STANDARD FORM	DIALECT FORM	GLOSS	DIALECT-SOURCE
a	within the stem			
	tésara ékso ónoma ektóte	tésara ókso ónama ektéte	‘four’ ‘out’ ‘name’ ‘since’	Farasa, An48:20 Ulaghatsh, D366 Silly, Ko33 Axo, MK8
b	between stem-suffix			
	petsét-a ánem-os fílak-s-e	petfáta ánomos fílekse	‘napkin’ ‘wind’ ‘guard-3SG.PAST’	Silly, Ko185 Axo, MK9 Axo, MK188

- Stressed final vowels are NOT triggers; in this case, the ‘default’ sonority-driven harmonic process takes place:

(5)

STANDARD FORM	DIALECT FORM	GLOSS	DIALECT-SOURCE
a   kerat-ás	tʃaratás	‘s.o. with horns’	Farasa, An48:20
b   monax-ós orfan-ós perpat-ó aðelf-ós elin-ik-ó	manaxós arfanós parpató aðarfós elenikó	‘lonely’ ‘orphan’ ‘walk-1SG.PRES’ ‘brother’ ‘greek-ADJ’	Axo, MK8 Livisi, An61:33 Farasa, An48:20 Livisi, An61:33 Farasa, An48:81
c   /kirek-í/	kerekí	‘Sunday’	Axo, MK8
d   alep-ú	alapú	‘fox’	Livisi, An61:33

### 3. Southern Greek vowel copying: the Karpathos dialect

The importance of sonority in the Cappadocian harmony process reminds us of a vowel copying pattern found in other (southern) dialects of Greek. The following examples show that Karpathos Greek (Minas 2002) has a vowel copying pattern in which two adjacent vowels are assimilated:

(6) *initial vowel assimilation in Karpathos Greek* (Minas 2002: 56-60)

a	orfan-ós árot-r-on kalo-pód-i pano-fór-i	arfanós áratron kalapói panafóri	‘orphan’ ‘plough’ ‘shoehorn’ ‘overcoat’
b	elafr-ís ená-mis-i eryá-t-is ðrepán-i	alafirís aná-misi argátis ðrapáni	‘light’ ‘one and a half’ ‘worker’ ‘sickle’
c	irakl-ís ipako-í	araklís apakoí	‘Hercules’ ‘obedience’
d	velón-i embrós pepón-i	volóni ombrós popóni	‘needle’ ‘in front’ ‘melon’
e	iyr-ós siróp-i	oyrós sorópi	‘wet’ ‘syrup’

f	/stomúx-i/ /skotúr-a/	stumúxi skutúra	‘stomach’ ‘worry’
g	ésθi-ma éksi	éstema ékse	‘feeling’ ‘six’
h	kukíð-i /e-vréx-umin/	kukúi evréxumun	‘bullet’ ‘get wet-1SG-PAST’

- Vowel-assimilation obeys a sonority hierarchy. If two vowels are adjacent, the less sonorous one assimilates to the more sonorous one, according to the hierarchy in (7):

(7)  $a > o > u > e > i$

Note: there are a few inconsistencies with respect to the ordering of /o/ and /u/ which will be ignored here

- ✓ Sonority-driven vowel assimilation is common in many Southern Greek dialects, e.g. Symi (Katsiki 1974), Cypriot (Newton 1972), Rhodes (Papachristodoulou 1986), and so on.
- The hierarchy in (7) is obviously more generally known in the phonology of Greek, since it also guides vowel deletion in hiatus contexts:

(8) *vowel hiatus in Karpathos Greek* (Minas 2002: 62-67)

a	/ta ómorfa/	támorfa	‘the beautiful ones’
b	/ðéka éksi/	dekáksi	‘sixteen’
c	/mesá íne/	mesáne	‘s/he is inside’
d	/to éma/	tóma	‘the blood’
e	/me uranó/	muranó	‘with sky’
f	/roméika/	roméka	‘Greek’

There are, however, differences between Karpathos vowel copying and Cappadocian harmony:

- In the first place, unlike Karpathos Greek, Cappadocian harmony does not obey the sonority hierarchy, especially the one that applies to the end of the word:

(9) *Karpathos*

a	orfan-ós	arfanós
b	elafr-ís	alafirís
c	velón-i	volóni
d	iγr-ós	oγrós

(10) *Cappadocian*

a	ektóte	ektéte
b	filak-s-e	filekse

- In the second place, Karpathos vowel copying only seems to happen within a stem (or possibly within a disyllabic morpheme). More specifically, in Karpathos, assimilation seems to be limited to:

a. the stem:

ésθi-ma                      éstema  
an-ésθi-t-os                anéstetos

b. disyllabic suffixes:

e-vréx-umin                evréxumun (this could be due to the labial /m/)

Vowel assimilation crosses morphological borders only if the stem is monosyllabic and hence does not form the required disyllabic domain:

élk-os                        órkos  
éry-on                        órgon  
iyɾ-ós                        oyɾós

Cappadocian, however, does not obey this restriction (see also ex. in (4)):

(11)

a	between stem-suffix			
	petsét-a ánem-os perðik-ó-θir-a	petfáta ánomos perðikóθara	'napkin' 'wind' 'door for birds'	Silly, Ko185 Axo, MK9 Farasa, An48:20
b	within a suffix			
	erx-ómaste	erúmeste	'come-1PL.PRES'	Axo, MK190
c	within a stem			
	meta-kán-o moná-ðipl-os	matakáno manáðifkos	'do again-1SG.PRES' 'single-double'	Farasa, An48:20 Farasa, An48:20

#### 4. Two domains of harmony

(12) THEORETICAL BACKGROUND: in order to describe the pattern of Cappadocian we assume the following:

- A harmonic span of two syllables is constructed at the end of the word and at the beginning of the word (see McCarthy 2004 for various implementations of the notion of harmonic span)
- The two spans obey different requirements:
  - ✓ The span at the end of the word is more like Turkish vowel harmony. It concerns mainly spreading from roundedness and backness. There is no spreading from stressed vowels

- ✓ The span at the beginning of the word is less restricted. It copies one vowel to the other vowel, along the lines of sonority à la Karpathos and other Southern Greek dialects (e.g. Symi, Rhodes, Cypriot, etc.).

- c. Since the span at the end is more restricted, it takes precedence over the one at the beginning in the case of possible conflict.

(13) In two syllable long words, the harmonic domains coincide:

	STANDARD FORM	DIALECT FORM	GLOSS	DIALECT-SOURCE
a	fáyo	fóyo	'eat-1SG.PRES'	Ulaghatsh, D65
b	ékso	ókso	'out'	Ulaghatsh, D366
c	pu θá	paá	'that will'	Livisi, An61:33
d	kíthe	kéxe	'there'	Axo, MK77
e	édoken	édeken	'give-3SG.PAST'	Ulaghatsh, D376

☞ Examples such as *fáyo* → *fóyo* (13a), *édoken* → *édeken* (13e) suggest that final-domain harmony takes precedence over initial-domain harmony.

(14) In more than two syllable long words, harmony domains do not coincide. Provided there is a harmony-triggering vowel, namely a vowel from the set {a, o, e}, the domain is at the end of the word:

	STANDARD FORM	DIALECT FORM	GLOSS	DIALECT-SOURCE
a	tésara	tésara	'four'	Farasa, An48:20
	petsét-a	petfáta	'napkin'	Silly, Ko185
	ónoma	ónoma	'name'	Silly, Ko33
b	ánem-os	ánomos	'wind'	Axo, MK9
c	/ektóte/	ektéte	'since'	Axo, MK8
	filak-s-e	filekse	'guard-1SG.PAST'	Axo, MK188

(15) otherwise, the harmony span is formed at the beginning of the word:

	STANDARD FORM	DIALECT FORM	GLOSS	DIALECT-SOURCE
a	sevast-í	savastí	'name'	Axo, MK8
b	kateváz-i	kataváz	'put down-3SG.PRES'	Axo, MK192
c	meyaríz-o	mayarízo	'mess up-1SG.PRES'	Axo, MK8

(16) Stressed final vowels do not create a harmonic span (see also ex. in (5)):

	STANDARD FORM	DIALECT FORM	GLOSS	DIALECT-SOURCE
a	kerat-ás	tjaratás	's.o. with horns'	Farasa, An48:20
b	monax-ós	manaxós	'lonely'	Axo, MK8; Silly, Ko56
c	kirek-í	kerekí	'Sunday'	Axo, MK8

	elin-ik-ó	elenikó	‘Greek’	Farasa, An48:81
d	alep-ú	alapú	‘fox’	Livisi, An61:33

- ✓ The reason for this is that this would create a mismatch between the structure of the harmonic span and that of the metrical foot, which is a trochee. In other words,  
 ⇨ the head of the metrical foot should not be in the weak position of the harmonic foot:

(17)            ↓ mismatch  
                   (\* . ) harmonic span  
                   ( \* ) metrical foot  
 m o n a x ó s

## 5. Formalization

In this section we will attempt a formalization of the chief insights presented in the previous section. We assume that a notion of a harmonic span, consisting of two syllables is required (Halle & Vergnaud 1978, Harris & Lindsey 1995, van der Hulst and van de Weijer 1995). In accordance with at least some of these authors, we also claim that these spans are congruent with metrical feet, more specifically, trochees (McCarthy 2004 presents a different approach).

(18) a.         $\wedge$                     initial domain  
                   o v d o m a j a

          b.         $\wedge$                     final domain  
                   e z a s a

Within these feet, different principles apply, as we have seen. We propose to formalize these using the notion of *positional markedness* (Kiparsky 1997, Zoll 1998, Smith 2004, and others): certain markedness constraints hold only (or hold more forcefully) in prominent positions than in others. Prominence may be defined either in terms of stress, or of absolute position: word-initial positions are considered more prominent than others.

At the beginning of the word, we propose the following positional markedness constraint is in effect:

(19) HNUC/FIRSTFOOT: Syllable nuclei should be maximally sonorous (within the first foot of the word)

One way to make the nuclei within the first foot maximally sonorous, would be by simply turning them all into the most sonorous vowel, namely /a/, e.g.:

(20) elin-ik-ó > \*alanikó

The reason why this does not happen, is that (20) interacts with a faithfulness constraint to the following effect:

(21) MAX-VFEAT: Do not insert (vocalic) features

(22)

/elin-ik-o/	MAX-VFEAT	HNUC/FIRSTFOOT
a. elinikó		ei!
b. elenikó		ee
c. elanikó	*!	e
d. alanikó	**!	

This part of the system thus has nothing to do with harmony, from a purely formal point of view. Both vowels want to be as sonorous as possible, without adding new material. Spreading of the full vowel is the best way to get this effect. The autosegmental representation of (23) should be something like the following (we represent vowels and consonants on separate tiers, but there are other formal ways of getting the same effect):

(23)

	l	n	k
x	x	x	x
x	x	x	x
/			
e		i	o

The domain at the right-hand edge of the word obeys a different type of positional markedness constraint. In this case, we propose a constraint which is more in conformity with the proposals of Walker (to appear) for metaphony in Romance (specifically Italian) dialects, in which features seem to move to stressed (i.e. head) positions in the word. In order to analyze these, Walker uses constraints of the following type:

(24) LICENSE(F,S-Pos): Feature [F] is licensed by association to strong position S.

Let: i.  $f$  be an occurrence of feature [F] in an output O

(optional restrictions:

(a)  $f$  is limited to a specification that is perceptually difficult,

(b)  $f$  belongs to a prosodically weak position,

(c)  $f$  occurs in a perceptually difficult feature combination),

ii.  $s$  be a structural element (e.g.  $\sigma$ ,  $\mu$ , segment root) belonging to perceptually strong position S in O,

iii. and  $s\delta f$  mean that  $s$  dominates  $f$ .

Then,  $(\forall f)(\exists s)[s\delta f]$ .

Simply put, LICENSE(F, S-Pos) requires that a feature be affiliated with a perceptually strong position. In the case of Cappadocian dialects, the relevant features F are (possibly) [round] and [back]. The S-Pos is the head of the domain-final harmonic foot:

(25) LICENSE([round, back], HeadHarmony): Features [round, back] are licensed by association to the head of a harmonic domain.

Because of the nature of this constraint, spreading will only go from a less prominent position to a more prominent position. This is the reason why we do not find forms such as the following:

- (26) \*m o n o x ó s  
                   |  
                   [labial]                   spreading from a prominent (main stressed) position

This constraint also interacts with a faithfulness constraint, in this case of the following type:

- (27) IDENT([round, back]): If an input segment A and an output segment B are in a correspondence relation, they should have the same specification for features [round, back].

The interaction between these two constraints gives us the required pattern:

(28)

/anemos/	LICENSE	IDENT
a. ánemos	*	
b. ánomos		*
c. ónomos		**!

☞ If we assume: LICENSE » HNUC/FIRSTFOOT, we can also account for the fact that the domain at the end of the word takes precedence over the domain at the beginning of the word.

## 6. Discussion

Our analysis of the data in the preceding section just scratches the surface of the complicated data we find in the Cappadocian dialects. Even though our generalizations made above seem to cover a large majority of data, it also is possible to find problematic cases, which do not conform to what we have said:

- (29) *non-application of vowel harmony*
- |   |         |          |                 |                 |
|---|---------|----------|-----------------|-----------------|
| a | seránda | *saránda | ‘forty’         | Ulaghatsh, D362 |
| b | éfaksan | *áfaksan | ‘kill-3PL.PAST’ | Ulaghatsh, D364 |
| c | mílo    | *mólo    | ‘apple’         | Ulaghatsh, D370 |
| d | mayéri  | *mayári  | ‘knife’         | Ulaghatsh, D374 |
- (30) *initial-domain > final-domain*
- |   |              |             |                     |                 |
|---|--------------|-------------|---------------------|-----------------|
| a | meta-kán-o   | matakáno    | ‘do again-1SG.PRES’ | Farasa, An48:20 |
|   |              | *metakóno   |                     |                 |
| b | moná-ðipl-os | manáðifkos  | ‘single-double’     | Farasa, An48:20 |
|   |              | *monáðofkos |                     |                 |

(31)	<i>other (unproductive) patterns</i>			
a	léfteros	líftirus	‘free’	Livisi, An61:32
b	keramíði	keremítzi	‘tile’	Silly, Ko168
		*karamítzi		
c	trayúðó	troyoðó	‘sing’	Ulaghatsh, D65
		*trayodo		

We may see these forms either as lexical exceptions, as indications that a finer-grained analysis is necessary or as indications that other (diachronic) processes have interfered. In either case, we believe that the basis of our analysis will stand to scrutiny.

Some further issues:

- one could wonder *why* Cappadocian dialects have developed these intricate patterns of harmony. Even though we have shown that they do not really have a truly Turkic type of vowel harmony, it stands to reason that these patterns have still developed under the influence of language contact with Turkish. Possibly, this contact has brought Greek language learners to extend the patterns they already found in the (Southern) Greek of their parents so that they would look more like vowel harmony.
- another question is why the ‘Greek’ pattern shows up at the beginning of the word, while the ‘Turkish’ pattern shows up at the end. Our guess is that the language learner will have more opportunity to observe the Turkish pattern at the end of the word. First, vowel harmony patterns in Turkish are most easily observed at the edge between stems and suffix (because this is where the real alternations are). Second, the end of the word is where the main stress usually is (in these dialects), so naturally this positions tends to be more prominent. Furthermore, we speculate that adoption of something similar to the foreign language is more likely in these prominent positions than in non-prominent positions.

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