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Consonant-vowel interactions in Karaim phonology: A Government Phonology perspective

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The NW dialect of Karaim, which is spoken in Lithuania, provides a challenge for theoretical phonologists. The essence of this language's harmonic process is elusive, prompting questions about how to define it. For example, is it the consonants alone which drive the harmony, or do the vowels play a part? Or is it the syllabic head which encodes all harmonic information? Is it indeed possible to separate the harmonising properties of consonants from those of vowels? In this paper consonant-vowel interactions in Karaim are looked at from a Government Phonology theoretical point of view. Harmony is treated as a supra-segmental phenomenon, driven by inter-nuclear relationships. The effect of such a relationship percolates down through all intermediate relationships, between the structural positions which consonants and vowels occupy, and between the component parts of the segments occupying these positions. There is more than one manifestation of structural hierarchy in Karaim phonology. Firstly, inter-nuclear relationships ensure that all nuclei within the relevant domain contain the palatalising element, I. Secondly, the complementary distribution of the vowels *e* and *ȧ* in front-harmonic words provides evidence for an inter-nuclear relationship which also involves the element I. The occurrence of *e* (only in initial nuclei) and of *ȧ* (only in non-initial nuclei) is explained as a restriction on the way I fuses with other elements in non-initial nuclei. I conclude that the hierarchy of relationships firstly between structural positions occupied by consonants and vowels, and secondly between the elements which these segments are composed of, makes it impossible to separate the quality of a consonant from the properties of a vowel, or vice versa, in a Government Phonology analysis of Karaim harmony.

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1. Introduction

The North Western dialect of Karaim, spoken in Lithuania, has been documented by Csató as part of her efforts to preserve the language. Karaim is interesting because it has a full set of plain and palatalised consonants, probably influenced by its long contact with Polish and Russian which are both well-known for their palatalised consonants. It is an unusual feature for a Turkic language to have a full set of contrasting consonants, although palatalisation itself occurs to a greater or lesser extent

in related languages. What is particularly interesting about Karaim is that palatal[1] harmony involves consonants as well as vowels. In some cases, even, the front quality of non-initial vowels appears to be less distinct than the front quality of the surrounding consonants.

Two recent analyses of Karaim harmony have been proposed. Csató (1999) following Johanson (1991) proposes syllabic harmony; Nevins & Vaux (2002) propose consonant harmony. The problem of how Karaim harmony should be defined reveals differences in theoretical approaches to analysing the data. The question here is not whether "syllabic" harmony or "consonant" harmony is the correct analysis, but whether Government Phonology (GP)[2] can offer some insights into a relationship between harmony and palatalised consonants. In this paper I propose an analysis of Karaim harmony in GP terms, suggesting that consonants and vowels interact with each other. I shall consider some distributional asymmetries, focussing on the complementary distribution of /e/ and /å/ as transcribed in Csató (1999)[3] in relation (i) to palatalised consonants and (ii) to their position in the word. The analysis will be based firstly on a special relationship between an onset containing a palatalised consonant and the nucleus which follows it[4] and secondly on a hierarchical relationship between the nucleus which is head of the harmonic domain and the remaining nuclei within its domain.[5] It will be proposed that nuclei which are not head of the harmonic domain have constraints on the composition and structure of vowels which occupy these positions. The conclusion will be that consonants and vowels are not easily separated when analysing Karaim harmony.

For the benefit of readers who may not be familiar with GP, a few words about the framework may be helpful, before looking in detail at Karaim.

2. The GP framework: basic concepts

GP is a principles and parameters abstract theoretical approach. Harmony can be analysed as the spreading of some property or properties, but this is essentially only a *metaphor*. Harmony involves the presence of a particular property (for example,

1 Harmony may be classified as "palatal", "front" vs. "back", depending on one's theoretical background. From a GP point of view, palatality is expressed by the presence of an element "I".

2 The theoretical framework will be introduced briefly wherever it applies.

3 Two short extracts are illustrated in the Appendix. For the purposes of this paper, the focus is on the vowel transcribed as /å/ although the same analysis could be extended to the other vowels. The pronunciation of /å/ varies both between different speakers and also between examples of the same speaker. Approximate IPA symbols [a] and [æ] are used to show this. The variation will be explained as two manifestations of a constraint on the fusion of elements in non-initial nuclei.

4 This relationship, defined as "Sharing" by Kaye (1992), will be discussed in detail in section 3.

5 Restrictions on the content of recessive nuclei will be explained in section 4 by means of the Licensing inheritance principle, Harris (1997).

frontness or roundness) in all the relevant positions within the harmonic domain. Two significant differences from some other frameworks are the use of monovalent elements as the basic building blocks in the composition of segments, and the organisation of the structure above segments. As the name implies, relationships within a domain involve government.

2.1. Elements

There are no distinctive features (plus or minus), phonemes, allophones etc. in GP. A very small number of elements in various combinations generate all phonological expressions (i.e. consonants and vowels).[6] For example, the element I represents palatality, frontness etc., the element U represents labiality, roundness etc. and the element A represents openness, lowness etc.

Elements play one of two roles within a phonological expression. They may either be a head or an operator. Only one head per expression is permitted, but the number of operators is not limited since these do not form a hierarchical relationship with each other when they fuse together (unlike the relationship between a head and an operator). A phonological expression may have no head. It may even be empty, in which case it can be interpreted in various ways in different languages, e.g. as [ɨ] or as schwa.

Three elements combined in an unstructured relationship generate seven possible vowels, plus a potential expression without any content. These are illustrated in (1) with approximate phonetic interpretations since they are not specific to any particular language.

(1) (A) a (I) i (U) u (A.I) e (A.U) o (U.I) ü (A.I.U) ö ( ) ɨ

A structured relationship between elements produces further possibilities. For example, the elements A and I can combine either as (I.A) where A is head, or as (A.I) where I is head. (By convention, heads of expressions are usually shown on the right-hand side and underlined.) Since there is no ordering of operators, (A.I) is theoretically the same as (I.A). This makes a total of three ways that two elements can combine, illustrated in (2).

(2) (A.I) (A.I) (I.A)

Such differences in structure can be utilised in some languages to analyse expressions which are related, but which may behave differently phonologically e.g. [e], [ɛ] and [æ].

[6] For general background on elements, see Harris & Lindsey (1995). Cobb (1993) and Charette & Göksel (1998) discuss some revisions to the theory, together with constraints on combinatorial properties of elements especially with respect to Turkic vowel harmonies.

Language-specific constraints determine how elements combine in order to produce the inventory of sounds for a given language. For example, in some languages it has been proposed that the element A cannot be a head in nuclear expressions, i.e. vowels, whilst in other languages it has been proposed that the element I must be a head. As far as palatal harmony is concerned, the element I should be present in all relevant positions within the harmonic domain. From the point of view of Karaim harmony, the question is to define which position is relevant: the onset (consonant), the nucleus (vowel), or both. The role that the element I plays within the position it occupies forms a crucial part of the analysis.

2.2. Structure above the segment

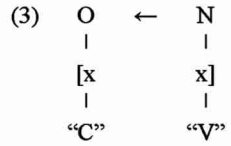
It is necessary to discuss structure very briefly for two reasons. Firstly, we need to understand how the terms "syllabic" harmony and "consonant" harmony can be translated into GP theoretical concepts. Secondly, the hierarchy of relationships between constituents of a word, and also between heads of constituents has consequences for the analysis of harmony.

Melody is linked to a structure which is constrained by principles of Universal Grammar.[7] GP differs fundamentally from many other frameworks in that segments are allocated to an existing structure, and not vice-versa (i.e. structure is not made to fit the segments) via a skeletal tier of timing slots. This means that logically a structural position may sometimes be empty.[8]

The syllable is not recognised as a constituent in GP. Onset nucleus pairs form the basic structural unit which can be identified informally as the equivalent of an open syllable in other frameworks. Since GP does not allow a word-final coda, word-final consonants must occupy an onset followed by a silent nucleus. The most important aspect for the present purposes is the universally head-final relationship between onset and nucleus, whereby the nucleus is the licensor, i.e. the head, and the onset is the licensee of the minimal structure illustrated in (3).

[7] For background reading on constituent structure in GP, see Kaye (1990), Kaye, Lowenstamm & Vergnaud (1990) or Brockhaus (1995). Although Government phonologists allow maximally binary branching constituents, Lowenstamm (1996) proposes a more constrained non-branching version of the theory. In some versions, melody may be linked directly to CV positions without intermediate skeletal points. A non-branching structure suffices here for the purpose of this paper.

[8] An empty position remains silent (uninterpreted) subject to the conditions of the phonological empty category principle. It should be possible here to have a general picture of constituent structure without a detailed discussion of how GP deals with empty categories although these form an essential part of GP theory.

(3)


Relationships between nuclei, the heads of ON pairs, are formed when there is a string of more than one such pair. These relationships take place at a higher level where supra-segmental phenomena, for example stress and harmony, are organised. The direction of relationships between nuclei, for example in harmony phenomena, may be either head-initial or head-final, according to the language.

3. Relationships between structure and content

Relationships between onset and nucleus, as well as between nucleus and nucleus, may be manifested as harmony of one kind or another. In this paper we are especially concerned firstly with the relationship between an onset containing a palatalised consonant and the following nucleus, and secondly the relationship between onset-nucleus pairs which form harmonic domains in Karaim.

3.1.1. Harmony between onset and nucleus

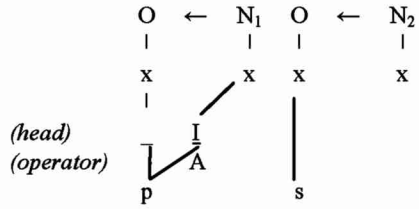
Although there are many languages where the content of an onset appears to be totally unrelated to the content of its nucleus (in other words any vowel may follow any consonant), there are languages where constraints clearly exist on the content of adjacent consonant and vowel. A typical example of this is the relationship between a palatalised consonant and the vowel which follows it. For example, the vowel [i] should follow a palatalised and not an unpalatalised consonant in languages where the two types of consonant contrast. The vowel [ɨ] should follow a plain consonant. Since Karaim is famous for its palatalised consonants, we begin by looking at their structure in GP.

3.1.2. Palatalised consonants in GP

In GP terms, palatalisation (as well as other phenomena involving the front quality of consonants or vowels) is represented by the presence of the element I. From the point of view of structure, the element I occupies the onset as an operator.[9] In addition to this, Kaye (1991) proposed that a palatalised consonant in Polish has a special relationship with the following vowel, whereby the same element I occupies the nucleus as a head. A rough sketch to show a concrete example from Polish, *pies* 'dog', is given in (4). The full elemental composition of the consonants is not shown here, only the relevant palatalising I element.

[9] This distinguishes palatalised consonants from true palatals, which have I as a head.

(4)



Pol. *pies* 'dog'

In (4) a single I element is linked both to the onset as operator and to the nucleus as head, giving us a palatalised p. The nucleus N_1, which is head of the ON constituent, licenses the I-head it dominates to be an operator in its own onset. The fusion of two elements in N_1, an I-head with an A-operator, gives us the vowel [e]. (The final empty nucleus need not concern us here.)

The theoretical concept of Sharing was introduced by Kaye (1991, 1992) to explain the appearance and disappearance of palatalised consonants in Polish, related to vowel-zero alternation in that language.[10] For example, the word *pies* 'dog' apparently has a palatalised consonant followed by a front vowel, but when the addition of a suffix triggers vowel-zero alternation the consonant is not palatalised, e. g. *pies* 'dog' ~ *psa* [dog:GEN]. Kaye argues that it is not helpful in Polish to say whether the I element occupies the onset or the nucleus, therefore he proposes sharing I between both positions. This avoids the problem of deciding whether to analyse the word *dog* either as *p^j-e-s*, with a palatalised consonant, or as *p-ie-s*, with a diphthongised vowel. In Polish, when the nucleus containing a shared I is silent, then the same I element cannot be interpreted in the onset.

Whilst the Polish analysis is crucial for understanding the very close relationship between an onset containing a palatalised consonant and the nucleus which licenses it, this is not to say that the relationship is constrained in exactly the same way in all languages. It is clear that in some languages, e.g. Russian and Khalkha Mongolian, palatalised consonants can be followed by a silent nucleus. Although this must be the case also in Karaim because certain palatalised consonants occur word-finally (please see the text in the appendix for examples), this detail will not be discussed here.

From the point of view of harmony between onset and nucleus, it appears that either both positions must contain an I element, or else neither position may contain an I element. This point will be returned to later, when we look at restrictions on which vowel may follow a palatalised consonant in Karaim, and which may not.

[10] In Slavic languages a vowel which alternates with zero is called a *yer*. The interaction between *yers* and palatalisation is well-known, but analyses vary according to different frameworks. There is no vowel deletion in GP, only the operation of the phonological empty category principle controlling non-interpretation of the nucleus a vowel occu-pies. The operation of the ECP (not only on fully empty categories but also on a pseudo-empty category, i.e. a position occupied only by a shared element) is beyond the scope of this paper.

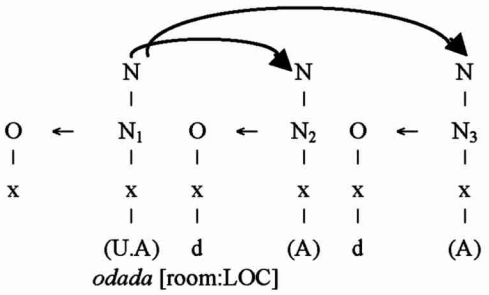
Meanwhile, let us see how relationships between nuclei, the heads of ON constituents, control harmony within the domain of a word.

3.2. Harmony between nuclei

Harmony can be defined as agreement with respect to some property between a licensor and its licensee. At a suprasegmental level, this is assumed to be a manifestation of governing relationships between nuclei on a projection where they are adjacent. The domain-head, the governor, licenses a certain property in its licensee(s) through government.

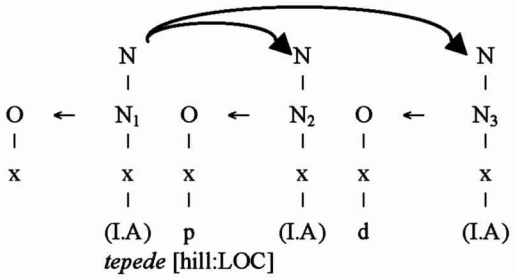
Let us take Turkish to illustrate a typical example of harmony between vowels. In this case, the I element is the property which is shared by all nuclei within a harmonising domain. Two words are shown in (5), one where no I element is present in any nucleus, and the other where I is present in all nuclei of the domain.[11]

(5) a.



odada [room:LOC]

(5) b.



tepede [hill:LOC]

To begin with, in (5a) there is no element I present in any of the nuclei. This does not mean that there is no relationship between nuclei at the projection where internuclear government takes place. N_1 is assumed to govern N_2, and then again to gov-

[11] U-harmony is not considered here. Consonants are involved in I-harmony only very marginally in Turkish, and will not be included in this part of the discussion. No attempt is made here to define the status of heads or operators in these examples.

ern N_3, which are both within its domain.[12] It simply means that no I element is present for the governing nucleus to license. In (5b), on the other hand, all nuclei contain an I element. N_1 licenses the element I which is present in itself also to occupy the remaining nuclei within its domain.

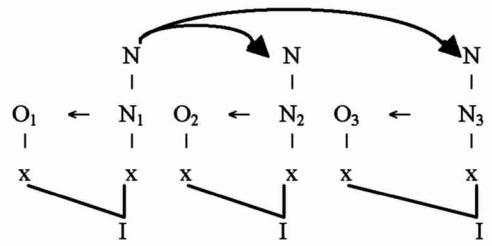
It makes no difference for the present purposes whether harmony is viewed as a process of I-spreading from the head of the domain, or as a static process of licensing I to occupy all nuclei within the harmonic domain. In a non-derivational framework like GP, harmonic spreading is essentially only a metaphor.

3.3. Combining the two relationships

It should logically be possible to combine the two relationships described above. Harmony between onset and nucleus, as in the case of a palatalised consonant and a following vowel both of which contain a shared I element, could go hand in hand with harmony between nuclei which also all contain an I element.

Leaving aside the fact that in some languages there may be constraints preventing certain consonants from being palatalised, let us imagine a hypothetical language where all consonants palatalise in the context of all front vowels. The diagram in (6) shows an abstract example with none of the additional segmental material. The shared I element alone is illustrated occupying O_1 and N_1, representing a palatalised consonant followed by a front vowel. According to the harmonic spreading metaphor, licensing of the I element passes down the chain of relationships through nuclear government by the domain head. N_1 governs N_2 which in turn licenses its own onset O_2, and licenses the I element to be shared between them. As head of the harmonic domain, N_1 also licenses the I element in the remaining positions of its domain either directly through inter-nuclear government or indirectly through onset licensing.

(6)



The question is: can this hypothesis be applied to Karaim?

[12] The licensing principle (Kaye 1990) states: "All phonological positions, save one, must be licensed within a domain. The unlicensed position is head of the domain".

4. Harmony in Karaim

The thing that distinguishes Karaim from other Turkic languages is that it has a full set of contrasting plain and palatalised consonants. Words where there is palatal harmony, i.e. I-harmony in GP terms, have palatalised consonants, in contrast with words where there is no I-harmony.[13] Examples in (7) illustrate the contrast.

(7)	a.	*kaldïm*	[stay:PAST1SG]
		orunγa	[place:DAT]
	b.	*kʲelʲdʲim*	[come:PAST1SG]
		jʉvʲgʲa	[house:DAT]

As far as the consonants are concerned, they are clearly palatalised in words where I-harmony occurs. The quality of certain vowels in the context of palatalised consonants however, especially those transcribed as *ȧ, ȯ* and *ʉ̇*, is more problematic.[14] These are different from the front vowels usually transcribed as *e, ö* and *ü*, to the extent that sometimes they appear to be phonetically little different from the vowels in non-harmonic words.

The phonetic quality of these so-called front vowels has prompted Nevins & Vaux (2002) to analyse Karaim harmony as "consonant harmony" in which intervening vowels play no part. Csató (1999), on the other hand, defines Karaim harmony as "syllabic harmony"[15] whereby the value for frontness or backness is encoded in the whole syllable rather than residing in a single component of the syllable.

No real criticism or comparison of these two analyses is proposed here, since the theoretical foundations on which their proposals are made differ from those of GP. Nevertheless, both approaches assume a harmonising relationship between constituents at a higher structural level. In other words, both treat harmony as a suprasegmental phenomenon and not as spreading between strictly adjacent constituents. Syllabic harmony implies a relationship between syllable heads, i.e. nuclei in GP terms. Consonant harmony, as I interpret Nevins & Vaux's analysis, takes place at a projection where onsets are adjacent and visible to each other, and where nuclei play no part in the process.

From a GP perspective, I aim to show that in Karaim there is a relationship between nuclei at a supra-segmental level which has direct consequences on the relationship between vowels and palatalised consonants at the segmental level. It is not so much a question of whether onsets or nuclei establish harmonising relationships with each other, but a question of where and how the I element, i.e. frontness, is interpreted. I suggest that the properties of a palatalised consonant cannot easily be separated from the properties of a following vowel.

[13] Palatalisation of final consonants is variable. This will not be discussed here.

[14] Csató (1999) describes these as front vowels "pronounced in a somewhat retracted way".

[15] There are two types: intra-syllabic in which all constituents of a syllable are involved (and must agree), and inter-syllabic which involves agreement between different syllables.

First, let us be clear about what consonant harmony involves.

4.1. Definition of consonant harmony

Consonant harmony appears to fall into two categories. One type would be better described as "consonant-vowel harmony", since both consonants and intervening vowels are affected. The second type involves only consonants. According to Hansson (2001), the latter type is comparatively rare and unusual. He gives the following pre-theoretical working definition for this type of harmony.

> (8) *Consonant harmony* (definition):
> Any assimilatory effect of one consonant upon another consonant, or any assimilatory co-occurrence restriction holding between two consonants, where:
> a. the two consonants are separated by a string of segmental material consisting of, at the very least, a vowel; and
> b. intervening segments, in particular vowels, are not audibly affected by the assimilating property.

Hansson claims that true consonant harmony is oblivious to the nature of intervening vowels. According to the above definition, Karaim appears to fall into the consonant-vowel category on two counts.

Firstly, there are adjacency restrictions between certain consonants and certain vowels. Palatalised consonants must occur in the context of *e* and *i* and never occur in the context of *ï* [1], e.g. *kʲelʲdʲim* **keldim* 'I came', *kaldïm* **kʲalʲdʲïm* 'I stayed'. This fact alone tells us that there is a certain amount of interaction between consonants and vowels in Karaim, otherwise we incorrectly predict that **keldim* 'I came' and **kʲalʲdʲïm* 'I stayed' ought to be possible.

Secondly, there is the question of the front quality of vowels transcribed here as *ȧ, ȯ* and *u̇*, which occur in the context of palatalised consonants. These vowels may be considered problematic since they vary not only between different speakers but also between different contexts for the same speaker.[16] Nevertheless, the very fact that there is sometimes an audible effect on intervening vowels should be taken into account.

For some phonologists, the question of whether or not the intervening vowels are thought to be involved in the harmonic process depends on their theoretical point of view. For example in a framework where features are distinctive, the problem is to define whether the vowels contrast and palatalisation of consonants is allophonic, or whether the consonants contrast and front quality of vowels is allophonic. If harmony is considered to be solely a consonantal property, any assimilation of the vowels has

[16] For example, the two vowels transcribed as /ȧ/ in *č'u̇p'r'ȧk'k'ȧ* 'in a cloth' (The famous Karaim cucumber) are clearly different, the former being more audibly front than the latter. In the same passage, the vowel /ȧ/ in *k'er'ȧk* 'need' is less audibly front than in *č'u̇p'-r'ȧk* 'cloth', although the adjacent consonants are identical.

to be treated as a mere phonetic co-articulation affect without any theoretical significance.

GP does not have this problem, because there are no distinctive features, phonemes or allophones. When we hear frontness in consonants or vowels, then the I element is present. The problem in the present case is to know where the I element is interpreted, either in the onset or in the nucleus, or in both. This is something that our ears alone cannot tell us, as for example in the case of the alternating palatalised consonant and following vowel in Polish, e.g. *pies* ~ *psa* [dog:GEN], which was discussed in 3.1.

The distributional restrictions on *e* and *i*, which must follow a palatalised consonant, and on *ï*, which must not follow a palatalised consonant, show that there is a direct link between an onset containing a palatalised consonant and the following nucleus, at least in the case of these vowels. Such a relationship qualifies as harmony between onset and nucleus, as defined in 3.1. The distribution of palatalised consonants within a harmonic domain demonstrates a relationship between the nuclear heads of ON pairs at a supra-segmental level. This was the hypothetical structure suggested earlier in 3. iii, and illustrated in fig. (6). If it can be shown that the composition of all vowels which follow palatalised consonants is subject to constraints on nuclei within the harmonic domain, then there can be no doubt that nuclei as well as onsets are involved in the harmonic process. It is impossible to separate the properties of the onset from the properties of the nucleus.

The problem which remains is how formally to relate the quality of the vowels *ȧ*, *ȯ* and *u̇* to the palatalised consonants which they follow. Focussing on the asymmetrical distribution of *e* and *ȧ*, I hope to show that different interpretations of the element I are a manifestation of a hierarchical relationship between nuclei within the harmonic domain. Whatever is proposed here for the composition of *ȧ* can later be extended to analyse *ȯ* and *u̇*. The problem has two parts: firstly to explain the complementary distribution of *e* and *ȧ*, and secondly to explain the variable pronunciation of the vowel so far transcribed as *ȧ*.

4.2. Distribution of Karaim vowels

The distribution of palatalised consonants within a harmonic domain is uncontroversial. The quality of certain vowels following palatalised consonants is less clear. Nevertheless, there are distributional asymmetries which can help us in an analysis of Karaim harmony. The following vowel distribution facts are taken from Csató (1999), using the same transcription as far as possible.[17]

[17] Reduced central vowels are not included here. We leave aside the absence of word-initial *ï* (a nucleus without any element). The lack of *o*, *ö* and *ȯ* in non-initial nuclei is irrelevant here because it is due to restrictions on U-harmony and not on I-harmony.

(9) a. Vowel-initial words:

	Back				Front			
initial nucleus	a		o	u	e	i	ö	ü
non-initial nucleus	a	ï		u	ȧ	i		u̇

b. Consonant-initial words:

initial nucleus	Ca	Cï	Co	Cu	C^{j}e	C^{j}i	C^{j}ö	C^{j}ü
non-initial nucleus	Ca	Cï		Cu	C^{j}ȧ	C^{j}i		C^{j}u̇

Although consonant-initial words display a slightly different pattern of contrasts from vowel-initial words, the most important asymmetry to be observed here is the complementary distribution of *e*, which is restricted to initial nuclei, and *ȧ*, which is restricted to non-initial nuclei. This asymmetry is the same whether there is an initial consonant or not. For this reason the following analysis is focussed upon the distribution of *e* and *ȧ*.[18]

Two closely connected questions are now discussed. Firstly, why does *e* occur only in initial nuclei, and not in non-initial nuclei? Apparently *e* is the trigger for harmony but never the result of harmony. In other words, what prevents *e* from following a palatalised consonant in non-initial nuclei? Secondly, what, precisely, is *ȧ*? Its pronunciation varies, not only between speakers but also between utterances of the same speaker. For example, in the story of "The famous Karaim cucumber", the vowel *ȧ* in the words *č^{j}üp^{j}r^{j}ȧk^{j}k^{j}ȧ* 'into a cloth', and *k^{j}er^{j}ȧk* 'need' does not sound the same each time. I suggest that the IPA symbols in (10) approximately reflect two different interpretations of *ȧ*.

(10) Phonetic interpretations of *ȧ*:
a. C^{j}[æ]
b. C^{j}[a]

In terms of elemental composition, the elements A and I are involved. I suggest that in (10a) A and I fuse together as (A.I), but in (10b) I suggest that there is no fusion of elements, separating the expression into two components (I) and (A). The fact that frontness, i.e. the I element in GP terms, is not *always* clearly discernible in the second part of the expression has prompted some people to propose that the property of frontness belongs only to the palatalised consonant and not to the following vowel. So, does the I element really belong to the onset and not to the nucleus?

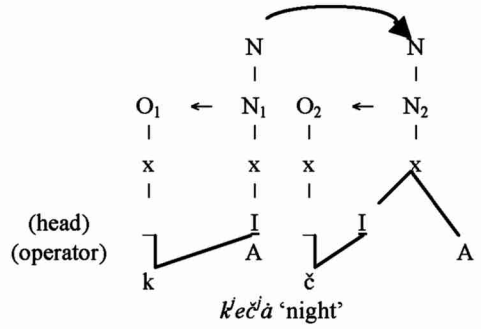
[18] The difference between *ö/ȯ* and *ü/u̇* in initial nuclei appears to depend on the presence or absence of an initial consonant, e.g. *öz^{j}* 'self' versus *k^{j}öz^{j}* 'eye', but the difference between *e* and *ȧ* does not have this additional complicating factor.Whatever explains the difference between *e* and *ȧ* may later be extended, with variations on a similar theme, to explain the distribution of *ö/ȯ* and *ü/u̇*.

4. 3. Relationship between consonant and vowel

Consider first the pronunciation C^{j}[a]. It is possible to describe this simply as a palatalised consonant followed by a non-front vowel. On the other hand, is there any theoretical reason why we should not analyse this as a consonant followed by a diphthong [ia]? Even if the consonant is palatalised, we might also claim that this is followed by a kind of diphthong. After all, when we find the combination C^{j}i, we analyse this as a palatalised consonant followed by a vowel [i]. In other words, we hear I in the nucleus as well as in the onset.

Following Kaye's insight that we cannot separate the vowel from the consonant, as in the Polish example *pies* ~ *psa* [dog:GEN], I suggest similarly that the front properties of onsets and nuclei cannot be separated in Karaim. In other words, it is impossible to say whether *ḱ'eč'a* 'night' should be analysed as *"ḱ'eč'a"* with the I element in the onset or as *"kiečia"* with the I element in the nucleus. In (11) a single I element is shown shared between two positions, as head in the nucleus and as operator in the onset, which represents a palatalised consonant followed by a front vowel. The remaining elemental composition of the consonants is not given, the letters *k* and *č* being used to represent informally the unpalatalised portion of the consonants.

(11)



ḱ'eč'a 'night'

In both nuclei, the I element is head. In N_1 the I-head fuses with an A-operator and is interpreted as [e] (A.I). In N_2 the I-head does not fuse with A, resulting in a diphthong-like sound [ia] ((I)(A)).[19] This example is what was described in 3.1. as harmony between onset and nucleus.

Before we consider the alternative pronunciation [æ] in non-initial nuclei, let us look at the relationship between nuclei which must take place if harmony between vowels is to be considered. Firstly, do nuclei relate to each other harmonically in Karaim? Secondly, why does *e* contrast with *ȧ*? Why is *e* not found in non-initial nuclei? I suggest that the *e/ȧ* contrast provides evidence for a relationship between nu-

[19] The question of whether this (A) is the same as the vowel usually transcribed as /a/ following a non-palatalised consonant is beyond the scope of this paper. They do not necessarily have the same phonological structure.

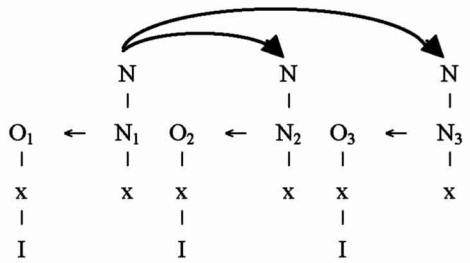
clei. In addition, I suggest that the alternative interpretation of *à* as [æ] reflects a different manifestation of a constraint on I-heads in nuclei.

4.4. Relationships between nuclei

A nucleus is head of the onset-nucleus pair which makes up the minimal syllabic constituent in GP. The universal relationship between O and N has been illustrated in this paper by a left-pointing arrow. In any word longer than one ON pair, there must be a licensing relationship between heads of constituents, i.e. nuclei, at a higher projection. This relationship is illustrated by a right-pointing arrow between nuclear heads.[20] There is no doubt that some kind of a relationship exists between nuclear heads, since according to the licensing principle, Kaye (1990), all nuclei within a domain must be licensed apart from the head of that domain. What remains to be shown is that in Karaim this relationship involves the element I.

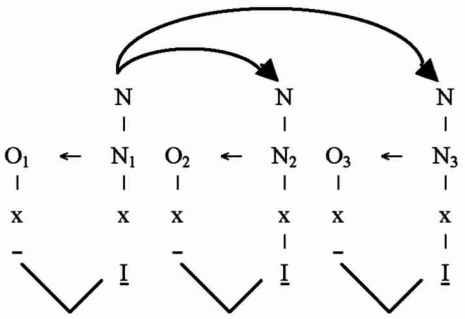
Let us assume that the minimal requirement for harmony in Karaim is that the consonants of a word agree with respect to the element I; either they all have it, or none have it. According to such a hypothesis, if there were no sharing relationship between O and N, it might be possible for any vowel to follow a palatalised consonant. In that case, nuclei would license an I-operator in their onsets, but would be free to have any content themselves. The relationship between nuclei would depend upon the initial nucleus licensing a palatalised consonant, and then licensing all remaining nuclei within its domain to do the same. This would be an example of consonant rather than consonant-vowel harmony. Such a hypothesis is illustrated abstractly in (12a). The alternative, with I shared between O and N as operator in the onset and head in the nucleus, is shown in (12b). This would be an abstract example of consonant-vowel harmony.

(12) a.



[20] The direction of inter-nuclear relationships varies according to the phenomenon and the language in question.

(12) b.



The implication of the sharing hypothesis is that if I is linked jointly to O and N, as illustrated in (12b), there will be some effect on the content of nuclei. One effect would be that all nuclei contain vowels which include I, e.g. *e* (A.I). Any relationship between I and other elements which may occupy the same nucleus would depend on the constraints and restrictions on element combination in the specific language under analysis.

Nuclear relationships manifest themselves in many ways. One manifestation of an inter-nuclear relationship is harmony. The nucleus which is head of the harmonic domain licenses some property of its own in the remaining nuclei within its domain.[21] A typical example of this is I-harmony, as for example in Turkish where the vowels can be grouped according to whether they contain I {e, i, ö, ü}, or not {a, ı, o, u}.

Harmony is not the only manifestation of an inter-nuclear relationship. There may be other restrictions on the content or structure of certain nuclei. For example, in many languages e.g. Neapolitan Italian, Bulgarian, Catalan, Chumash, the full vocalic inventory is found only in certain privileged positions.[22] Neapolitan Italian, for example, has an inventory of seven vowels {a, e, ɛ, i, o, ɔ, u}. Non-stressed nuclei are restricted to i (I), u (U) and a (A), which consist of a single element (or to schwa, which contains no element). Only a stressed nucleus can support a vowel composed of more than one element.

This situation is typical of constraints on the content of harmonised positions in some languages. A restriction on U-harmony illustrates the interaction between harmony and constraints on a particular position. For example, Turkish vowels can be grouped according to whether they contain the U element {o, ö, u, ü}, or not {a, e, i, ı}. Like I-harmony, vowels within a given domain should agree with respect to the element U, e. g. *kolu* [arm:POSS3], *sözü* [word:POSS3]. If the initial nucleus contains U, then subsequent nuclei within its domain should also contain U. Unlike I-harmony, there is a restriction on the occurrence of two vowels which contain U, *o* and

[21] The harmonising property may be an element which occurs in all nuclei throughout the domain, or it may be structural. For example, all nuclear expressions within a domain may either have an element as head, or no element as head.

[22] For details, see Harris (1997).

ö, and which should only occur in initial nuclei of the domain, e.g. *kollar* **kollor* [arm:PL], *sözler* **sözlör* [word:PL]. This is the result of a constraint on the combination of two specific elements, A and U, in non-initial nuclei.[23]

Taking the licensing principle (whereby all positions within a domain must be licensed except one, the head of the domain) as the starting point, Harris (1997) has given us a way to formalise the restrictions which are frequently found on positions which are not head of the relevant domain. In simple terms, he proposes that positions which are farther down a chain of licensing relationships are essentially weaker than those at the head of the domain. This weakness, which may be expressed in many ways, includes restrictions on the content of a licensed position. The licensing inheritance principle is defined formally in (13).

(13) *Licensing inheritance principle*

a. Autosegmental licensing (a-licensing) potential
The a-licensing potential of a skeletal position refers to its ability either
(i) to directly a-license a melodic expression, or
(ii) to confer a-licensing potential on another position.

b. Licensing inheritance
A licensed position inherits its a-licensing potential from its licensor.

I suggest that the asymmetrical distribution of *e* and *ȧ* in Karaim can be explained by the licensing inheritance principle.

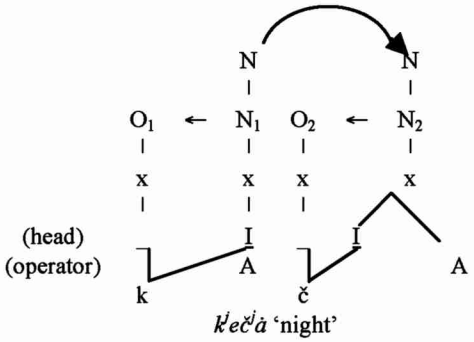
5. The analysis

In Karaim, I propose that an I-head can fuse with an operator only in an initial nucleus, the head of the harmonic domain. This allows the vowel *e* (A.I) to occur in initial nuclei. A restriction on non-initial nuclei prevents an I-head from fusing with an operator, therefore (A.I) is prohibited there. In other words, only an initial nucleus has sufficient licensing potential to allow an I-head, which automatically follows a palatalised consonant as part of the harmonic relationship between O and N, to fuse with another element. The vowel *ȧ*, which does not have I as a head, occurs in non-initial nuclei.

In addition to this, I suggest that varying pronunciations of *ȧ* are the result of different outcomes of the proposed constraint. The example *kʲeǰʲȧ* 'night' is repeated in (14) to illustrate the analysis in detail.

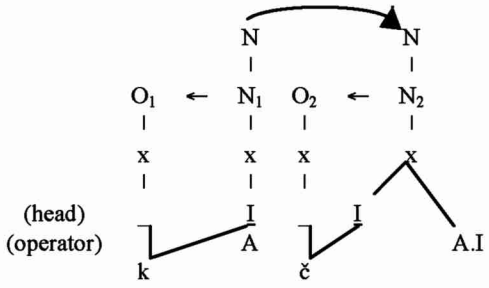
[23] Note that this particular constraint does not apply to all Turkic languages in the same way.

(14) a.



kʲečʲà 'night'

(14) b.



The situation in (14a) and (14b) is the same with respect to the initial nucleus, N_1, the head of the harmonic domain. N_1 licenses O_1, which contains a palatalised consonant. This entails a relationship between the two positions whereby a shared I element occupies the onset as an operator and the nucleus as a head. N_1 also contains an A element, which fuses with the I-head to form (A.I) *e*. The pronunciation of the onset and nucleus must be taken together as [k^{j}e]. It is impossible to separate the vowel *e* from the palatalised consonant it follows.

We come now to the situation in the second nucleus, N_2. Up to a certain point, the analysis is the same for (14a) and (14b). There is chain of licensing relationships. N_1 licenses N_2. N_1 and N_2 both license their onsets O_1 and O_2 respectively. Since N_1, the head of the domain, contains an I-head which it shares with the onset it licenses, N_2 must also contain an I-head which it must in turn share with its onset O_2. This relationship between the nuclei ensures palatalisation of all consonants within the domain.

The hierarchy between nuclei has a further consequence. According to the licensing inheritance principle, N_2 (and any other subsequent nuclei there may be within the domain) is farther down the licensing path of relationships between the domain-head and its licensee(s), therefore it has diminished segmental licensing potential. A

consequence of the weaker licensing potential of non-initial nuclei is that the I-head cannot fuse with an operator. There are two possible outcomes of this restriction, shown in (14a) and (14b), and both involve decomposition of head and operator into separate nuclear expressions.

In (14a) the two elements do not fuse at all. The effect of this is something like a diphthong whose second member has no I element, ((I)(A)). The outcome could loosely be described as [ia], not forgetting that the glide belongs both to the vowel and to the preceding palatalised consonant. In (14b) (I) is still unable to fuse with the operator (A). On the other hand, the two elements may fuse in a different relationship where neither element is head, but both are operators. The outcome this time is a diphthong-like expression [iæ] ((I)(A.I)), again not forgetting that the glide belongs both to the vowel and to the preceding palatalised consonant.

5.1. A theoretical issue

There are many branches of linguistics, and again many theoretical frameworks within each branch. Even though their aims may be similar, e.g. to record, to analyse etc., the tools used by practitioners of different frameworks may be very different. So, does it really matter how we define Karaim harmony? That depends very much on what our analysis aims to prove.

Perhaps it is relevant at this point to consider the role of phonology in language. Phonological phenomena act as a parsing device. They provide cues for the beginnings and endings of domains, words, phrases etc. The problem is to define what acts as a parsing cue in Karaim, consonants or vowels, or both.

Two phenomena in particular have been considered in this paper: harmony between related positions, and restrictions on harmonically related positions. Harmony is like glue which binds a domain together. More than one kind of harmony can operate within a single domain, e.g. I-harmony and U-harmony in vowels, although the conditions are different. Vowel harmony and consonant harmony may also operate side by side within the same domain, although it should also theoretically be possible in some languages for harmony to affect only vowels or only consonants. Perhaps, in Karaim, I-harmony in consonants is gradually becoming a more significant parsing cue than in I-harmony in vowels.

Restrictions on certain positions give rise to distributional asymmetries, which provide another powerful parsing cue. Some languages have restrictions on what kind of consonant can occur word-initially or word-finally. Other languages have restrictions on the distribution of vowels. The greatest number of vowel contrasts is one of the marks of a domain-head; restriction on vowel contrasts is typical of non-heads. In Karaim, it seems that there is a restriction on the way that I combines with other elements in non-initial nuclei of the I-harmonic domain.

Both phenomena involve relationships between nuclei. In Karaim, both phenomena involve the element I.

6. Conclusion

In this paper consonant-vowel interactions in Karaim have been looked at from a GP point of view. Harmony is treated as a supra-segmental phenomenon, driven by inter-nuclear relationships. These take place at a higher projection where all nuclear heads are visible to each other, and where one nucleus, the head of the domain, licenses all other nuclei in the relevant domain.

The effect of the relationship between nuclei percolates down through all intermediate relationships, between nuclei and the onsets they license, and between the elements occupying in these positions. There are several different manifestations of this structural hierarchy in Karaim. Inter-nuclear relationships ensure that all nuclei within the relevant domain contain an I element. Inter-nuclear relationships ensure that all nuclei within the relevant domain license their onsets to contain an I element i.e. a palatalised consonant. Inter-nuclear relationships also impose restrictions on how that I-element fuses with other elements in non-initial nuclei, giving rise to the complementary distribution of *e* and *ȧ*.

I conclude that it is impossible to separate the quality of the consonant from the properties of the nucleus which licenses the onset that the consonant occupies.

Appendix

Texts published by Csató, Éva Á. in Csató, Éva Á. & Nathan, David (2002). *Spoken Karaim*. CD-ROM. Tokyo University of Foreign Studies.

A. *The Karaim Street*

> Kayda karaylar tʲirʲil'ȧdʲl'ȧrʲ ([æ] [æ]) bu oram Karay oramï inʲdʲȧlʲȧtʲ ([æ][æ]). Kačanʲ-esʲ da bar vaxtlarnï də ekʲinʲčʲi dunya yat tə dunya bʲizʲ dʲə inʲd'ȧrʲ ([æ]) edʲik bu karay oramïn Karaimščïznabə.
> 'The place where the Karaim live is called the Karaim street. Since long ago, the non-Karaim and also the foreigners, and also we Karaims have called it Karaimshchizna.'
>
> ... onu də yanïndan oramnïn, sonu də yanïndan oramnïn suvlar. Gʲóŋʲlʲȧr ([æ]).
> '...there is water on both the right and on the left sides of the street. Lakes.'

B. *The famous Karaim cucumber*

> Xïyarnïn bʲùrʲtʲùgʲùnʲ kʲerʲȧk ([a]) alma, kʲečʲȧ ([a]) ašïra anï ibʲitʲm'ȧ ([a]) suvda. Son kʲerʲȧk ([a]) alma čʲùpʲrʲąkʲkʲȧ. ([æ] [a])
> 'You have to take cucumber seeds and soak them in water overnight. Then you have to put them in a cloth.'

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References

Brockhaus, Wiebke 1995. Skeletal and suprasegmental structure within Government Phonology. In: Durand, Jacques & Katamba, Francis (eds.) *Frontiers of phonology: Atoms, structures, derivations*. London, New York: Longman. 180-221.

Cobb, Margaret 1993. Licensing constraints and vowel harmony in Uyghur. *SOAS working papers in linguistics and phonetics* 3, 40-62.

Charette, Monik & Göksel, Asli 1998. Licensing constraints and vowel harmony in Turkic languages. In: Cyran, Eugeniusz (ed.). *Structure and interpretation: studies in phonology*. Lublin: Folium. 65-88. Also in: *SOAS working papers in linguistics and phonetics* 6, 1-26.

Csató, Éva Á. & Johanson, Lars 1996. Zur Silbenharmonie des Nordwest-Karaimischen. *Acta Orientalia Hungarica* 48, 329-337.

Csató, Éva Á. 1999. Syllabic harmony in Turkic: the evidence of code-copying. In: Brendemoen, Bernt (ed.) *Language encounters across time and space: Studies in language contact*. Oslo: Novus Press. 341-352.

Csató, Éva Á. & Nathan, David 2002. *Spoken Karaim*. CD-ROM. Tokyo University of Foreign Studies.

Johanson, Lars 1991. On syllabic frontness opposition in Turkish. In: *Varia Eurasiatica*, Szeged: Department of Altaic studies. 77-94.

Hansson, Gunnar O. 2001. *Theoretical and typological issues in consonant harmony*. [PhD thesis, University of California, Berkeley.]

Kaye, Jonathan 1990. 'Coda' licensing. *Phonology Yearbook* 7, 301-330.

Kaye, Jonathan 1991. *On the incoherence of the notion "phonological segment"*. Talk given at University College. Phonology Seminar, London.

Kaye, Jonathan 1992. *Polish Yers*. Talk given at the London Phonology Seminar.

Kaye, J. & Lowenstamm, J. & Vergneaud, R. 1990. Constituent structure and government in phonology. *Phonology* 7, 193-231.

Harris, John 1997. Licensing inheritance: an integrated theory of neutralisation. *Phonology* 14, 315-370.

Harris, John & Lindsey, Geoff 1995. The elements of phonological representation. In: Durand, Jacques & Katamba, Francis (eds.) *Frontiers of phonology: Atoms, structures, derivations*. London, New York: Longman. 34-79.

Lowenstamm, Jean 1996. CV as the only syllable type. In: Durand Jacques & Laks, Bernard (eds.) *Current trends in phonology: models and methods 1*. European Studies Research Institute (ESRI) & Manchester: University of Salford. 419-443.

Nevins, Andrew & Vaux, Bert 2003. Consonant harmony in Karaim. In: Csirmaz, Anikó & Lee, Youngjoo & Walter, Mary Ann (eds.) *The Proceedings of the workshop on Altaic Formal Linguistics*. [MIT Working Papers in linguistics 46.] Cambridge, Mass. 175-194.