

# Vowel harmonies in Kazan Tatar

## Element Theoretical Analysis

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### Abstract

Tatar has a nine-vowel system with two vowel harmonies, namely fronting harmony (FH) and rounding harmony (RH). FH is a long-distance agreement of [ $\pm$ front] with adjacent vowels, and RH is that of [ $\pm$ round]. The main aim of this study is to examine these vowel harmonies in terms of Element Theory (ET), which has yet to be done in previous relevant literature. This study firstly clarified the vocalic inventory of Tatar as well as its ET representations, and then vindicated the coherence of the representation, particularly demonstrating the blocking process of RH spreading and vowel-zero alternation. As a result of the observations it formulated a set of generalized ET rules of the Tatar vowel harmonies.

### 1. Introduction

Tatar is an agglutinative Kipchak language in the Turkic language family, mainly spoken in Republic of Tatarstan in the Russian federation. The canonical word order is SOV, AN, with an extensive case-marking system. Kazan Tatar, spoken in Kazan, the capital of Tatarstan, is the prominent literary variant of the language.

Tatar has a nine-vowel system with two vowel harmonies<sup>1</sup>. Vowel harmony is a long-distance process of assimilation in which a certain vowel triggers changes in the properties of adjacent vowels<sup>2</sup>, and this phenomenon is widely observed among the Turkic languages. The two harmonies of Tatar are fronting harmony (FH) (also known as palatal harmony), which is an assimilation of the feature [ $\pm$ front], and rounding harmony (RH) (also known as labial harmony), which is an assimilation of [ $\pm$ round]. While FH is both phonetically and orthographically prominent as in many of other Turkic languages, RH is phonetically rather weak<sup>3</sup> and it is not expressed in the current Cyrillic and Latin orthographies. This study stands on the conventional position to admit RH, albeit a controversial matter, due to the phonetic impression of RH and the existence of RH in some of other Turkic languages<sup>4</sup>.

The peculiarity of the Tatar RH is that only /o/ can be a trigger but not /u/. This shows a contrast with the Turkish RH, where both /u/ and /o/ are triggers. In the example of Turkish in (1), the last vowel of the verb stem /u/ affects the past tense suffix *-t<sup>5</sup>* and *I* realizes as /u/, whereas in Tatar /u/ never affects *I*. Instead, /o/

<sup>1</sup> This paper only deals with words with Turkic origin, because loanwords from Russian, Persian, Arabic, etc. frequently violate the vowel harmony.

<sup>2</sup> Conklin (2015: viii)

<sup>3</sup> Poppe (1963) and Comrie (1997) describe RH as extant in Tatar, but Conklin (2015) demonstrates with phonetic experiments that it does not have any RH. Henry (2018) analyzed the Tatar FH supporting the position of Conklin (2015).

<sup>4</sup> RH is cross-geographically reported in Turkish, Kyrgyz, Sakha, Tuvan etc.

<sup>5</sup> *I* in capitals denote that it may change to /i /, /i/, /u/, /ü/ in Turkish and to /i/, /e/, /o/, /ö/ in Tatar, in accord with the preceding adjacent vowel.

triggers the assimilation as in (2):

- (1) Turkish: *unut-tI* ‘s/he forgot’ realized as *unut-tu*  
Tatar: *uz-dI* ‘s/he passed’ realized as *uz-di* (\**uz-du*, \**uz-do*)
- (2) Turkish: *ol-dI* ‘s/he (it) was’ realized as *ol-du*  
Tatar: *tor-dI* ‘s/he stood’ realized as *tor-do*

Considering roundedness, Tatar /u/ is phonetically more round than /o/; therefore it is intuitively reasonable to predict that /u/ could be the trigger of RH, but the data show only /o/ can be the trigger.

The final goal of this study is to determine what conditions the two vowel harmonies in Tatar as well as to clarify the abovementioned intuitional gap, taking advantage of Element Theory (ET) within the framework of Government Phonology (GP). In so doing, a phonetic and phonological representation of the Tatar vocalic system and its counterparts expressed in elements will be illustrated, and then relevant phonological phenomena will be observed and explained.

## 2. Element Theory

In standard phonology, segmental structures have been analyzed chiefly by means of features that express bivalent phonological properties of a certain segment relying on how the sound is articulated. This concept plays an important role in Optimality Theory (OT), being based on the notion that grammaticality is a bundle of constraints, where bivalent features are utilized to describe segments. By contrast, elements are monovalent properties that is able to stand by itself to represent a sound; for example, a simplex element |I| can itself represent [i] or [j], whereas conventional features have to show all positivity and negativity according to each of them; that is, [+high] itself cannot address any sound<sup>6</sup>. In ET phonological segments are expressed in elements. As far as this paper is concerned, since it deals with only vocalic features, three vocalic elements |I|, |U| and |A| are used hereafter.

### 2.1. Element Dependency

Many domains in linguistics assume that a structure is asymmetric, and ET is not an exception. In other words, when a structure consists of two objects, one of the two is the head and another is the dependent. In ET, numerous vowels can be expressed by complex elements, and a compound made of two elements has a head and a dependent in it, where the head is marked with an underline. This dependency enables elements to represent the differences in vocalic quality, for instance, of /e/ and /ɛ/ in Italian where /e/ is represented as |A I| with headed |I| and /ɛ/ as |A I| with headed |A|. In terms of acoustics, headedness gives a prominence to an element and its phonetic properties, and it accounts for higher and more front feature of /e/ and, likewise, lower and more back feature of /ɛ/.

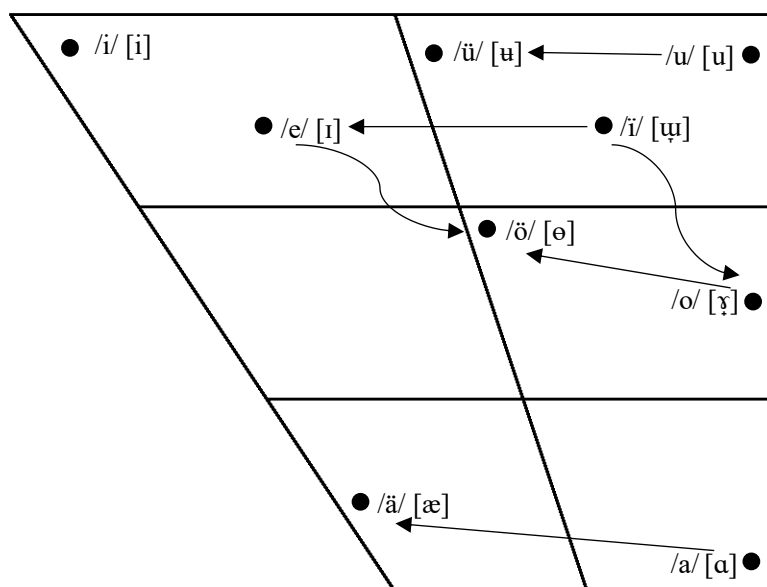
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<sup>6</sup> For further explanations, see Backley (2011).

### 3. Tatar vocalic system

Tatar has nine vowels (/a/, /ä/, /i/, /e/, /o/, /ö/, /u/, /ü/, /i/; see (3) for an approximate phonetic distribution), and they can be categorized according to their features, namely height (high, mid, and low), roundedness (rounded and unrounded), and frontness (front and back). In (4), based on the table provided in Poppe (1963: 9), I shall propose a table representing the vocalic system of Tatar in terms of ET, where each of the three features plays a role of assigning an element. A sound bracketed in a pair of slashes // stands for a phonological representation, one in square brackets [ ] for a phonetic description, and one in vertical bars || for an element representation. The feature of high vowel adds headedness to an element; being a mid-vowel gives no change (i.e. unmarked, featureless); the low vowels /a/ and /ä/ are assumed to have headed |A|, partially because in Kazan Tatar it is characteristic that /a/ is lowered further (and also rounded) in the first syllable of a word (e.g. *xaliq ara* ‘international’ [xəlɪq̄ɑrɑ]). Mid vowel /i/ is described to have no element, because it is dropped when it is p-licensed<sup>7</sup> by its following vowel when it is not lexically filled (see (5)). The feature of roundedness adds |U| element to a vowel. We can correctly predict from the table, for instance, that a vowel having a combination of front |I|, rounded |U| and high [ ] vowel is [U I], namely /ü/. We can correctly predict from the table, for instance, that a vowel having a combination of front |I|, rounded |U| and high [ ] vowel is [U I], namely /ü/.

(3) Phonetic distribution of Tatar vowels (straight arrows for fronting harmony; curly arrows for RH)



<sup>7</sup> P-licensing is a terminology used in GP (Kaye, Lowenstamm & Vergnaud 1985). When the last nucleus in a morpheme is empty, it is itself p-licensed and the preceding empty nucleus is phonetically realized (as a schwa, for example). When the last nucleus is lexically occupied, it p-licenses the preceding empty nucleus, and the p-licensed nucleus is not phonetically realized.

### 3.1. Observations

The fronting harmony is paraphrased to |I|-harmony in ET, as well as the RH to |U|-harmony. In Tatar, these harmonies occur both within a lexeme (internal vowel harmony) and over suffixes following the lexeme (external vowel harmony). Except for loanwords, both internal and external vowel harmonies are determined by the first vowel of a word; that is, in case of |I|-harmony, when the first vowel has a quality of |I| element, following vowels of the word (including suffixes) must have |I| element in common. As for |U|-harmony, this is only applicable as long as following vowels are mid vowels, and the harmony is blocked when any high or low vowels intervene. Examples in (6) below show the spreading of |I|-element. Next, |U|-element spreading is shown in (7). In (8), the spreading of |U|-element is blocked by non-mid vowel /a/.

(4) Tatar vocalic system

	[+f]		[-f]	
	I			
	[-r]	[+r]	[-r]	[+r]
	U			
H  ]	/i/  I]	/ü/  I U]		/u/  U]
M	/e/  I]	/ö/  I U]	/i/  ]	/o/  U]
L  A]	/ä/  A I]		/a/  A]	

(5) Silent /i/ by p-licensing

<i>xaliq</i> ‘nation’	<i>xalq-i</i> ‘its nation’ nation-POS.3SG																																																												
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(6) Spreading of |I|

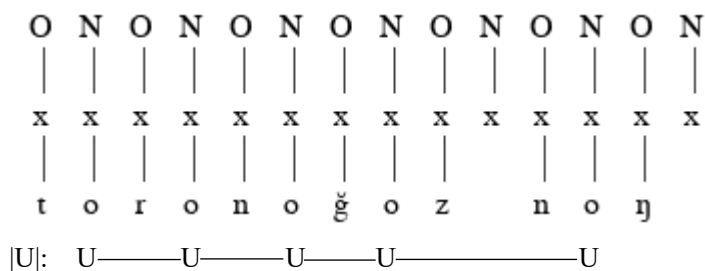
*bäränge-lär-egez-gä* ‘to your (pl.) potatoes’  
potato-PL-POS.2PL-DAT

O	N	O	N	O	N	O	N	O	N	O	N	O	N	O	N	O	N
x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
b	ä	r	ä	ŋ		g	e	l	ä	r	e	g	e	z		g	ä
I :		I	—	I	—	I		—	I	—	I	—	I			—	I
A :		A		A		A			A		A			A			

(7) Spreading of |U|

*toron-oğoz-noŋ* ‘of your (pl.) niece’

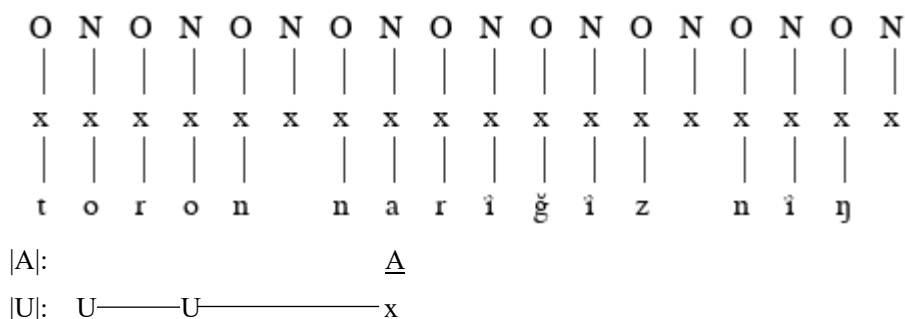
niece-POS.2PL-GEN



(8) |U|-harmony blocked by |A| element (x stands for blocking)

*toron-nar-iğiz-niŋ* ‘of your (pl.) nieces’

niece-PL-POS.2PL-GEN



### 3.2. ET analysis of |I|-harmony

A peculiar point about the Tatar vocalic system is that /i/ has no back counterpart. This is coherently accountable in terms of ET by assuming a theoretical headed empty element |  | which cannot phonetically represent itself on its own (see (9)).

(9) |I|-harmony correspondence in Tatar

	I	U	U	A	<u>  </u>
- I	/i/	/o/	/u/	/a/	
+ I	/e/	/ö/	/ü/	/ä/	/i/

Thus, the condition of |I|-harmony is described straightforwardly in (10). Since |I|-harmony is never blocked by other elements unlike |U|-harmony, there is no more constraint in the condition.

(10) Condition of |I|-harmony

|I|-harmony is caused if and only if the trigger has |I|-element.

### 3.3. ET analysis of |U|-harmony: why /u/ cannot be a licenser

At this point, one may well expect /u/ to be the factor of |U|-element spreading, rather than /o/ being the licenser. For, based on the vocalic system provided in (4), /u/ is headed, and is also phonetically more round than /o/, which is actually around [ɤ]. However, in fact, /u/ never causes RH as shown in (1). To explain this gap, cross-linguistic conditions of RH based on the typological study by Kaun (2004) help us clarify the point (see (11)). Here “target” is vowel(s) following the trigger.

#### (11) Conditions favoring RH

- i. The trigger is non-high.
- ii. The trigger is front.
- iii. The target is high.
- iv. The target is back.
- v. The trigger and target agree in height.

The vowels relevant to the RH in Tatar are /i/, /e/, /o/, and /ö/, which are all mid-vowels; therefore, it is plausible to claim that the fifth condition in (11) is working in Tatar as well. Also, the first condition is the case for Tatar, as the triggers /o/ and /ö/ are non-high. Paraphrasing these constraints in the ET’s terminologies, we find the following conditions:

#### (12) Element Theoretical conditions of RH in Tatar

RH is caused if and only if

- (a) The trigger has |U|-element;
- (b) The trigger has no headed element;
- (c) The target has no headed element.

Condition (a) confines the definition to RH; condition (b) excludes the possibility of RH caused by /u/; and condition (c) defines that following vowels must be mid-vowels, both of which agree with the fifth condition mentioned by Kaun. The RH fails in (1) because /u/ is headed, i.e. the condition (b) is violated.

## 4. Conclusion

Through the examination of behaviors of the vowel harmonies, the argument reached the conditions regulating FH and RH in Tatar. As the Tatar FH behaves similarly to other Turkic languages, the rule (10) was merely a paraphrase to ET terminologies. As for the definition in (12) it is notable that it not only formulated the phonological grammar of RH but also was consistent with the table of vocalic system in (4), cross-linguistic observations by Kaun (2004) and the ET framework. Taking advantage of the monovalent representation of elements, this study successfully demonstrated a simple account for the vowel harmonies. The abstract description of the rules comes from the abstractness of elements itself, and at the same time it explains the intuitional gap mentioned in the introduction ensuring that phonetic intuition does not always regulate the assimilation.

## Abbreviations

1, 2, 3: 1st, 2nd, 3rd person (respectively) / DAT: dative / GEN: genitive / PL: plural / POS: possessive / SG: singular

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