# K ~ ø :  morpho-phonology in Turkish

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## 1.    Introduction

Vowel~zero alternation is analysed in GP as the interpretation of an empty nucleus when it fails to be properly governed.  In this paper it is proposed that [k] which alternates with zero in Turkish is the interpretation of an empty onset whose following nucleus cannot properly govern it.

Three contexts where [k] fails to alternate with zero even though a potential proper governor is available are discussed.  A hypothesis in which all words are composed of a minimal 'stem' template followed by subordinate 'suffix' templates provides an explanation both for the k ~ ø alternation and for its failure.  Different restrictions on stem and suffix templates, together with the need to avoid a sequence of more than two adjacent nuclei, complete the picture.

The context for k ~ ø alternation and its failure are briefly described in section 2.  Section 3 is devoted to a summary of the template hypothesis.  The context for regular alternation is analysed in 4, followed in 5, 6 and 7 by the exceptional cases.  The conclusion in 8 is that the template hypothesis provides an insight into the k ~ ø phenomenon in Turkish.

## 2.    Contexts for k ~ ø

Word-final [k] alternates with zero when a vowel-initial suffix is added, e.g. *ayak* [ayak] 'foot' ~ *ayağı* [ayaɨ] 'foot (3.poss)'.  Deletion of morpheme-final [k] and its exceptions are discussed by Sezer (1981).  Exceptions to the alternation can be summed up as follows:

(i)    most monosyllabic[1] words, e.g. [ek] 'affix' ~ [eki] 'affix (3.poss)'
(ii)    some verbal morphology, e.g. [bɨrak] 'leave' ~ [bɨrakadʒak] 'leave (fut)'
(iii)    following a long vowel, e.g. [merak] 'curiosity' ~ [mera:kɨ] 'curiosity (3.poss)'

Words in the third group are unusual in two ways.  Firstly, they are loan words whose vowels were long in the original language (Arabic), but are not necessarily interpreted as long in Turkish.  Native Turkish words do not have long vowels except for those which derive from a sequence of two nuclei (i.e. 'pseudo' long vowels).  Secondly, all Arabic long vowels are shortened before a final consonant, leading to the alternation [merak ~ mera:kɨ].
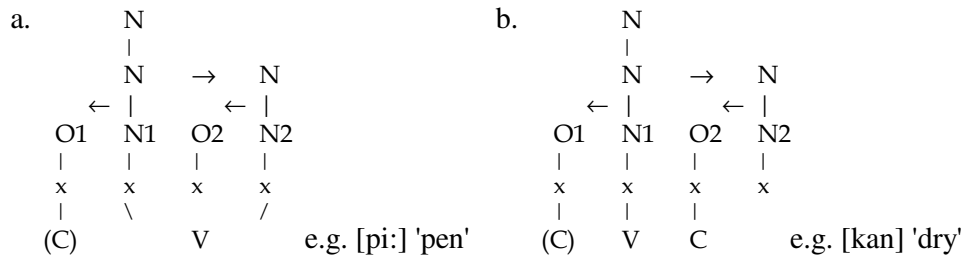
I suggest that the exceptions to k~ø can be explained by applying the Template

Hypothesis, which was first used by Goh (1996) for Beijing Mandarin and later adapted and extended first to Khalkha Mongolian (Denwood 1997), then to Turkish (Denwood 1998). The first exception to k ~ ø can be explained by the special privileges of an independent 'stem' template, the minimal word. The second exception can be explained by the structure of certain 'suffix' templates which do not trigger k~ø. The third exception arises in order to avoid a sequence of three adjacent nuclei.
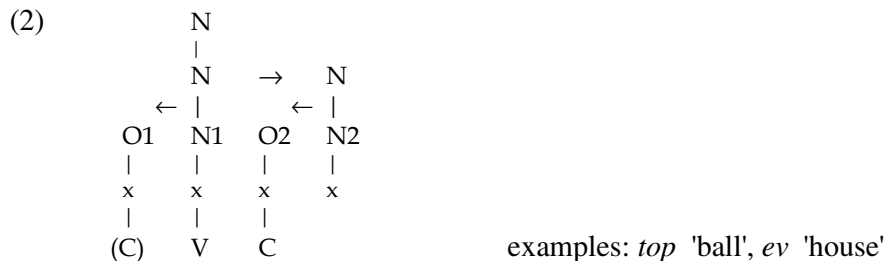
### 3. The Turkish template hypothesis

An adaptation of the Beijing Mandarin four position template (Goh 1996) has been proposed for Turkish (Denwood 1998). The template hypothesis is summed up briefly[2], beginning with the basic tool illustrated in (1).

(1)  The basic tool, the Chinese template

```
     a.       N                          b.        N
              |                                    |
              N    →    N                          N    →    N
         ←  |      ←  |                       ←  |      ←  |
         O1    N1   O2    N2                  O1    N1   O2    N2
         |    |    |    |                     |    |    |    |
         x    x    x    x                     x    x    x    x
         |    \         /                     |    |    |
         (C)       V        e.g. [pi:] 'pen'  (C)   V    C    e.g. [kan] 'dry'
```

A template consisting of two onset nucleus pairs is proposed as the minimal phonological string in Beijing Mandarin (Goh 1996). The arrows show licensing relationships between the nuclei, and also between nuclei and their onsets. N1 is head of the template. N1 licenses melody (optionally) in O1. N1 also licenses N2. N2 licenses melody either in O2 or in N2 (itself), but not in both positions. This is attributed to the weaker licensing potential[3] of N2 which is itself a licensee of N1, the head of the domain. A similar template is proposed for the Turkish minimal word[4], called here the 'stem' template, and illustrated in (2).

(2)
```
              N
              |
              N    →    N
         ←  |      ←  |
         O1    N1   O2    N2
         |    |    |    |
         x    x    x    x
         |    |    |
         (C)   V    C              examples: top 'ball', ev 'house'
```
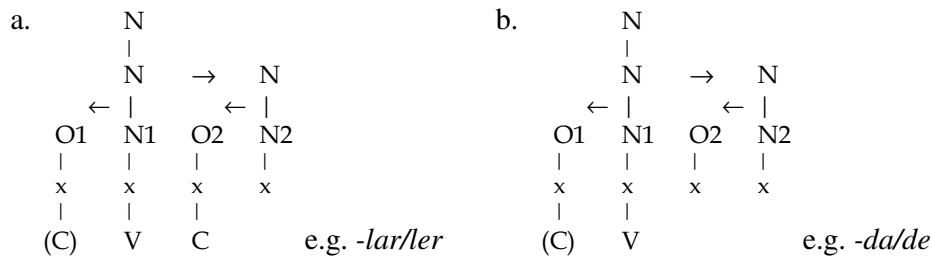
A stem template is most frequently interpreted as (C)VC. This may not be surprising since there are far fewer restrictions on a final consonant in Turkish than in

Chinese[5]. Words of the type shown in (1a) where O2 apparently has no content and the vowel is long, e.g. *dağ* [da:] 'mountain', are much less common in Turkish, and will be considered in detail in 5.2.

### 3.1   The 'suffix' template

In addition to the stem template which is interpretable independently as a minimal word, a dependent version of the template can extend the minimal word. This so-called 'suffix' template need not make use of both of its onset nucleus pairs. Like a stem template, O1 may be empty, e.g. the dative suffix *-a/e*. Unlike a stem template, if O2 has no content, the second onset nucleus pair remains unused (i) because the requirements of the minimal word are already met and (ii) because N1 of a suffix template does not have sufficient licensing power to allow its content to occupy a second position (unlike a stem template whose final onset is empty, see section 5.2).

(3)   interpretations of a suffix template

```
a.        N                           b.        N
          |                                     |
          N    →   N                            N    →   N
      ←   |    ←   |                        ←   |    ←   |
      O1   N1  O2   N2                      O1   N1  O2   N2
       |   |   |    |                        |   |   |    |
       x   x   x    x                        x   x   x    x
       |   |   |                             |   |
      (C)  V   C        e.g. -lar/ler       (C)  V            e.g. -da/de
```

One of the constraints on N1 of a suffix template is that its content must be licensed by N1 of the stem template, manifested as vowel harmony. N2 of a suffix template is never interpreted. I suggest that the head of each template licenses only one nucleus (i.e. itself) to be interpreted. There is insufficient licensing power for N2 to be interpreted, although N2 may inherit sufficient power to license melody in O2 (3a). When O2 has no content, the second pair remains unused (3b). It is not necessary to talk about domain-final parametric p-licensing[6] of N2. All template-final nuclei (N2s) remain silent through lack of licensing power[7]. In fact, in a string of suffix templates, only odd-numbered nuclei (heads) are ever interpreted. Stem and suffix templates combine analytically as [[A]B] dependent ('postman' type) morphology[8].

### 4.   k ~ ø alternation

Before we can consider the exceptions to k ~ ø alternation, we have to look at the regular cases. The proposed structure of *durak* 'stop (noun)' ~ *durağa* [duraa] 'stop (dative)' is illustrated in (4) and (5), including the combination of stem and suffix templates. The nominalising suffix *-ak* is added to the verbal stem *dur* in (4). The

dative suffix *-a* is added on to the combined stem and suffix in (5). Both suffixes are vowel-initial and analysed here as having no initial onset point, which triggers reduction of adjacent empty onset and nuclear positions[9].

```
(4) a.   O1  N1  O2  N2  O3  N3  O4  N4        b.    O1  N1  O2  N3  O4  N4
         |   |   |   |       |   |   |               |   |   |   |   |   |
       [ [ x   x   x   x ]     x   x   x ]         [ x   x   x   x   x   x ]
         |   |   |           |                       |   |   |   |
         d   u   r           a  [k]                  d   u   r   a  [k]

         [dur] + ak                                  [durak] 'stop'
```

In (4a) the full representation of *dur+ak* is shown, occupying a stem and a suffix template. After reduction of domain-final empty N2 and adjacent pointless O3, the word [durak] occupies three out of the four onsets and nuclei, shown in (4b). Although O4 is empty, it is interpreted as [k] because N4 is itself uninterpreted and cannot act as proper governor for the skeletal point in O4. The addition of the dative suffix *-a* to *durak* is shown in (5).

```
(5) a.  O1  N1  O2  N3  O4  N4  O5  N5  O6  N6
        |   |   |   |   |   |       |   |   |
      [ [ x   x   x   x   x   x ]     x   x   x ]
        |   |   |   |           |
        d   u   r   a  [k]         a              [durak] + a
```

```
    b.                        O ← N    proper government
                              |   |
        O1  N1  O2  N3  O4  N5
        |   |   |   |   |   |
      [ x   x   x   x   x   x ]
        |   |   |   |       |
        d   u   r   a       a              [duraa] 'stop (dative)'
```

The full representation of the suffix template occupied by the dative *-a* is given in (5a), without reduction. In (5b) domain-final empty N4 and suffix-initial pointless O5 are reduced from the structure (the final O6N6 pair is unused by the dative suffix). N5, head of the final suffix template, is now adjacent to the empty O4 which was interpreted as [k] when no proper governor for it was available. N5 properly governs O4, which now remains silent according to the conditions of the ECP.

## 5. Exceptions to k ~ ø

Given that [k] is the interpretation of an empty onset which has no proper governor, why is [k] sometimes interpreted when a proper governor is available?

Before discussing the three exceptional cases listed in section 2, we briefly consider an additional exception where [k] is part of a final consonant cluster, e.g. *kɪrk ~ kɪrkɪ* 'forty (3.poss)', *türk ~ türkü* 'Turkish (3.poss)', *halk ~ halkɪ* 'people

(3.poss)'. For some frameworks, such words might be counted as monosyllabic and therefore exceptional for that reason. In GP terms, regardless of the length of such words, the final [k] must either be an onset governing a preceding rhymal complement, or else it must be an onset in a governing relationship with a preceding onset thereby p-licensing an intervening empty nucleus. Either way, the final [k] is an onset that is a governor, and therefore inaccessible to outside government. Assuming that branching rhymes are not involved, and that the word occupies more than the minimal stem template, an example is illustrated in (6). Stem and suffix templates are not shown separately because the outcome is the same regardless of morphology. The relevant point is the relationship between O3 and the preceding O2 in (6a) which prevents a relationship between N3 and O3 in (6b).

(6) a.
```
                    O   ←   O                       inter-onset government
                    |       |
        O1   N1   O2   N2   O3   N3
        |    |    |    |    |    |
        x    x    x    x    x    x
        |    |    |
        t    ü    r         [k]                     türk 'Turkish'
```

b.
```
                    O   ←   O // N                  proper government fails
                    |       |    |
        O1   N1   O2   N2   O3   N3
        |    |    |    |    |    |
        x    x    x    x    x    x
        |    |    |              |
        t    ü    r         [k]  ü                   türk + ü [türkü] 'Turkish (3.poss)'
```
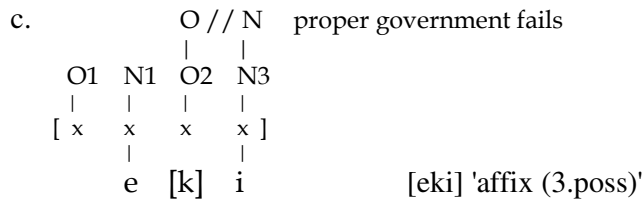
In (6a) an inter-onset governing relationship between O3 and O2 p-licenses the intervening empty N2. In (6b), when the possessive suffix is added N3 is a potential proper governor for O3, but O3 is not accessible to government because it is itself an inter-onset governor.

Although the template hypothesis has nothing to say about the failure of k ~ ø in the context discussed above, it is a different matter when it comes to monosyllabic words ending in a single [k].

## 5.1 Monosyllabic words ending in k

Most[10] monosyllabic words ending in [k] fail to alternate, e.g. *ek ~ eki* 'affix (3.poss)', illustrated in (7).

(7) a.
```
        O1   N1   O2   N2              b.    O1   N1   O2   N2   O3   N3
        |    |    |    |                     |    |    |    |         |
       [ x   x    x    x ]                  [ [ x  x    x    x ]       x ]
        |                                    |                   |
        e   [k]                              e   [k]              i        [ek] + i
```

```
c.              O // N    proper government fails
                |    |
        O1   N1   O2   N3
        |    |    |    |
      [ x    x    x    x ]
             |         |
             e   [k]   i              [eki] 'affix (3.poss)'
```
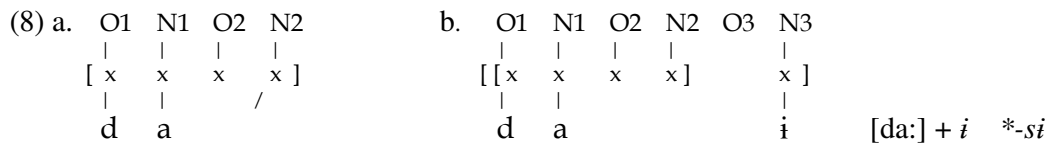
In (7a) O2 is empty, but interpreted as [k].  When the possessive suffix is added (shown here onwards without its unused O4 N4 of the suffix template), it provides a potential proper governor for O2, but, in spite of this in (7c) O2 remains interpreted.  I suggest that this is because monosyllabic words occupy a single stem template, which has different constraints from a suffix template.

A property of the stem template, which is an independent morphological domain, is that both N1 and O2 must be interpreted in order to satisfy the requirements of a minimal word in Turkish.  Empty positions of a stem template are not accessible to proper government by the head of a suffix.  Phonology is ultimately all about parsing devices.  I suggest that the interpretation of [k] in the final onset of a stem template signals the end of a minimal domain, even when suffixes are added.  Nevertheless, there is a small group of monosyllabic words which behave differently.

## 5.2   Monosyllabic words ending in ğ

There are a few monosyllabic words with an empty O2 which is not interpreted as [k].  A typical example is *dağ* [da:] 'mountain'.  Although this word apparently has a final long vowel, when a vowel-initial suffix is added, it behaves as though it has a final consonant.

```
(8) a.   O1   N1   O2   N2        b.   O1   N1   O2   N2   O3   N3
         |    |    |    |              |    |    |    |         |
       [ x    x    x    x ]        [ [ x    x    x    x ]       x ]
         |    |         /              |    |                   |
         d    a                        d    a                   i      [da:] + i    *-sɨ
```

In (8a) the word *dağ* occupies a stem template.  O2 and N2 are empty, but since the onset is not interpreted as [k], the requirements of a minimal word force the content of N1 to occupy one of the positions of the second onset nucleus pair.    I suggest that this is the only context where the final nucleus of a template is interpreted.  A suffix template does not have to satisfy the conditions of a minimal word, hence its second nucleus never needs to be interpreted.  Whether the vowel spreads to N2, or whether it in fact occupies O2[11], it is significant that vowel-initial suffixes never use their 'buffer' consonant following the resulting pseudo long vowel.  In (8b) the third person possessive suffix is added, yielding *dağɨ* and not *dağ sɨ* [12].

Interestingly, before vowel-initial suffixes the pseudo long vowel shortens, although not before consonant-initial suffixes. Examples are given in (9).

(9)       da:       (nominative)                          da:da    (locative)
          daɨ       (3 person possessive)                 daa       (dative)

Vowel shortening in the stem template poses a problem for the minimal word. The conditions on a stem template ought to make it inaccessible to government by a suffix template, as seen in the example *ek* ~ *eki* 'affix (poss)' (7). On the other hand, the addition of a vowel-initial suffix creates an impossible situation, i.e. three consecutive interpreted nuclei. This is shown in (10).

(10)    O1  N1  O2  N2  O3  N3
         |   |   |   |       |
        [[x   x   x   x]     x ]
         |   |               |
         d   a               ɨ        [da ɨ ]  *[da: ɨ ]

The conflict is resolved by vowel shortening in the stem, so that the vowel [a] is interpreted only in N1. N3 is head of the suffix template and must be interpreted. If three consecutive nuclei were to be interpreted, this would violate Binarity[13]. The question remains: why is the *-si* form of the suffix not used? This would seem to be the obvious way to avoid a sequence of three nuclei. One plausible answer might be that this is a case of irregular non-analytic morphology, with both stem and suffix occupying a single stem template. My suggestion is less obvious, and precludes non-analytic morphology because it relies on the special status of a stem template, the minimal word, when suffixes are attached. I suggest that buffer consonants are initial floating consonants belonging to a suffix which does not have an initial skeletal point, and which must attach to a preceding word-final empty onset. I further suggest that the initial buffer consonant of certain suffixes cannot attach to the final onset of a preceding stem template, but only to the final onset of a preceding suffix template.

If the buffer consonant could attach to O1 of its suffix template, then it would not be a vowel-initial suffix. There would be no reason for that consonant not to be used every time. After all, consonant-initial suffixes do not lose their initial consonant when they follow word-final consonants, e.g. *evde* 'at home' *evler* 'houses' etc. regardless of the nature of the final consonant or the length of the word. Other suffixes begin with initial *-s-*, which can follow any consonants e.g. conditional *-se*, negative *-siz*, etc.[14]. So, why can the buffer *-s-* not attach to the final empty O2 of a stem template? I suggest the following answers.

(i)      The *-si* suffix (like the buffer variant of all other vowel-initial suffixes) does not attach directly on to stem templates because stems normally end in domain-final

empty nuclei. Stem templates do not regularly end in vowels. When a stem ends in a final empty onset, this is interpreted as [k] in order to fulfil the conditions on a stem template, the minimal word. In some exceptional cases, however, the onset is not interpreted, and the content of N1 spreads to N2 in order to fulfil the conditions. In either case, there is no empty onset available for the buffer to attach to.

(ii) According to the template hypothesis, all word-final vowels must in fact belong to the first onset nucleus pair of a suffix template, followed by a second unused onset nucleus pair, (unlike a stem template, a suffix template is not obliged to use its second onset nucleus pair). This kind of final vowel is always followed by the buffer variant of vowel-initial suffix, which attaches to the final unused onset of the preceding suffix template. I suggest that a final unused onset, in other words the onset of a spare ON pair, is the only position a buffer consonant can attach to in Turkish.

(iii) A buffer consonant cannot invade the territory of a stem template, a minimal word[15]. A stem template is inaccessible to segmental material from outside attaching to its final onset, even if this is empty. A stem template is inaccessible to outside government, therefore [k] does not alternate with ø (as shown in 5.1).

The exceptions discussed in this section involve the special properties of a stem template. The exceptions in the next section involve special properties of certain suffix templates.

## 6. Suffixes which do not trigger k ~ ø

The addition of the dative *-a* to *durak* 'stop' was used in section 3 to illustrate regular k ~ ø alternation. Without going into details of exactly which suffixes trigger k ~ ø and which do not[16], I suggest that the structure of suffixes which do not trigger k ~ ø is different in some way from those that do. In (11) two suffixes are added to *gerek* 'need', which can be either a verb or a noun.

(11) a.     *gerek + i*          [gerei]        'its necessity'
     b.     *gerek + ir*         [gerekir]      'it is necessary'

In (11) we have two suffixes, both beginning with a vowel. One, the possessive in (11a), triggers k ~ ø. The other, the aorist in (11b), does not trigger the alternation but behaves as though it begins with a consonant. This is reminiscent of French h-aspirée, where some vowel-initial words behave as though they have an initial consonant. Two French examples are given in (12).

(12)  a.  
```
       O1  N1  O2  N2  O3  N3              b.    O1  N1  O2  N2  O3  N3
       |   |       |   |   |                     |   |   |   |   |   |
       x   x       x   x   x                     x   x   x   x   x   x
       |           |   |   |                     |   |   |       |   |
       l           a   m   i                     l   ə   e       r   o
```

      l'ami     [lami]   'the friend(m)'      le hero [ləero]    'the hero'

In (12a) the definite article is followed by the noun *ami*. According to standard GP, this word has an initial onset without a skeletal point. The final nucleus of the article is adjacent to the initial nucleus of the noun. French does not allow adjacent nuclear points, so N1 is lost, yielding *l'ami* [lami] 'the friend'. In (12b), on the other hand, the noun *hero* [ero] begins with a vowel preceded by a skeletal point in the onset. This time the two nuclei are not adjacent at the skeletal tier, but separated by an onset skeletal point. No elision takes place. N1 and N2 are both interpreted, i.e. [ləero] and not *[lero].

A similar structural difference between the two kinds of Turkish suffix could explain the exceptions to k ~ ø alternation. In (13) the alternation is shown exactly as in the earlier example (5) in section 3. The complex domain *ger + ek* is assumed, in which [k] is the interpretation of suffix-final O4. The possessive suffix has no initial onset point and provides a proper governor for O4 after reduction of N4 and pointless O5. (O6N6 remain unused.)

(13) a.  
```
         O1  N1  O2  N3  O4  N4  O5  N5  O6  N6
         |   |   |   |   |   |       |   |   |
       [ [x  x   x   x   x   x]      x   x   x ]
         |   |   |   |               |
         g   e   r   e   [k]         i                    [gerek] + i
```

    b.  
```
                             O ← N    proper government
                             |   |
         O1  N1  O2  N3  O4  N5
         |   |   |   |   |   |
       [ x   x   x   x   x   x ]
         |   |   |   |       |
         g   e   r   e       i                    [gerei] 'its necessity'
```

In (14) the failure of k ~ ø is illustrated. In this example, although the aorist suffix has an initial vowel, it also has an initial onset skeletal point preceding it. The skeletal point in O5 separates N4 from N5, prevents the reduction of N4 and O5, and blocks any interaction between the two templates.

(14)
```
        O1  N1  O2  N3  O4  N4  O5  N5  O6  N6
        |   |   |   |   |   |   |   |   |   |
    [ [ x   x   x   x   x   x]  x   x   x   x ]
        |   |   |   |               |   |
        g   e   r   e   [k]         i   r          [gerek] + ir
```

[gerekir] 'it is necessary'

A simple way to explain why certain suffixes do not trigger k ~ ø is to propose that all such suffixes occupy templates using their initial onset point. Now we look at the third kind of exception, which involves only loan words.

## 7.    Failure of k ~ ø following a long vowel

These exceptions are unusual because they all involve loan words, and also because they involve a vowel length distinction. Firstly, it is hard to justify the vowel length alternation, e.g. [merak] ~ [mera:kɨ] 'curiosity (poss)' as a synchronic Turkish phonological process. This is because Turkish does not have true long vowels in native vocabulary. All it has is sequences of nuclei (pseudo long vowels) when an intervening onset point is uninterpreted, for example those discussed in section 4 when [k] alternates with zero, e.g. [durak] ~ [duraa] 'stop (dat)'.[17] For this reason I do not attempt to discuss the 'shortening' phenomenon. This has been analysed by Yoshida (1992) as a failure of nuclear heads to be licensed to occupy two nuclear positions. It is interesting that the shortening phenomenon is found in Palestinian Arabic too, also discussed by Yoshida in the same paper. I suggest that since the long~short alternation is not found in native Turkish words[18], the Arabic vocabulary involved has been borrowed along with some of its own phonological idiosyncracies. What concerns us here is the failure of k ~ ø alternation in these circumstances.

## 7.1   k ~ ø in Arabic words when the preceding vowel is short

There is evidence that k ~ ø failure has nothing to do with the internal representation of [k] in loan words. Alternation triggering suffixes added to final [k] in loan words behave normally after a short vowel, e.g. [la:yɨk] 'worthy' [la:yɨm] 'I am worthy'. K ~ ø following a short vowel is illustrated in (15). The failure of k ~ ø following a long vowel in (16) shows that vowel length is the determining factor[19]. Internal morphology or multiple templates are not shown here, although the template hypothesis predicts that the loan word occupies more than a single template. The relevant morphological domains for present purposes are the loan word plus the alternation triggering suffix.

(15) a.
```
        O1   N1   O2   N2   O3   N3   O4   N4   O5   N5   O6   N6
        |    |    |    |    |    |    |    |         |    |    |
    [ [ x    x    x    x    x    x    x    x]        x    x    x ]
        |     \            /    |    |              |    |
        l         a         y   ɨ   [k]             ɨ    m          [la:yɨk] + im
```

b.
```
                                        O ← N     proper government
                                        |   |
        O1   N1   O2   N2   O3   N3   O4   N5   O6   N6
        |    |    |    |    |    |    |    |    |    |
      [ x    x    x    x    x    x    x    x    x    x ]
        |     \            /    |    |         |    |
        l         a         y   ɨ            ɨ    m          [la:yɨim] 'I am worthy'
```

In (15a) the word-final empty O4 is interpreted as [k]. The first person suffix occupies a template [O5N5 O6N6], which has no initial onset point. In (15b) reduction of N4 and O5 brings N5 adjacent to O4, which it properly governs. O4 is not interpreted, and a sequence of two nuclei is interpreted as a pseudo long vowel. The circumstances in (16) are very different. Here a long vowel is assumed to occupy the sequence N2 and N3, even though in the unsuffixed form it cannot be interpreted in both nuclei. That problem does not concern us here. What we are interested in is the interpretation of [k] in O4, although N5 is a potential proper governor for it in (16b).

(16) a.
```
        O1   N1   O2   N2   O3   N3   O4   N4   O5   N5   O6   N6
        |    |    |    |    |    |    |    |         |    |    |
    [ [ x    x    x    x    x    x    x    x]        x    x    x ]
        |    |    |     \                            |
        m    e    r         a            [k]         ɨ               [mera:k] + i
```

b.
```
                                        O // N     proper government fails
                                        |    |
        O1   N1   O2   N2   O3   N3   O4   N5
        |    |    |    |    |    |    |    |
      [ x    x    x    x    x    x    x    x]
        |    |    |     \         /         |
        m    e    r         a        [k]   ɨ          [mera:kɨ] 'curiosity (3.poss)'
```

In (16b) a long vowel [a:] occupies the sequence N2 N3. After the reduction of pointless O5 and empty N4, N5 is adjacent to O4 and provides a potential proper governor for the empty onset. O4, however, is interpreted as [k] although when the preceding vowel is short, as in (15), it is not interpreted. I suggest that this is because if O4 were not interpreted, there would be an illegal sequence of three adjacent interpreted nuclei. I suggest that in Turkish a maximum of two adjacent nuclei can be interpreted[20]. For this reason O4 in (16) must be interpreted as [k] in order to separate adjacent nuclei.

If we compare this analysis of [mera:kɨ] 'curiosity (3.poss)' with the analysis of

the exceptional behaviour of [da:] ~ [daɨ] 'mountain (3.poss)' discussed in 5.2, we find that exactly the same principle is involved. 'Binarity', a fundamental principle in GP, is manifested here as the illegality of three adjacent filled nuclei. The difference between the two contexts is the outcome of the conflict produced by the addition of a vowel-initial suffix which has no initial onset point. In the one case the onset point fails to be properly governed, in the other case the vowel shortens.

## 8.    Conclusion

In this paper I have shown how the template hypothesis can shed light on the phenomenon of k ~ ø alternation in Turkish, as well as on some of the exceptional contexts where it does not occur. A stem template, the minimal word, is independent. It is inaccessible to government from outside, i.e. from a dependent suffix template. An exceptional class of vowel-initial suffixes behaves differently because they have an initial onset skeletal point, resembling the French h-aspirée phenomenon. The third exception, which occurs only in loan words with long vowels, is explained as a strategy to avoid a violation of Binarity.

## Notes

[1] Note that 'syllable' is not a constituent in GP. This word is used informally. Note also that in a syllable-based framework, words like *kɪrk* 'forty' *halk* 'people' are also exceptions. I am grateful to Monik Charette for reminding me of this. These words are not a problem for my analysis. See section 5.

[2] This paper follows on from Denwood (1998), which can be referred to for more detailed background information on the template hypothesis.

[3] Licensing Inheritance Principle (Harris 1992): "A prosodically licensed position inherits its autosegmental licensing potential from its licensor".

[4] Although there are a few notable exceptions in common use e.g. [bu] 'this', [ye] 'eat', the vast majority of Turkish words conform to this pattern.

[5] Beijing Mandarin allows only nasals and glides in this position.

[6] The Phonological ECP is defined by Kaye (1993) as follows:

A p-licensed (empty) category receives no phonetic interpretation

P-licensing:        1. Domain-final (empty) categories are p-licensed  (parameterised)

2. Properly governed (empty) nuclei are p-licensed

3. A nucleus within an inter-onset domain is p-licensed

Proper Government:

α properly governs β if

1. α and β are not adjacent on the relevant projection

2. α is not itself licensed, and

3. no governing domain separates α from β.

[7] This is in the spirit of Goh's (1996) propsal.

[8] Kaye (1993) defines different kinds of morphology.

[9] Reduction (Gussmann & Kaye 1993): "An empty nucleus followed by a pointless onset are removed from any phonological representation in which they occur".

[10] A few words do not conform to this exception, e.g. *gök ~ göğü* 'sky (3.poss)'.

[11] According to Clements & Keyser (1983), the vowel spreads to a final empty C-slot, which is why the vowel-initial form of the suffix is selected.

[12] The form *dağ sɪ* occurs in some non-standard Turkish dialects.

[13] The Binary Theorum, Kaye (1990): "All constitutents are maximally binary". In the non-branching framework implicit in the template hypothesis, 'binarity' is understood to mean that no more than two

adjacent nuclei may be interpreted.  Adjacent nuclear sequences in Khalkha Mongolian are separated by [g], analysed as the interpretation of an empty onset point (Denwood 1998).

[14] Sezer (1986) makes a similar point.

[15] Note that exceptional words which fail to fill a stem template, e.g. *su* 'water' have a final floating consonant of their own which is used when a vowel-initial suffix  is added, i.e. *suyu *susu* 'water (3.poss)'.

[16] Sezer (1981) discusses these in detail.  Broadly speaking it seems that nominal suffixes do whilst verbal suffixes do not.  An alternative analysis could be that the two kinds of suffix combine in different ways, e.g. either analytically and non-analytically, or else with dependent and independent analytic morphology (Kaye 1993).  An independent analytic morphology analysis is more appropriate for the failure of k ~ ø in compound verbs,  e.g. *merak et* 'worry', *yasak  ol* 'be forbidden'.

[17] With the possible exception of stem templates, e.g. [da:] 'mountain', sequences of nuclei belong to different templates.  Only heads of templates are interpreted.  All domain-final nuclei are uninterpreted.

[18] Except for the alternation  [da:] ~ [daɨ] discussed above.  This is actually the reverse of the [merak] ~ [mera:ki] alternation because the addition of a vowel-initial suffix shortens [da:] but lengthens [merak].

[19] It would be interesting to speculate whether the length contrast in these loan words may disappear in time, together with the exceptional behaviour of [k] in this context.

[20] Note that some words in their original language have sequences of long and short vowels separated by a (lost) consonant, e.g. Arabic /sa:ɣat/ [saat] 'hour', /saʔa:det/ [saadet] 'happiness'.  These words do not retain both long and short vowels, which become a sequence of two short vowels when the intervening consonant lenites in Turkish.

## References

Clements, G.N & J. Keyser (1983) *CV Phonology: a Generative Theory of the Syllable*  MITPress, Cambridge

Denwood, M.A. (1997) *The role of the element I in Khalkha Mongolian phonology*  PhD thesis  SOAS,  University of London

Denwood, M.A. (1998) *A Template for Turkish*  SOAS Working Papers in Linguistics and Phonetics 8: 177 - 190

Goh, Y.S.  (1996) *The segmental phonology of Beijing Mandarin*  PhD thesis  SOAS,  University of London

Gussmann, E,  Kaye, J.K.  (1993) *Polish notes from a Dubrovnik cafe.  I. The yers*  SOAS Working Papers in Linguistics and Phonetics 3: 427 - 462

Harris, J. (1992)  *Licensing Inheritance*  UCL Working Papers in Linguistics and Phonetics 4: 359 - 406

Kaye, J.D. (1990) '*Coda' Licensing*  Phonology 7: 301 - 330

Kaye, J.D. (1993) *Derivations and Interfaces*  SOAS Working Papers in Linguistics and Phonetics 3: 90 - 126.   Also in Durand & Katamba *Frontiers in  phonology*

Harlow,  Essex,  Longman

Sezer, E. (1981) *The k/ø alternation in Turkish* in G.N.Clements (ed) *Harvard Studies in Phonology*, *Vol. II*.  354 - 382  Indiana University Linguistics Club

Sezer, E. (1986) *An Autosegmental Analysis of Compensatory Lengthening in Turkish* in W.L. Wetzels & E.Sezer (eds) *Studies in Compensatory Lengthening*  Dordrecht Foris 227 - 250

Yoshida, S. (1992) *Licensing of governing nuclear heads*  Paper presented at Krems Government Phonology Workshop