Denison, D. (1993) *English Historical Syntax: Verbal Constructions.* London, New York: Longman.

Denison, D. (1994) English inflectional morphology and syntax 1776-present, paper delivered to the Philological Society, SOAS, 13.5.

Emonds, J. (1994) Two Principles of Economy, paper presented at the Linguistics departmental seminar, SOAS.

Giacalone Ramat, A., O. Carruba & G. Bernini (eds.) (1987) *Papers from the 7th International Conference on Historical Linguistics.* Amsterdam, Philadelphia: John Benjamins.

Givón, T. (1979) *On Understanding Grammar.* New York: Academic.

Heine, B., U. Claudi & F. Hünnemeyer (1991) *Grammaticalization: A Conceptual Framework.* Chicago & London: Chicago University Press.

Heine, B. & M. Reh (1984) *Grammaticalization and Reanalysis in African Languages.* Hamburg: Buske.

Hopper, P. & E. Traugott (1993) *Grammaticalization.* Cambridge: CUP.

Jeffers, R. (1987) On methodology in syntactic reconstruction: Reconstructing inter-clause syntax in prehistoric Indo-European, in Giacalone Ramat et al. (eds.): 305-323.

Jones, Ch. (ed.) (1993) *Historical Linguistics. Problems and Perspectives.* London, New York: Longman.

Kemenade, A. van (1992 [93]) The History of English Modals; A Reanalysis, *Folia Linguistica Historica* XIII/ 1-2: 143-166.

Lakoff, G. & M. Johnson (1980) *Metaphors We Live By.* Chicago: Chicago University Press.

Lehmann, W. (1987) Time, in Giacalone Ramat et al. (eds.): 339-348.

Lightfoot, D. (1974) The diachronic analysis of English modals, in Anderson & Jones (eds.), vol. 1: 219-249.

Lightfoot, D. (1979) *Principles of Diachronic Syntax.* Cambridge: CUP.

Lightfoot, D. (1988) Syntactic Change, in Newmeyer (ed.): 303-323.

Mc Elhinny, B. (1992) The Interaction of Phonology, Syntax and Semantics in Language Change: The History of Modal Contraction in English, *CLS* 28, vol. 1: 367-381.

Meillet, A. (1912) L' évolution des formes grammaticales, *Scientia* 12. Reprinted in (1958) *Linguistique historique et linguistique générale.* Paris: Champion.

Newmeyer, F. (ed.) (1988) *Linguistics: The Cambridge Survey.* Vol. 1. Cambridge: CUP.

Plank, F. (1984) The Modals Story Retold, *Studies in Language* 8: 305-364.

Ross, J. (1972) The Category Squish: Endstation Hauptwort, *CLS* 8: 316-328.

Sweetser, E. (1990) *From Etymology to Pragmatics.* Cambridge: CUP.

Traugott, E. (1989) On the Rise of Epistemic Meaning in English: An Example of Subjectification in Semantic Change, *Language* 65: 31-55.

Traugott, E. & B. Heine (eds.) (1991) *Approaches to Grammaticalization.* 2 vols. Amsterdam: Benjamins.

Vennemann, Th. (1974) Topics, Subjects, and Word Order: From SXV to SVX via TVX, in Anderson & Jones (eds.), vol. 1: 339-376.

Switching and Vowel Harmony in Turkic Languages[*]

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The aim of this paper is twofold: i. to have yet another look at vowel harmony in Turkish[1] and ii. to shed light on the notions of spreading and switching (i.e. changing the role of an element in a phonological expression) by comparing our findings with the same types of harmony found in other Turkic languages.

Our analysis is expressed in terms of the revised theory of elements as proposed by Kaye (1993).[2] The paper is organised as follows: section 1 consists of the presentation of certain notions of the revised theory of elements which are relevant to the analysis of vowel harmony in Turkic languages. In section 2 we present the vocalic system of Modern Standard Turkish by considering the licensing constraints which govern the combinations of elements in this language. We then analyse the processes of I and U harmony in the light of the licensing constraints we have proposed. In section 3 and 4 we discuss the notion of switching by comparing Turkish U-harmony with the same type of harmony found in Sakha (Yakut) and Kazak. We conclude our study by comparing the system of Modern Turkish with the system of pre-17th century Ottoman Turkish.

1.0 Theoretical background

Following Kaye, Lowenstamm & Vergnaud (1985), henceforth KLV, we assume that phonological segments are expressions composed of elements occurring alone or in combination. A segment which consists of a unique element is called 'simplex'. When two or more elements combine in a fusion operation the resulting expression is 'complex'. In this latter case, one element occupies the head position and the other(s) act as operator(s). According to KLV (1985) the internal representation of vocalic expressions involves the following elements: I, U, A, v (the identity element), N (nasal) and ɪ (ATR). Elements have a charm value. A, N and ɪ are positively charmed and I, U and v are charmless. The combination of elements is constrained by their charm value. That is, a positively charmed element and a positively charmed expression cannot combine. In terms of charm, the two positively charmed elements N and ɪ, for example, are prevented from combining with each other or with the element A when it is the head of an expression. While the proposal that the fusion operation is constrained by the charm value of the elements gives desirable results, it is not without problems. Taking the Nasal element as an example, this cannot be part of an expression along with the ATR element. Thus, tensed nasal vowels are ruled out, an outcome which appears to be empirically justified. But the constraint also prevents the Nasal element from combining with the element A when it is the head of an expression. This wrongly precludes nasalised low vowels which are found in many languages.

In order to cut down the number of phonological expressions that the theory generates and

to address the theoretical issues concerning the presence of a nasalised low vowel, Kaye (1993) and Harris & Lindsey (forthcoming) propose the elimination of the ATR element.[3] Reducing the number of elements is one way of decreasing the number of phonological expressions. As for the choice of the ATR element ɪ, and not, say, N, this is largely motivated by the fact that i. unlike the other elements, ɪ is never the head of an expression and ii. it is the only element found in the representation of vowels but not of consonants.[4]

Let us consider some aspects of the revised theory of elements.

1.1 The revised theory of elements

In this section we will provide an introduction to certain aspects of the revised theory of elements which will be pertinent to our analysis of Turkic languages. Starting with English, we will illustrate that the contrast between tense and lax vowels can be expressed in terms of headedness. The claim being that long vowels are universally headed. We will then turn to Québec French and show that languages can have both headed and headless short lax vowels.

1.1.1 Tense/lax vowels in English

The elimination of the element ATR calls for a new way of representing the difference between tense and lax vowels (i.e. ATR and non-ATR vowels). It has been proposed by Kaye (1993) that tense vowels are headed expressions and lax ones are headless.[5] The contrast between tense and lax mid-vowels is represented in (1) below.

(1)   e   (A•I)   o   (A•U)

       ɛ   (A•I•_)   ɔ   (A•U•_)

In terms of the revised theory then, languages having a contrast between tense and lax vowels have two series of phonological expressions: one with headed expressions and another with empty-headed ones. In certain dialects of English for example, in which long vowels are tense and short vowels lax, branching nuclei dominate headed expressions and non-branching nuclei dominate headless ones. We give in (2) below the difference between tense and lax 'i' and 'u' as found in words like *beat/food* and *bit/book* respectively.

(2) a.

```
     O   N   O   N      b.   O   N   O   N
     |   |\  |   |            |   |\  |   |
     x   x x x   x            x   x x x   x
     |    \/  |                |    \/  |
     b   (I)  t                f   (U)  d
```

c.

```
     O   N   O   N      d.   O   N   O   N
     |   |   |   |            |   |   |   |
     x   x   x   x            x   x   x   x
     |   |   |                |   |   |
     b  (I•_) t               b  (U•_) k
```

As illustrated above, the difference between tense and lax vowels is no longer one of charm value but of headedness. In English there is rigid correlation between headedness and quantity. Short vowels are headless and long ones headed (cf. *beat* [bi:t] vs *bit* [bɪt], *mate* [me:t] vs *met* [mɛt], *coat* [ko:t] vs *cot* [kɔt]). Consider the vowel 'a' as another example. As argued by Charette & Kaye (see C & K in preparation) languages of the type of English and French, to be considered below, show that the difference between the vowels 'a' and 'æ' is not one of I-ness (i.e. frontness) but of headedness. In other words, the sound 'æ' corresponds to the expression (A•_) and not to the expression (I•A), this latter expression being interpreted as [ɛ] as will be illustrated below. The argumentation goes as follows. As shown above long vowels are headed. The vowel in 'father', for example, is a long 'a' and therefore corresponds to the expression (A). Taking now a short 'a' as in the word 'cat' it sounds like [æ] and it corresponds to the expression (A•_). Similarly, the word *bath* has two possible pronunciations: [ba:θ] and [bæθ]. This shows the correlation between headedness and quantity. There is no evidence that the English 'æ' has the element I in its representation. On the contrary, what English shows is that in this language [æ] is not phonologically a front vowel but a lax one.

Let us now consider Québec French where the contrast between tense and lax vowels is not necessarily realised in terms of length.

1.1.2 The headed lax vowel of Québec French

Québec French has short headed vowels which become headless when they precede an empty nucleus. Some examples of this process, known as laxing, are given below.

(3)   Québec French laxing:

a.

vider	[vide]	'to empty'	vide	[vɪd]	'empty'
tapis	[tapi]	'carpet'	tapisse	[tapɪs]	's/he carpets'
couler	[kule]	'to flow'	coule	[kʊl]	'flows'
saoul	[su]	'drunk (masc)'	saoule	[sʊl]	'drunk (fem)'
rusé	[rüze]	'cunning'	ruse	[rÜz]	'cunning'
céder	[sede]	'to give up'	cède	[sɛd]	's/he gives up'

b. O N O N   c. O N O N
   | | | | | | | |
   x x x x   x x x x
   | | | | | | | |
   v (I) d (A•I)   v (I•_) d ( )

Taking the same process applying to words containing the vowel 'a' we have the following alternation: *rat* [ra] 'rat (masc)' vs *rate* [ræt] 'rat (fem)'. As in English the sound [æ] corresponds to the expression (A•_) in Québec French.

(4) a. O N   b. O N O N
        | | | | | |
        x x   x x x x
        | | | | | |
        r (A) t   r (A•_) t ( )

Finally, we look at mid vowels in more detail.

In word-final position in French only headed expressions can occur. This accounts for the presence of words like *sot* [so] 'stupid (masc)', *peau* [po] 'skin' versus the absence of those like *sɔ* ending with [ɔ] (i.e. (A•U•_)). The vowel [ɔ] being headless, it cannot occur in word-final position. Hence, lexically headless expressions become headed when they occur word-finally. This is illustrated below where we can observe a change in the quality of the mid-vowels depending on their syllabic position. Vowels which are lax before a word-final consonant are tense when they occur in word-final position.

(5) French

sotte	[sɔt]	'stupid (fem)'	sot	[so]	'stupid (masc)'
rote	[rɔt]	's/he burps'	rot	[ro]	'a burp'
dernière	[dɛrnjɛr]	'last (fem)'	dernier	[dɛrnje]	'last (masc)'
fermière	[fɛrmjɛr]	'farmer (fem)'	fermier	[fɛrmje]	'farmer (masc)'

Interestingly, while the contrast between e/ɛ and o/ɔ is clearly one of headedness, we find words in French ending with 'ɛ'.

(6) French

lait	[lɛ]	'milk'	etais	[etɛ]	'was'
parfait	[parfɛ]	'perfect'	balai	[balɛ]	'broom'
secret	[sɔkrɛ]	'secret'	poulet	[pulɛ]	'chicken'
laid	[lɛ]	'ugly (masc)'	fait	[fɛ]	'fact'

On the one hand the forms given in (5) above show that 'ɛ' is the headless counterpart of the vowel 'e' (i.e. (A•I)). So how is it that these headless expressions occur in word-final position which we supposed had only headed expressions? The proposal is that while there is an empty headed expression corresponding to the sound 'ɛ' (the one we found in the forms given in (5) above), there is also a headed expression (I•A) which also sounds like 'ɛ' and which is found word-finally. It is this headed expression (I•A) that occurs in words such as those given in (6).[6]

In this section we have shown that the sound 'ɛ' can correspond to separate expressions (i.e. (A•I•_), (I•A)), a point which we will come back to in the discussion of Turkish.

1.1.3 Licensing constraints

We have seen that the elimination of the ATR element suggests the elimination of charm. This raises an interesting question: what prevents certain elements from combining if not their charm value? The answer is simply nothing. That is, fusion is not prevented. The result is that the theory of phonology, which derives all and only the possible phonological expressions, now aims at the reduction of the number of elements rather than relying on combinatorial constraints.

Related to this issue is finding the means of generating all and only those phonological expressions present in human languages alongside characterising language-specific segmental inventories. The segmental inventory of a given language naturally consists of a sub-set of all the possible combinations of elements. In the revised theory, since nothing prevents elements from combining other than the licensing constraints of a language, the task becomes one of discovering these language-specific constraints. Consider a language like Moroccan Arabic the vocalic system of which consists of the four vowels 'i', 'u', 'a' and 'ɨ'. The presence of simplex vowels and the absence of complex ones are captured by a licensing constraint stating that *I, U and A must be head*. If I, U and A must occupy the role of head within an expression, it follows that they can neither combine with each other nor can they occur in operator position. This accounts for the absence of complex headed expressions (eg. (A•I)) or complex headless expressions (eg. (I•_)) in Moroccan Arabic. Hence the expressions (I), (U), (A) and (_) which represent the system of Moroccan Arabic. By adding the constraint *non-branching nuclei must be headless* (as we saw earlier is also needed for certain dialects of English) we capture the fact that the vowels 'i', 'u' and 'a' are always long, therefore headed, and that the only short vowel is 'ɨ'; the interpretation of an empty expression.[7]

We now turn to the vocalic system and harmony processes in Turkish with a view to investigating further the nature and role of licensing constraints.

2.0 Turkish

In this section we will concentrate on Turkish and show how licensing constraints can

capture both a language-specific vocalic system and the behaviour of its harmony processes.

2.1 Turkish vocalic inventory

On the surface, Turkish appears to have a system of eight vowels, (i, ü, u, ɛ, œ, ɔ, a, ɨ) which are represented in the orthography as (i, ü, u, e, ö, o, a, ı). The first fact to take into consideration is that Turkish lacks a lexical contrast between tense and lax vowels. Recall that the "tense/lax" distinction is now represented as a headed/headless contrast. As will be motivated in our discussion of vowel harmony, we propose that lexically filled nuclei in Turkish contain phonological expressions which are headed. Headless phonological expressions are ruled out by a licensing constraint *operators must be licensed*. If the licensers of operators are elements, we exclude complex headless expressions. That is, an element can occupy the role of operator if and only if there is an element in the head position which licenses it. What this latter constraint excludes are the expressions (I•_), (U•_), (A•_), (I•U•_), (I•U•A•_)). The only headless expression our licensing constraint does not rule-out is a headless expression with no operator (i.e. (_)). This expression, we claim, corresponds to the vowel 'ɨ'. Without going into a detailed analysis of the phonological behaviour of this vowel, it has all the properties of a sound corresponding to the interpretation of an unlicensed empty nucleus.[8] In addition to its alternation with zero, we will shortly see that it behaves like an identity element in vowel harmony.

The elimination of complex headless expressions in Turkish entails that the representation of the vowels 'i', 'u' and 'a' are (I), (U) and (A) respectively. Let us now consider the representation of the complex vowels.

The presence of front rounded vowels (cf. ü, œ) indicates that in Turkish, unlike English for example, the elements I and U can combine. We need to determine what regulates their fusion. For example, if both I and U were to occur freely, there would be two lexical 'ü's (viz. (U•I), (I•U)). However, as will be discussed subsequently, this is not the case in Turkish. To account for i. the presence of a unique 'ü' and ii. the constraints on U-spreading, Kaye (1993) proposed the licensing constraint *U must be head*.[9] This licensing constraint of Turkish rules out any expression having an element U in operator position (cf. *(U•I), *(U•A), *(U•A•I), *(U•_), this latter expression also being excluded by the constraint *operators must be licensed*). It follows from the constraint *U must be head* that U occupies the role of head in all expressions containing it (i.e. 'u' (U), 'ü' (I•U), 'ɔ' (A•U) and 'œ' (I•A•U)).

Having considered the U-headed expressions, let us turn to those containing the element I. Turkish appears to have four different expressions containing I (i.e. 'i', 'ɛ', 'ü' and 'œ'). Since *U must be head*, I occupies the role of operator in the expressions corresponding to 'ü' and 'œ' and because *operators must be licensed*, it occupies the role of head in the expression corresponding to the vowel 'i'. What remains to be seen is the role I occupies in the expression corresponding to 'ɛ'. According to the licensing constraints we have proposed so far, both the expressions (A•I) and (I•A) must exist. However, if this were the case,

Turkish would have a contrast between two "non-high front" vowels. That is, two of the three vowels [e, ɛ, æ] would be found in the first nucleus of a word, i.e. in the harmonic head position where vowels are not derived but lexical. The fact is that there is no contrast between [e] and [ɛ] in the language. The sound corresponding to 'e' in Turkish orthography is [ɛ]. Both [ɛ] and [æ] are found in Turkish, but their distribution is dependent on both the quality of the surrounding consonants and the syllabic position the segment occupies. What this indicates is that the difference between [ɛ] and [æ] is not lexical but rather phonological.[10] Accordingly, we conclude that the two expressions (A•I) and (I•A) are not both lexically present in Turkish. The question therefore remains as to what is the representation of the sound corresponding to the letter 'e'. Is this vowel composed of an I head and an A operator (viz. (A•I))? Or is it composed of an A head and an I operator (viz. (I•A))? If Turkish does not have both expressions (I•A) and (A•I), it is because of a licensing constraint concerning either I or A. The proposal regarding the status of U as head rules out the possibility of stating a constraint which requires either A or I to be head. Recall that A is an operator in the internal representation of the vowels 'ɔ' and 'œ' and I is an operator in the expressions corresponding to the vowels 'ü' and 'œ'. In other words the assumptions made so far allow for both I and A to be operators. We could, however, discard one of the two expressions (A•I) and (I•A) by claiming that either *I or A does not license operators*. Consider the case of A not licensing operators. It will then have to occur alone as the head of an expression, or as the operator of a headed expression. A position where it will not occur is in the head position along with an operator (e.g. *(I•A)). However, we have the following reasons to propose that the representation (I•A) does in fact correspond to the Turkish 'e' and we take this to follow from the constraint *I does not license operators*.

Firstly, the expression (A•I), which we reject for Turkish, normally sounds like [e] in a variety of languages (cf. English, French, Italian, etc.). In Turkish however, 'e' sounds more like an [ɛ]. Furthermore, as we have illustrated above, French and English show that contrary to standard assumptions (cf. Anderson & Jones (1974), KLV (1985) among others), the expression (I•A) does not universally correspond to the front low vowel [æ]. In French, (I•A) is manifested as [ɛ] (as in *lait* 'milk') and it is the expression (A•_) which corresponds to the sound [æ] in both French and English.

Returning to the representation of the vowel 'ɛ' in Turkish, we propose that it is identical to the one we find in word-final position of French words ending in 'ɛ'. Namely, it has the representation (I•A). Adopting this representation also has the advantage of proposing the same representation for the lexical 'ɛ' and the I-harmonised 'a'. As we will see in the next section on I-harmony, we have strong reasons to believe that an I-harmonised 'a' (i.e. 'ɛ') has the element A as head and I as operator. If the two elements occupied a different role in the representation of a lexical 'ɛ', we would expect the stem and suffixal vowels in forms such as *ev-de* 'in the house', *et-le* 'with the meat' to be phonetically different. Again, this is not the case. Yet another argument for the representation (I•A) is that there is a process in Turkish whereby the vowels 'a' and 'ɛ', unlike all the other vowels, are affected by the presence of a following empty-nucleus. That is, the quality of these two vowels is different when they are followed by a sequence, consonant-lexically filled nucleus, or a, sequence

consonant-empty nucleus. A detailed analysis of this process is beyond the scope of this paper and we refer the reader to Charette & Göksel (in preparation) for a discussion of these issues. Relevant to the present discussion, however, is the fact that only the two vowels 'a' and 'ε' are affected by a following empty nucleus. This could be captured if those two expressions had something in common that the other expressions did not have. It may well be the case that the vowel 'a' and the vowel 'ε' (lexical or derived) are different from the other vocalic segments in being the only ones to have the element A as head.[11]

To conclude, we capture the non-occurrence of (A•I) in Turkish by the constraint *I cannot license operators*. I can occur alone as head of an expression (i.e. 'i'=(I)), or as the operator of an element-head (i.e. 'ε'=(I•A), 'ü'=(I•U) and 'œ'=(A•I•U)). It cannot occupy the role of a head licensing an operator (i.e. *(A•I), *(U•I) and *(A•U•I)).

With these three licensing constraints we derive all and only those lexical expressions present in Turkish. The licensing constraints and the internal representation of the vocalic expressions are summarised in (7) below.

(7)   A. The licensing constraints of Standard Turkish

  i.   U must be head
  ii.   I does not license operators
  iii.   Operators must be licensed

  B. The phonological expressions of Standard Turkish

i (I)	ü (I•U)	u (U)	ɨ ( )
ε (I•A)	œ (I•A•U)	ɔ (A•U)	a (A)

What we have said so far concerns the lexical phonological expressions of Turkish and not the ones derived by phonological processes. In Turkish, the one position where vocalic segments are not affected by the phonology, and must therefore be lexical, is in the harmonic head position (i.e. the first nuclear position from which harmony is triggered).[12] Excluding any effects a consonant may have on a following or a preceding vowel, we find in word-initial position all and only the phonological expressions given in (7B) above.

Now that we have established the lexical vocalic inventory of Turkish, let us turn to its processes of vowel harmony and see how they interact with the licensing constraints we have proposed.

2.2 Turkish I-harmony

The literature on vowel harmony is abundant and Turkish provides a classic example of this process. Typical of languages with vowel harmony, any vowel can occur in N¹ position (i.e. the first nucleus of the domain) while those occurring in the recessive nuclei N², N³ etc., are quite restricted. The language is known to have both I (i.e. front) and U (i.e. round) harmony

processes. This might be why the expressions occurring in recessive nuclei never contain the elements I or U in their lexical representation.[13][14] This leaves us with (A) and ( ) in the recessive nuclei.[15]

By looking at the examples given below we can observe that only i. 'a', 'ε' and ii. 'ɨ', 'i', 'u' and 'ü' are found in recessive positions. The two vowels 'ɔ' and 'œ' are restricted to N¹.[16] In the case of 'a' and 'ε' they involve a lexical (A) which may or may not be I-harmonised and in the case of 'ɨ', 'i', 'u' and 'ü', these involve a lexically empty expression which is either a. not harmonised, b. harmonised by I, c. harmonised by U and d. harmonised by both I and U respectively. The absence of 'ɔ' and 'œ' in recessive positions follows from the absence of lexical (U) word-internally and from the absence of A-harmony in the language.[17] Below we give the possible sequences of vowels in Turkish in (8a) and illustrate them in (8b).

(8)   a.   Vowel in the stem

Vowel in the stem	Suffix Type (a)	Type (b)
a or ɨ	a	ɨ
e or i	e	i
o or u	a	u
ö or ü	e	ü

  b.   Stem

Stem		Suffix Type (a)		Type (b)	
kal	'remain'	kalan	'remaining'	kalın	'remain!'
kıs	'reduce'	kısan	'reducing'	kısın	'reduce!'
kes	'cut'	kesen	'cutting'	kesin	'cut!'
gir	'enter'	giren	'entering'	girin	'enter!'
sor	'ask'	soran	'asking'	sorun	'ask!'
kur	'establish'	kuran	'establishing'	kurun	'establish!'
gör	'see'	gören	'seeing'	görün	'see!'
gül	'laugh'	gülen	'laughing'	gülün	'laugh!'

Starting with type (b), these suffixes represent the empty phonological expression which is realised as 'ɨ' when nothing spreads into it, as 'i' when I spreads alone, as 'u' when U alone spreads and finally as 'ü' when both I and U spread. As for type (a) suffixes, they have two realisations: 'a' and 'ε'. The suffixal vowel lexically contains the element A in its representation; it is realised as 'ε' when I spreads into it and as 'a' when nothing spreads.

Let us begin by considering what harmony is. What we know about harmony is that it involves the spreading of an element from a governing nucleus into nuclei it governs. We wish to propose that spreading is an instance of element-licensing. That is, an element X occurring within a governing nucleus licenses the presence of this element X (i.e. licenses

itself) into the expression of the nuclei it governs. Along these lines, when an element spreads into an expression, it is not licensed by the element it combines with, but by itself. We also claim that an element can only license itself in a role it can occupy lexically. If, for example, because of a licensing constraint, an element can only be the head of a phonological expression (like U in Turkish) this element will never be able to license itself in a role of operator within the expressions it governs. Let us now investigate how harmony operates in Turkish.

I-harmony involves the spreading of the element I from N^1 into the nuclei it governs.[18] The spreading of I does not appear to be subject to any constraints and since it can lexically occupy both head and operator positions it is not surprising that it can also spread into these positions. For the segments triggering I-harmony having I either as a head (viz. 'i') or an operator (viz. 'ü', 'ɛ' and 'œ'), the analysis is as follows: from the harmonic head-nucleus of the domain (the leftmost nucleus), I licenses itself as head or operator in the nuclear positions it governs. We said above that the only possible word-internal representations are ( ) and (A). We illustrate below how I spreads into these positions starting with the empty phonological expression.

(9)   First person possessive: -( )m

a. at-ım 'my horse'

```
O N O N O N    --->   O N O N O N
| | | | |             | | | | | |
x x x x x             x x x x x x
| | | | |             | | | | | |
(A) t ( ) m ( )      (A) t ( ) m ( )
```

b. fil-im 'my elephant'

```
O N O N O N    --->   O N O N O N
| | | | | |           | | | | | |
x x x x x x           x x x x x x
| | | | | |           | | | | | |
f (I) l ( ) m ( )    f (I) l (I) m ( )
```

c. et-im 'my meat'

```
O N O N O N    --->   O N O N O N
| | | | |             | | | | |
x x x x x             x x x x x
| | | | |             | | | | |
(I•A) t ( ) m ( )    (I•A) t (I) m ( )
```
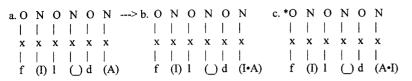
The lexical representation of the 1st pers. poss. has two empty nuclei. The final empty nucleus will never be phonetically expressed since word-final empty nuclei are licensed in Turkish.[19] The initial empty nucleus of the suffix will receive an interpretation because it lacks a proper governor. In the first example, because there is nothing spreading from the harmonic head position, the unlicensed empty nucleus of the suffix is realised as 'ɨ' (i.e. the phonetic interpretation of an empty phonological expression which is not p-licensed). In the second and third examples there is an element I present in the representation of the word-initial vowel. The I element spreads into the following empty expression and the suffixal vowel is manifested as 'i'. Notice that the element I occupies the position of head when it spreads into the empty expression. This proposal, however, is not a direct outcome of the licensing constraint *Operators must be licensed*, since this constraint pertains to lexical expressions only. The process of spreading, however, involves the licensing of an element in a different nucleus. As we will see in the next section on U-harmony, we have strong reasons to believe that U spreads as a head into an empty expression. We are proposing that I spreads into head position in order to capture a parallelism between U and I-harmony although this may not necessarily be the case. In conclusion, I licenses itself to occupy the role of head within an empty expression it governs. Examples of I spreading into (A) are given below.[20]

(10)   Stem   Dative -d(A)

a.   oda   'room'   oda-da
        kol   'arm'   kol-da
        su   'water'   su-da
        kıl   'girl'   kıl-da

b.   fil   'elephant'   fil-de
        et   'meat'   et-de
        süt   'milk'   süt-de
        göz   'eye'   göz-de

As the examples given above illustrate, I spreads from a head position when harmony is triggered by the vowel 'i' and from an operator position when the process is triggered by 'ü', 'ɛ' and 'œ'. In contexts where the expression (A) harmonises, two possibilities for I to spread exist. It can either fuse with A as an operator (i.e. (I•A)) or as a head (i.e. (A•I)). The former fusion operation would follow from what we have said so far. That is, I would be licensing itself in a position of operator within an expression it governs.[21] The case where I would spread into (A) and occupy the role of head, would require switching the element A from the head position it lexically occupies into the position of operator within the harmonised expression. This is illustrated below.

(11) fil-de 'on the elephant'

```
a. O  N  O  N  O  N  --->b. O  N  O  N  O  N    c. *O  N  O  N  O  N
   |  |  |  |  |  |         |  |  |  |  |  |          |  |  |  |  |  |
   x  x  x  x  x  x         x  x  x  x  x  x          x  x  x  x  x  x
   |  |  |  |  |  |         |  |  |  |  |  |          |  |  |  |  |  |
   f (I) l  ( ) d (A)       f (I) l  ( ) d (I·A)      f (I) l  ( ) d (A·I)
```

As we will see in the next section on U-harmony, "switching" is not possible in Turkish. For this reason we propose that I spreads as an operator into the expression (A). With this in mind, let us now turn to U-harmony.

2.3 Turkish U-harmony

Although the spreading of I does not appear to be subject to any constraints in Turkish, U-harmony is quite restricted in that it only spreads into an empty phonological expression and not into (A). This is illustrated in (12) below.

(12) a.

		Poss: -( )m( )	Durative: -d( )r( )
kuş	'bird'	kuş-um	kuş-tur
		*kuş-ım	*kuş-tır
yük	'load'	yüküm	yük-tür
		*yük-im	*yük-tir
ok	'arrow'	ok-um	ok-tur
		*ok-ım	*ok-tır
göz	'eye'	göz-üm	göz-dür
		*göz-im	*göz-dir

b.

		Dative: -d(A)	Plural: -l(A)r( )
kuş	'bird'	kuş-ta	kuş-lar
		*kuş-to	*kuş-lor
yük	'load'	yük-te	yük-ler
		*yük-tö/ta	*yük-lör/lar
ok	'arrow'	ok-ta	ok-lar
		*ok-to	*ok-lor
göz	'eye'	göz-de	göz-ler
		*göz-dö/da	göz-lör/lar

In (12a) the spreading of U into an empty expression causes it to be realised as -um/üm as opposed to -ım/-im. It is also clear from (12b) that U does not spread into an expression

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containing A, unlike Khalkha Mongolian (cf. Charette 1989) and Sakha, to be discussed shortly. This is true whether U occurs alone (cf. 'u' (U)) or with an operator (cf. 'ɔ' (A·U), 'œ' (I·A·U), 'ü' (I·U)). In other words, the vowel 'a' is realised as 'a' or 'ɛ' but never as 'ɔ' or 'œ' when it follows an expression containing an element U. These facts are found in any analysis of Turkish harmony, and to our knowledge previous analyses do not go beyond a mere stipulation. What needs to be understood at this point is what prevents U from spreading into (A) but not into an empty expression. We will now show how these restrictions on the spreading of the element U follow from the licensing constraints we have proposed for Turkish.

2.3.1 The restrictions on U-spreading: Why switching is forbidden in Turkish

The spreading of U into an empty expression but not into (A), we claim, follows from the licensing constraint *U must be head*. We first take the case of the empty expression exemplified here by the possessive suffix -( )m( ). We claimed earlier that the vowel 'i' is the phonetic realisation of an empty nucleus which fails to be p-licensed. As illustrated below when such an expression follows an expression containing U, this latter spreads and occupies the head position in line with the constraint just mentioned .

(13)   a.   ok-um 'my arrow'

```
O   N   O   N   O   N   ----->   O   N   O   N   O   N
|   |   |   |   |                |   |   |   |   |   |
x   x   x   x   x                x   x   x   x   x   x
|   |   |   |                    |   |   |   |   |
(A·U) k ( ) m ( )                (A·U) k (U)m ( )
```

b.   kuš-um 'my bird'

```
O   N   O   N   O   N   ----->   O   N   O   N   O   N
|   |   |   |   |   |            |   |   |   |   |   |
x   x   x   x   x   x            x   x   x   x   x   x
|   |   |   |   |                |   |   |   |   |   |
k  (U)  š  ( ) m ( )             k  (U)  š (U) m ( )
```

Let us now consider harmonising the expression (A) by U spreading, as would be the case with the dative suffix -da or the plural suffix -lar, both of which lexically contain the element A. Such a combination would yield the ungrammatical forms *ok-lor, *kuş-lor etc. We now have to understand what prevents this type of harmony from taking place.

There are two options for U to spread into the expression (A). Either U spreads into the operator position (i.e. (U·A)) or it spreads into the head position (i.e. (A·U)). In the first option an U-head in the governing nucleus would be licensing an U-operator in the position

it governs. In the second option U would be licensed by an U-head in the governing position to occupy the role of head within that governed expression. The first option is straightforwardly ruled out by the constraint *U must be head*. A significant outcome of this is that the lexical restriction according to which U can only occupy the role of head within an expression, carries over to its licensing properties in the phonology.[22] Let us now consider the second strategy where U would spread as a head and move A into the operator position (from its original head position). We will henceforth refer to the shifting of a role within a phonological expression as 'switching'.

The expression (A•U) whereby A moves into the operator position leaving U occupying the role of head does not violate any of the licensing constraints given above. What this process would require is a mechanism which would switch the element A from the head position it lexically occupies into the position of operator. Although a priori nothing in the theory rules out switching as a possible phonological process, this does not seem to be an option for Turkish. If it were, the dative and plural suffixes *-da* and *-lar* would be realised as *-do* and *-lor* respectively, which is not in accordance with facts. However, Turkish itself does not shed light on the nature of switching and conditions that preclude it. In order to understand the conditions that regulate switching we will now turn to U-harmony in another Turkic language, Sakha.

3.0 Vowel harmony in Sakha

Sakha, also known as Yakut, is spoken in Siberia. Like Turkish it has both I and U harmony. Although I-harmony operates the same way as it does in Turkish and does not appear to be subject to any restrictions, the two languages differ with respect to U-harmony. While in Turkish U-spreading is restricted to empty expressions, it does spread into the expression (A) in Sakha. The facts are as follows: U spreads into i. an empty expression and ii. into (A) but only when the expression it spreads from also contains an element A. In other words U spreads into (A) from the vowels 'ɔ' and 'œ' but not from the vowels 'u' and 'ü'.[23][24] Some examples are given in (14) below.

(14) U-harmony in Sakha

			Acc.: -n( )	Plural: -l(A)r	Dative: -k(A)
a.	bulčut	'hunter'	bulčut-nu	bulčut-tar	bulčut-ka
	kus	'bird'	kus-nu	kus-tar	kus-ka
b.	tünnük	'window'	tünnük-nü	tünnük-ter	tünnük-ke
	üt	'hole'	üt-nü	üt-ter	üt-ke
c.	ot	'grass'	ot-nu	ot-tor	ot-ko
	oɣo	'child'	oɣo-nu	oɣo-lor	oɣo-ɣo

d.	börö	'head'	börö-nü	börö-lör	börö-ɣö
	töbö	'head'	töbö-nü	töbö-lör	töbö-ɣö

Comparing Sakha with Turkish, we have found no evidence for the presence of a set of different licensing constraints. We therefore propose that when U spreads into (A) it occupies the role of head (i.e. (A•U)). That is, an element U occurring in the head position of the harmonic nuclear head, licenses itself to occupy the role of head within the expression of the nucleus it governs. The possibility for A to move into the operator position is Sakha but not in Turkish might be taken as resulting from a difference between the licensing properties of U in these languages. So for example, one might claim that in Sakha, U licenses switching while in Turkish it does not. This presupposes that the licensing of A to undergo switching takes place from within the expression. However, if U were the switching-licenser of A in Sakha, we would have no explanation for why it does not switch position when U is in a context to spread from the vowels 'u' and 'ü' (e.g. *üt-ler *üt-lör*).

As the examples above show, U can only harmonise (A) when the expression it spreads from also contains an element A. That is, U spreads if and only if it spreads *from* and *into* expressions containing an A. This condition can be expressed in terms of the notion of "A-bridge". Those two elements A merge into one as the result of an OCP effect and in their fusion they form a "bridge" for U to spread.

(15) ot-lar --> ot-lor 'grasses'

a.
```
   O  N  O  N  O  N  O  N         b.   O  N  O  N  O  N  O  N
   |  |  |  |  |  |                     |  |  |  |  |  |  |  |
   x  x  x  x  x  x  x                  x  x  x  x  x  x  x  x
   |  |  |     |  |  |                   |  |  |     |  |  |  |
 (A•U) t  ( ) l (A) r ( )           (A•U) t  ( ) l (A•U)r ( )
                                          |_____|
```

As illustrated above, what switching involves is alignment. That is, A can switch if it aligns itself with A in the domain-head position. It therefore seems that the licensing of switching, just like the licensing of spreading, is invoked from an element which is external to the expression where switching takes place. In conclusion, the difference between Sakha and Turkish with respect to U-harmony can be stated in terms of an OCP effect on A being active in the former language but not in the latter.

Up to this point we have shown that U-spreading appears to be more restricted than the spreading of its partner I in Altaic languages. In Turkish we saw that U can only spread into an empty expression and in Sakha that U can also spread into the expression (A) in the presence of an "A-bridge". We will now consider yet another constraint on U-spreading. This time the facts come from the dialect of Kazak spoken in the province of Xin Jiang in China.

4.0 U-harmony in Kazak

The vocalic inventory of Kazak is similar to Turkish and Sakha and we will assume that it has the same licensing constraints. The language has also two types of vowel harmony, viz. I and U-harmony. In this section we will concentrate on the behaviour of U, since I-harmony operates the same way in the three languages.

As in Turkish and Sakha, U always spreads into a following empty expression. This is illustrated below.

(16)   Stem   Poss.: -(_)m(_)

    murun   'nose'   murun-um
    süt   'milk'   süt-üm   o
    qol   'hand'   qol-um
    čöp   'grass'   čöp-üm

Although the spreading of U into an empty expression is not subject to any restrictions, the spreading of U into (A) is again more restricted. It can take place optionally if I-spreading also takes place.

(17)   Stem   Plural: -l(A)r(_)

    murun   'nose'   murun-lar/*lor
    süt   'milk'   süt-ter/tör
    qol   'hand'   qol-lar/*lor
    čöp   'grass'   čöp-ter/tör

As illustrated in the above examples, the element U can optionally spread into (A) from the vowels 'ü' and 'œ' but not from 'u' and 'ɔ', a result quite different from that in Sakha where the spreading is dependent on the presence of two A elements. However, in Kazak, because U can spread into (A) from the expression (I•U), the switching-licenser of A cannot be an element A occurring in the governing expression. Indeed there is simply no element A present in the internal representation of the vowel 'ü' and nevertheless U can spread from this expression. We claim that in Kazak an element I occurring in the operator position within both the governing and the governed positions is the switching-licenser of A. At first glance this seems to be a case of "parasitic harmony" (i.e. U-harmony is parasitic on I-harmony). Notice, however, that the spreading of U is not always dependent on the spreading of I, since we saw earlier that U spreads into an empty expression from any expression containing U. This clearly shows that U-harmony is not parasitic. Rather, the switching of A within a governed expression has to be licensed by an I-operator occurring both in the governing and in the governed expressions. That is, the switching of A into the position of operator is parasitic on the presence of an operator I within the governing expression.

To summarise, we have seen that switching requires licensing from an external position:

in Sakha, it is licensed by the presence of identical elements undergoing an OCP effect; in Kazak, it is licensed by an I-operator within the governing nucleus. And finally in Turkish, there is no licenser for switching.

Our analysis of harmony processes in three Turkic languages reveal an asymmetry between the elements I and U, with the spreading of U being more constrained than the spreading of its partner I. This, we claim, follows from a licensing constraint on the role of U and the absence of such constraints on the role of I.

We wish to conclude our discussion on the asymmetric behaviour between I and U harmony by briefly considering pre-17th century Turkish.

5.0 From Ottoman to Modern Turkish

In this section we will propose that pre-17th century Turkish, which we will henceforth refer to as Ottoman Turkish, unlike Modern Turkish, had only one type of harmony: I-harmony. U-harmony was completely absent.[25]

The absence of U-harmony in Ottoman Turkish correlates with the presence of fewer constraints on the vowels occurring in recessive nuclei. The three expressions (A), (U) and (_) are all allowed in non-initial positions as opposed to Modern Turkish which has a richer harmonic system and a more restricted set of vocalic segments in these same positions ((A) and (_)).

In Ottoman Turkish, as in Modern Turkish, any of the eight vowels are found in N^1 position. In recessive positions however, 'u' and 'ü' can follow an initial vowel lacking an element U in its internal representation. This is illustrated below.

(18)   Ottoman Turkish   Modern Turkish

  a. idüp   'doing'   edip
      baharınun   'in the spring of ...'   baharının
      devrdür   'is the era'   devirdir
      yaptur   'cause to make'   yaptır

  b. ittürdi   's/he causes to make'   ittirdi
      gümiş   'silver'   gümüş
      virmeyüp   'upon not giving'   vermeyip
      gösterüp   'upon showing'   gösterip

  c. oldılar   'they became'   oldular
      turış   'a standing'   duruş
      günlik   'daily'   günlük
      hükmince   'according to his decree' hükmünce

The examples given in (18a) show that in Ottoman Turkish (U) is found in recessive nuclei

of words where U-harmony is not taking place. This clearly shows that a word-internal 'u' is not derived, but lexical. This contrasts sharply with Modern Turkish where words with word-internal 'u' always have the element U in the first nucleus. In (18b) we observe that as in Modern Turkish, Ottoman Turkish has a process of I-harmony: 'u' is realised as 'ü' after a vowel containing I in its representation. (Notice that as expected, an initial 'ü' also triggers I-harmony.) Finally, words in (18c) have an initial vowel containing the element U in its internal representation and we observe that, unlike in Modern Turkish, in Ottoman Turkish, U does not spread into a following empty expression (e.g. O.T. *günlik*, **günlük*, M.T. *günlük*, **günlik*). That is, Ottoman Turkish does not have a process of U-harmony.

To summarise we suggest that harmony processes correlates with the constraints imposed on lexical vowels in recessive nuclei. The contrast between Ottoman Turkish and Modern Turkish is an example of this correlation.

7.0 Conclusion

In this article we have proposed that the licensing constraints of a language not only determine its vocalic inventory but also explain how vowel harmony operates. In analysing I and U-harmony in Turkish, Sakha, Kazak and Ottoman Turkish, we have proposed that harmony, or spreading, is an instance of element-licensing. An element occurring in a governing position licenses itself to be present in a nucleus it governs. We have seen that an element can only license itself to occur in a position it can lexically occupy. This explains why U, which unlike I must be head in these languages, can never license itself in an operator position. Finally we have considered the notion of switching and showed that as with spreading, it is subject to licensing from within the governing nucleus. Languages differ with respect to the switching-licensing properties of elements. In Turkish nothing has switching-licensing properties, in Sakha an element can undergo switching under an OCP and in Kazak an operator in the governing nucleus can license an element to switch into the position of operator in a governed nucleus.

Temme!

Notes

1. The variety of Turkish we will be dealing with in this paper is modern standard Turkish.
2. For a detailed presentation of the revised theory the reader is referred to Charette & Kaye (in preparation).

3. Although realised in a very different way, this proposal is along the lines of van der Hulst's 'Extended' Dependency Theory (van der Hulst 1989, 1992).

4. Having eliminated the ATR element, Kaye's latest attempts are: i. to eliminate the coronal element R and incorporate it into the element A and ii. merge the Nasal and Low Tone elements into a unique element. See also Jensen (this volume) for a proposal concerning the elimination of the 'glottal stop' element.

5. See also Lass (1984).

6. While the expression (I•A) is realised as [ɛ] in standard French, it has two realisations in Québec French. Some speakers realise this expression as [ɛ] and others as [æ]. This means that there is no one-to-one correspondence between a sound and the expression it represents. Note that the absence of French words ending with [ɔ] (viz. (U•A)) follows from a licensing constraint of French according to which *U must be head*.

7. See Charette & Kaye (in preparation) for a detailed analysis.

8. See, among others, Kaye (1990a), Charette (1991) for an analysis of empty nuclei in Government Phonology.

9. The licensing constraints we will be proposing for Turkish are primarily motivated by its two types of harmony which will be discussed in the following sections.

10. For a discussion on the presence of 'ɛ' and 'æ' in the first nucleus of a word the reader is referred to Charette and Göksel (in preparation) who propose that 'æ' is an instantiation of head-alignment. See also Lowenstamm & Prunet (1988) and Charette & Kaye (in preparation) for a discussion on head-alignment in Tigre and French respectively.

11. The same representation has been proposed for the vowel 'ɛ' in Uighur, an Altaic language spoken in the province of Xin Jiang in China (cf. Cobb (in press). Cobb claims that while I-harmony is obligatory when triggered by the vowels 'ɛ', 'œ' and 'ü' it is optional when the triggerring vowel is 'i'. She accounts for this asymmetry by proposing that 'i' is the only Uighur vowel that has the element I as head. Harmony from a I-head, she claims, is optional, as opposed to being obligatory when this element occupies the role of operator within an expression. As it is obligatory when triggered by the vowel 'ɛ' it has the representation (I•A), just as we propose for 'ɛ' in Turkish, the sister language of Uighur. We also refer the reader to Denwood (1994) for an opposite view on the representation of the Uighur 'ɛ'.

12. We are aware of cases where harmony is triggered by a non-inital vowel, such as *anne-ler (*anne-lar)* 'mothers' and *elma-lar (*elma-ler)* 'apples', but for the purposes of this paper we shall assume that harmony is head-initial, which is true for the vast majority of words in the language.

13. Although it appears that the absence of lexical I and U in recessive positions is dependent on the presence of I and U harmony in the language, there are languages like Chichewa, Finnish and Mongolian, which have A, I and U harmony respectively, and in which the vowels 'a', 'i' and 'u' are lexically found in recessive nuclei. Our proposal is that in a language where an element X is spreading, this element X will never lexically occur in a position of operator word-internally.

14. We would like to consider apparent counterexamples to the claim that 'i' and 'u' do not lexically occur in recessive nuclei. These are the cases of the putative suffixes -adur 'to keep on (verb)' and -ceğiz [ˌiːz] 'future 1ˢᵗ person plural', this latter belonging to the native Istanbul dialect. Of these -adur is complex, with -dur signaling the beginning of a domain. This is supported by the fact that -dur does not undergo harmony (although 'a' does) and is derived from the Old Turkish auxilliary verb durmak 'to remain', a fully inflected verb. As for -ceğiz, which in Standard Turkish is realised as -ˌaz/-ˌez, we claim that in the Istanbul dialect it also marks the beginning of a phonological domain which is not visible to harmony processes, hence yapıˌiz (*yapıˌız) 'we will make', duruˌiz (*duruˌuz) 'we will stay'.

15. Words of the type of tavuk 'chicken', kavun 'melon', sebük 'pond' are apparent couterexamples to our claim that non-initial "u-vowels" are always a result of U-harmony. Interestingly, this type of word often has a "u-consonant" (i.e. a consonant whose head is the element U) before the vowel. Taking kabuk 'crust' as an example, we propose that its second nucleus is lexically empty (i.e. k(A)b(_)k(_))and that U spreads into the empty nucleus from the consonant preceding it. See Clements & Sezer (1982), Yavaş (1980) and Vural (in preparation) for a discussion on counterexamples to our claim that only (A) and (_) are lexically found in recessive nuclei.

16. At this point we must draw attention to references in the literature which reject the claim that 'ɔ' and 'œ' do not occur in recessive nuclei (cf. Clements & Sezer (1982) among others). There are four sets of relevant examples: i. loan words, which we are not dealing with in this paper (see Vural (in preparation)), ii. words containing a 'Turkish soft g', iii. reduplication and iv. the suffix -iyor. Neither of these are serious counterexamples. The case of the 'soft g' (eg. yoğurt [yoort] 'yogurt') involves vowel lengthening (cf. Vural (in preparation)). Reduplication could not be considered a counterexample since it involves the addition of a prefix whose vowel is a copy of the stem's first vowel (viz. mos-mor 'completely purple', dop-dolu 'full to the brim', kos-kocaman 'huge'). We refer the reader to Piggott (1990) and Kaye (1991) for an analysis of reduplication. As for the suffix -iyor, it is a complex suffix composed of (_)-yor. The fact that -yor never undergoes harmony is in itself an indication that it forms a separate domain. This is supported by the claim that -yor is a derived form of the Old Turkish auxilliary verb yorumak 'to continue' a verb which is fully inflected.

17. At this stage we do not know from what it follows that the element A does not spread in Turkish.

18. We are not considering loan words which are generally disharmonic and in which harmony of the suffixes is triggered by the stem final vowel. See Vural (in preparation) for an analysis of loan words in Turkish.

19. We refer the reader to Kaye (1990a) and Charette (1991) for a discussion of the properties of empty nuclei.

20. The discussion to follow concerns the expression (A) occurring in a context where it is not followed by an empty nucleus (viz. word-finally or before a consonant which is followed by a filled nucleus). When the expression (A) is followed by an empty nucleus (as it is the case in suffixes of the type of -lar 'plural'), the vowel 'a' undergoes two different processes: i. I-harmony and ii. head-alignment. This latter process accounts for the difference in the

quality of the vowels 'a' or 'ɛ' in forms like odalar 'rooms', odadan 'from the room', eller 'hands', elden 'from the hand' vs odada 'in the room', elde 'in the hand'. As argued by Charette & Göksel, in Turkish, expressions having the element A as head, become empty-headed when they precede an empty nucleus. The reader is referred to Lowenstamm & Prunet (1988) and Charette & Kaye (in preparation) for a discussion on head-alignment.

21. Note that there is no contradiction in proposing that i. I cannot license operators and ii. when I spreads into (A) it licenses itself to occupy to role of operator within the harmonised expression. The constraint on the licensing properties of I is lexical and refers to the properties of I as the head of an expression. The licensing properties of an element under spreading are properties of that element, regardless of its role within the harmonising expression. I spreads from a head position when harmony is triggered by 'i' and from an operator position when it is triggered by 'ü' and 'œ'. In both cases, I licenses itself to spread. Where it ends up is dictated by the licensing contraints of the language.

22. Note that if, contrary to what we propose (cf. section 2), Turkish had a series of headless expressions (instead of a series of headed ones) U would be spreading from an into an operator position. If this were the case it would be impossible to explain why U-spreading is restricted to empty expressions.

23. According to Kenstowicz (1994), this is not in line with Kruger (1962) who claims that in Sakha, U spreads into (A) from the vowel 'ɔ' but not from the vowel 'œ'. Our data, collected from four native speakers of the language, contradict Kruger's facts.

24. This is also the case in Khalkha Mongolian: muːrːa: 'one's own cat', nüd-e: 'one's own eye', nom-o: 'one's own book', öndög-ö: 'one's own egg'.

25. The reader is referred to Johanson (1979) who proposes that the vowel change in Ottoman Turkish took place at the end of the 17ᵗʰ century.

References

Charette, M. (1989) 'Vowel harmony in Khalkha Mongolian', paper presented at the LAGB Conference, Belfast.

Charette, M. (1991) Conditions on phonological government, Cambridge Studies in Linguistics 58, CUP.

Charette, M. & A, Göksel (in preparation) 'On the properties of A in Turkish'.

Charette, M. & J. Kaye (in preparation) 'A revised theory of elements'.

Clements, G.N. & E. Sezer (1982) 'Vowel and consonant disharmony in Turkish', in The structure of phonological representations (Part II), Hulst van der H. & N. Smith (eds), Foris Publications, 213-257.

Cobb, M. (in press) 'Vowel harmony in Uyghur', to appear in The Proceedings of Langage et grammaire 1, Université de Paris 8.

Denwood, A. (1994) 'a-i alternation in Uyghur', SOAS Working Papers in Phonetics and Linguistics 3:65-90.

Harris, J. & G. Lindsey (forthcoming) 'The elements of phonological representation', to appear in Durand, J. & F. Katamba (eds), *New Frontiers in phonology*, Longman, Essex.

Harris, J. & F. Moto (1994) 'Bantu height harmony: monovalency and opacity', ms. University College, London.

Hulst, H. van der (1989) 'Atoms of segmental structure: components, gestures and dependency', *Phonology* 6:253-84.

Hulst, H. van der (1992) 'On the nature of phonological primes and the structure of segments', Ms. Rijksuniversiteit te Leiden.

Jensen, S. (this volume) 'Is ? an element?: towards a non-segmental phonology'

Johanson, L. (1979) 'The indifference stage of Turkish suffix vocalism', *Belleten*, Ankara, Turk Dil Kurumu Yayınları.

Kaye, J. (1990a) 'Government in phonology: the case of Morrocan Arabic', *The Linguistic Review*.

Kaye, J. (1990b) '"Coda" licensing', *Phonology* 7.2.

Kaye, J. (1991) 'Head projection and indexation: A Theory of Reduplication', in *GLOW Newsletter* 26.

Kaye, J. (1993) Post-graduate phonology seminar, SOAS.

Kaye J., Lowenstamm J., & J-R Vergnaud (1985) 'The internal structure of phonological elements: A theory of Charm and Government', *Phonology Yearbook* 2:305-328 .

Kaye J., Lowenstamm J., & J-R Vergnaud (1990), 'Constituent structure and Government in phonology', *Phonology* 7.2.

Kenstowicz, M. (1994) *Phonology in Generative Grammar*, Blackwell.

Kruger, J. (1962) *A grammar of Yakut*, Indiana University Press, Bloomington.

Lass, R. (1984) *Phonology: an introduction to basic concepts*, Cambridge University Press, Cambridge.

Lowenstamm J. & J.F. Prunet (1988), 'Tigre vowel harmonies', ms. Université du Québec à Montréal.

Piggott G. (1990) 'Empty Onsets: Evidence for the skeleton in phonology', paper presented at the 13th GLOW Colloquium, Cambridge.

Rona B. (1984) 'Harmony in Turkish: a discordant note', in Aksu-Koç, A & E.Erguvanlı-Taylan (eds.), *Proceedings of the Turkish Linguistics conference*, Boğaziçi University Publications, Istanbul.

Tulum, M. (1977) *Tursun Bey Tarih-i ebül-feth*, Baha Matbaası, Istanbul.

Vural, Y. (in preparation) 'Vowel and consonant alternations in Turkish: a Government Phonology approach', Ph.D. thesis, SOAS.

Yavaş M. (1980) 'Vowel and consonant harmony in Turkish', in *Glossa*14:2.

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In this paper, I consider the representation assigned to sequences involving consonant+glide in prevocalic position in French (hereafter 'CG clusters'), focusing on a process of glide-vowel alternation known as gliding[1]. Taking on board new developments within the theory of Government Phonology, I reanalyse cases of semi-vocalisation not as cases of resyllabification as advocated in Kaye and Lowenstamm (1984) and Kaye (1989), but as instances of spreading. I show that where CG clusters are the result of gliding, these sequences are always heterosyllabic and never tautosyllabic. Alternations between high vowels[2] and their corresponding glides involve conditions on the interpretation of pseudo-empty positions regulated by the phonological ECP. I begin with a look at the data which need to be accounted for.

1. A survey of the data

With respect to the behaviour of glides in French, the facts which any analysis must account for are as follows: glides in prevocalic position are in free alternation with their corresponding high vowels except before a tautosyllabic obstruent+liquid cluster (hereafter 'OL cluster').

As a rule, when a vowel-initial suffix is added to a stem ending in a high vowel, the high vowel changes into its corresponding glide by a process of 'semi-vocalisation' which, following Tranel (1987), I have referred to as 'gliding' (1). This process is in evidence in the formation of the past participle of so-called ER-verbs in French, and much of the data under review concerns itself with this process[3]. As can be seen from (1), the past participle of these verbs is formed by adding to a stem a suffix which is spelt <é>, and realised [e][4].

(1)		Standard French		Quebec French		Gloss
(1a)	li + e	lje	*lije	lije	*lje	tied
	sy + e	sɥe	*sɥɛ	sɥɥe	*sɥe	perspired
	nu + e	nwe	*nuwe	nuwe	*nwe	knotted
(1b)	kõfi + e	kõfje	*kõfije	kõfje	*kõfije	confided
	rəli + e	rəlje	*rəlije	rəlje	*rəlije	bound
(1c)	pri + e	prije	*prje	prije	*prje	prayed
	tru + e	truwe	*trwe	truwe	*trwe	pierced

The first thing to note with respect to the data in (1) is that, as previously mentioned, gliding is systematically blocked when the high vowel is preceded by a tautosyllabic obstruent+liquid cluster (1c). As first pointed out by Morin (1976), there exists a conspiracy in French against the creation of obstruent+liquid+glide clusters, and in cases where the application of a morphological process such as suffixation could result in the creation of such sequences, gliding is blocked[5]. Looking at the derivation of <prié> for example, we need to provide an explanation as to why a realisation *[prje] is ungrammatical