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Vowel Harmony is a Basic Phonetic Rule of the Turkic Languages

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ABSTRACT

The present study comprehensively analyzes vowel harmony as an important phonetic rule in Turkic languages. Recent changes in the vowel harmony potential of Turkic sounds caused by linguistic and extra-linguistic factors were described. Vowels in the Kazakh, Turkish, and Uzbek language were compared. The way this or that phoneme sounded in the Proto-Turkic language and the way it sounds now in each specific language was investigated. The common and distinguishing features of phonemes were specified based on concrete facts. The specificity of sounding of key vowel phonemes was analyzed with regard to the findings of prominent phoneticians. It was found that of the compared languages, only the Turkish and the Kazakh language preserved the classic eight Proto-Turkic vowels. Certain signs of vowel harmony were characterized – tree types of vowel opposition: by backness – front, back, central, by labialization – unlablialized-labialized, by roundness – narrow, wide, and medium. Thus, it is possible to see the full picture of the phonemic spectrum of vowel functioning in the Turkic languages under consideration by distinguishing the common trends in changes at the current stage of linguistics with regard to the specificity of each individual language system.

KEYWORDS
Vowel harmony, sound harmony, phonetic regularity, labialized-unlabialized vowel, palatal sound

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Introduction

Vowel harmony has recently been drawing more attention of scholars as an important background process in Turkic languages (Dzhunisbekov, 1991; Dzhusupov, 1991). This is primarily related to the testing of new ways to analyze the distribution of word and word form vocalism in these languages,

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caused by modern linguistic processes (Odanova, 2014). Nevertheless, in spite of the relatively large number of linguistics studies on the Turkic languages (Serebrennikov, 1986; Torsuyev, 1962; Korkmaz, 2013), the phonology of vowel harmony and its phonetic characteristics are still understudied, given the current changes in the Turkic languages (Tekin, 1978; Wurzel, 1983). The problem lies in the uncertainty of the concept of vowel harmony; it is unclear whether it should be regarded as a manifestation of accentuation or an individual independent sub-intonation prosodic language means.

It is necessary to outline a holistic picture of vowel harmony as a universal linguistic phenomenon that has specific features in different languages of the studied group (Dzhunisbekov, 1991). The comparative-typological aspect of this problem should be prioritized. It showcases the interferential phenomena of transposition and transference that are caused by the common Turkic system of correspondence on the one hand and by interaction with languages from other families on the other hand (Caferoğlu, 2013; Shcherbak, 1970).

Each Turkic language, regardless of how close it is currently related to its past, has its own history and, depending on its historical development, has acquired distinguishing features in its phonetic system, in addition to the original common ones (Serebrennikov, 1986; Torsuyev, 1962). In order to understand these phonetic features, it was decided, considering the Proto-Turkic origin of said features, to examine them by individual phonemes based on the information presented in the characteristics and interpretations of phoneticians for each individual language – Kazakh, Turkish, and Uzbek.

The present study traces the variations of vowel phonemes, how this or that phoneme sounded at the Proto-Turkic stage of development, how it currently sounds in each specific language – Kazakh, Turkish, and Uzbek, and analyzes their common and distinguishing features while giving examples (Baydar, 2013; Shcherbak, 1970). Vowel phonemes are characterized by the following features (Dzhunisbekov, 1991; Reshetov, 1961; Sevortyan, 1955): 1) by roundness – narrow, wide, and medium; 2) by backness – front, back, central; 3) by labialization – unlablialized, labialized.

The paper presents a comprehensive study of the vowel phonetic system of the Kazakh, Turkish, and Uzbek languages, which are understudied both in the synchronic and diachronic aspects. This predetermines the relevance of this study, since it reveals identical, partially common and contrasting phonetic phenomena in these languages and types the harmony of vowels that are characteristic of these languages to a varying extent.

Aim of the Study

The purpose of the study is to describe the action of vowel harmony in said languages, to determine the similarities and differences in the phonetic system organization in Turkic languages by means of contrastive analysis, and to characterize the interaction of vowels in speech flow.

Research questions

Which typical changes occurred in the Kazakh, Turkish, and Uzbek languages?

What are the common and unique vowels in these languages?

Method

The purpose and objectives of this study necessitated using methods and techniques of comprehensive analysis of vowel harmony in Turkic languages. The systematization, classification, and interpretation of the functioning of vowels in the Kazakh, Turkish, and Uzbek language used *linguistic observation* and *description*, which enable theoretically generalizing obtained results. *Phonological opposition* was used to study and analyze the collected materials. This method opposes phonemes in the studied Turkic languages. Common phonetic features of the Kazakh, Turkish, and Uzbek language were determined with the *synchronous-confrontive* method. The *descriptive* method and *statistical treatment of data* were used to determine the capacity of phonemes and to interpret obtained results.

Data, Analysis, and Results

Phoneme a

The ancient proto-language phoneme *a* has been preserved in almost all modern Turkic languages, although its position underwent certain shifts, transformations, and modifications. Scholars that compared the proto-language state of vowel phonemes in general and that of phoneme *a* in particular noted a number of changes in its structure, which occurred during its use in Turkic languages (Serebrennikov, 1986). The short proto-language phoneme *a* has been preserved in the first syllable in almost all Turkic languages, including the Kazakh and Turkish languages. However, the Uzbek language differs from the former two (Kazakh and Turkish), since here *a* became a labialized, retracted vowel *a°*: *ʁaqyr* – 'copper', *gara* – 'black', etc.

The abovementioned scholars describe the reason behind this change as follows: "It may be assumed that a similar transformation also occurred in the ancient Chuvash language, since in the upper dialect of the Chuvash language, *o* corresponded with *a* in the first syllable. Middle Turkic *baš* – 'head' – and upper Chuvash *pos*, Turkish *gara* – 'black' – and upper Chuvash *hora*. The transformation of the original *a* into *a°* in the Tatar, Bashkir, and ancient Chuvash languages is difficult to explain. This may have been caused by some substrate…" (Dzhunisbekov, 1991).

Phoneme ***a*** *in the Kazakh language*. It is necessary to refer to the information provided in specialized studies of Kazakh experts. However, these experts claim that a common opinion regarding the content of phonemes in the Kazakh language, their acoustic and articulation characteristics is lacking. The studies note that the phonetic system of the Kazakh language consists of nine vowel monophthongs: *a, ä, o, ö, e, y, ï, u, ü*. This opinion was common until recently. However, certain studies, including those of Zh. Abuov (1978), analyzed sounds by their perception and hypothesized the following regarding the mechanism of identification of Kazakh vowels: *a* in the Kazakh language is open, back, hand, and retracted; unlabialized *a* occurs in all positions in the word and is pronounced more distinctly; this phoneme is the most common one: *altyn* – 'gold', *tyrnaq* – 'nail' (Abuov, 1978).

Phoneme ***a*** *in the Turkish language*. In the Turkish language, the phoneme *a* is characterized as follows. Stressed *a* is positioned at the end of the word, while in monosyllabic words, at the beginning of the word or after consonants, it

is close to the Russian *a*, for instance, in the word *лак* – 'varnish'. Examples: *kakmak* – 'to hit, to beat', *han* – 'inn', *otlak* – 'pasture' (Sevortyan, 1955). In the Turkish language, *a* is wide, unlabialized, and has two variants: *a* – short, *á* – long.

a – short is an open back sound: 1) in stressed syllables: *taban* – 'sole', *kumda* – 'on the sand'; 2) near the palatal *L*, which is encountered in combination with *a* only in borrowed words: *hal* – 'position'. *á* – long, written graphically as â, is encountered only in borrowed words: *manâ* – 'meaning', *günâgün* – 'multicolored'.

Since the position of vowels at the beginning or at the end of the word has a noticeable effect on vowel harmony, scientists prefer investigating them as "starting vowels" and "end vowels" when studying their positional and combinational changes. The variants of *a* depend both on preceding and following consonants, while its tones form a relatively lengthy range, starting with retracted back labialized *a* and ending with open *e*, when *a* is replaced by other vowels. In this gradation, they are heard clearly before or after back or pharyngeal consonants in monosyllabic words, such as *hak* – 'right', *kal* – 'stay', *ak* – 'white' or *yonga* – 'chip', *daha* – 'more'. Back variants of *a*: it becomes nasalized before sonorant *н*: *anlamak* (pronounced as *annamak*) – 'to understand', *ormanlik* –'grove', *nane* – 'mint' (Sevortyan, 1955).

Phoneme ***a*** *in the Uzbek language*. The transformation of *a* into the wide unlabialized *o* is typical for the Uzbek language. For instance, *baš* – 'head' > *boš* in Uzbek, *bat* – 'dive' > *bot* in Uzbek, Old Turkic *taŋ* – 'dawn' > *toŋ* in Uzbek, although this transformation is not regular. A similar phenomenon is found in non-first syllables in the Uzbek language. For instance, the Proto-Turkic *a* in the last close syllable often (though not always) corresponds with Uzbek *õ*: Middle Turkic *bašaq* – 'ear' > Uzbek *bošoq*, *uzaq* – 'far' > Uzbek *uzoq*. In the Uzbek language, *a*>*õ* can also be encountered in affixes: *bormoq* – 'to go', *olmaq* – 'to take', *tošloq* – 'rocky place', *mõjrõқ* – 'stallion'.

This characteristic should be supplemented by information from V.V. Reshetov's (1961) study. In the modern Uzbek orthoepy, the vowel *a* has various tones. The most frequent tone is the front one, which is a wide, unlabialized, open variant of the phoneme *e*. In terms of pronunciation, this sound is close to the one between wide Russian *e* and *a*. The front tone of the vowel *a* in the literary Uzbek language is widely used in any phonetic surroundings, even next to uvular consonants *q*, *γ*, *h*. It is encountered both in the phonetic content of individual words and in various morphological markers (affixes). This is an orthoepic rule of the modern Uzbek language (Reshetov, 1961).

*Examples***:** Kazakh *ara* – 'saw', *al* – 'take', Turkish *av* – 'hunt', Uzbek *mana* – 'here', *bar* – *bor* – 'is'.

Phoneme ä

The short vowel phoneme *ä* was considered an independent phoneme in the structure of the Proto-Turkic language. It was featured in the Orhon-Yenisei writings and the Old Turkic language. The phoneme *ä* is encountered in the first and following syllables of most modern Turkic languages, including those compared in this study – Kazakh, Turkish, and Uzbek. Experts note that the phoneme *ä* in Turkic languages has a short *ä* and long *ä:* variant. In many Turkic languages, short *ä* was unstable and often transformed into other vowels.

At that, the transformation had two directions: *ä* either retracted and became *a* or narrowed. It often transformed into a semi-open *e*. The resulting *e* could narrow further, which is why in some Turkic languages, *ə* transformed into *i*. These changes may have been caused by the difficult articulation of *ä*, which required considerable physiological effort, or other factors, for instance, shifts in the vocalism system (Serebrennikov, 1986).

The following transformation is found in Turkic languages: *ä>a, ə>e, ä>e, ä>i*. Examples: Proto-Turkic *täŋ* – 'equal' > Kazakh *teŋ*, Turkish *denk*, Uzbek *teŋg*; *tär* – 'sweat' > Chuvash *tar*, Kazakh *ter*, Uzbek *ter*, Turkish *ter*, and other languages have the *ə-e* transformation. The phoneme *ä* also has a long variant in Turkic languages. In some languages (Turkmen, Chuvash) this length is preserved; in other languages it transforms into a diphthong. The Proto-Turkic long *ä:* is shortened in some Turkic languages; in other Turkic languages, it maintains its length.

*Phoneme **ä** (ə) in the Kazakh language*. Back unlabialized *ə* is encountered in the first syllable of such words as *äsem* – 'elegant', *äser* – 'influence'. *ə* (*ä*) is characterized acoustically as a central, open, unlabialized phoneme that dominates this level of the spectrum. It has a relatively low articulation, with insignificant qualitative fluctuations in spectra, depending on the position in polysyllabic words.

*Phoneme **ä** (ə) in the Turkish language*. *ä* is a wide, unlabialized, front, mid vowel. The vowel *ä* has multiple positions, from strong close *ä* to open *ä* that transforms into the close *a*. It is more often encountered in the Turkish and Nogai language and seldom in the Uzbek language. In the dialects of the Turkish language, the word *el* with a close *ä* means 'people', while with an open *ä* it means 'hand'. However, the literary Turkish language uses the close and open variants of the phoneme *ä*. Its close variant is encountered before, between, and after coronal consonants, often in front of dorsal sonant *j*, under the influence of etymological *ä*, in the word roots and derived words, if *j* is followed by a wide vowel, it transforms into *i*: *dinleyen* – 'follower', *iğmek* – 'to bend', etc. The open variant of *ä* is encountered after or between uvular consonants (*sel* – 'stream', *gel* – 'come', *eğe* – 'file', *keke* – 'stutterer') – the words *sel* and *eğe* have close variants of *ä*, while *gel* and *keke* have open variants (Kononov, 1976).

*Phoneme **ä** in the Uzbek language*. *ə* – the open, unlabialized, widest variant of the phoneme *ə* – is encountered in all Uzbek dialects: *kättä* – 'big', *käsäl* – 'ill', *äkä* – 'elder brother'. In the Uzbek language, the phoneme *ä* (as indicated in the original) is a front mid phoneme. According to V.V. Reshetov (1961), the vowel *ä* (orthographic *e* after consonants) in the Uzbek literary language is a front mid vowel, closer to the Russian *e* after consonants (for example, the words *сено* – 'hay', *время* – 'time', *село* – 'village', *дело* – 'business'). However, unlike its Russian counterpart, the Uzbek *ä* is not a diphthong, i.e. the Uzbek *ä* does not have the typical side-tone that is heard when the Russian *e* is pronounced after soft consonants and in front of hard consonants. The diphthongization and diphthong nature of the sound *ä* is characteristic of the Kipchak dialect of the Uzbek language, rather than of the literary Uzbek pronunciation. Examples: *tepa* [tepa] – 'hill', *tepak* [tepək] – 'poplar', *bemaza* [bemäzä] – 'tasteless', etc. In the Uzbek language, this phoneme is used with an [*ä (e)*] tone. In this case, it is a close front sound, which is why it is often perceived as [*i*], but its closest tone is

[e] after soft consonants, where its pronunciation is close to [*u*]: *beda* [>бъдə] – ‘clover’, *ečki* [>ъчкъ] – ‘goat’, *temir* [>тъмър] – ‘iron’, etc. (Reshetov, 1961).

*Examples***:** Kazakh *äke* – ‘father’, *än* – ‘song’, Turkish *är* – ‘husband’, *äsr* – ‘age’, *äbädi* – ‘eternal’.

Phoneme e

In Turkology, the origin of the phoneme *e* in Turkic languages is debatable. It is absent in some languages and present in others, but in widely different articular and acoustic variants. Experts, including B.A. Serebrennikov, believe that is it absent from the vocalism structure of the Proto-Turkic language, since *e* does not have its pair like other vowels (*a - ə, o - ö, u - ü, y- ï*) and emerged in certain languages due to subsequent development of the vowel system.

*Phoneme **e** in the Kazakh language*. Experimental studies characterize this phoneme in the Kazakh language as follows. In the articulation of the vowel phoneme *e*, most of the tongue is moved forward, unlike most other soft vowels of the Kazakh language, while the tip of the tongue is positioned at the base of the lower jaw, pressed against the teeth. The anterior of the dorsum is elevated toward the mid part of the palate. The vowel *e* is a diphthong, the format of which has a *j*-shaped beginning, while the stationary part is identical to the format structure of the vowel *i* (Serebrennikov, 1986).

*Phoneme **e** in the Turkish language*. *e* is a front, wide, unlabialized vowel with two tones: narrower (close) and wider (open), for example: *sevmek* – ‘to love’, *ses* – ‘voice’. E.V. Sevortyan (1955) characterized this phoneme as follows. The stressed vowel *e* is close to the Russian *ä*, for example, in words like *эра* – ‘age’ and *эхо* – ‘echo’ or to the same vowel after the consonant *ц*, for example, in the word *цены* – ‘prices’. Turkish examples: *ense* – ‘back of the head’, *keke* – ‘stutterer’, *seçme* – ‘select’, *çekirge* – ‘grasshopper’. The diphthong-like pronunciation of *e* (*ie*) is not typical for the Turkish language as it is for Russian and even more so for Kazakh and some other Turkic languages. Almost all researchers of Turkish phonetics distinguish two variants of the phoneme *e*: a close variant, as in *kireş* – ‘lime’, *değek* – ‘cost, dignity’, *sel* – ‘stream’, etc. Unlike variants of other vowels, the variants of *e* sometimes do not depend on their surrounding phonemes and have a distinctive meaning. Examples: *el* (pronounced with an open vowel) – ‘hand’ and *el* (with a close vowel) – ‘people, country’, *dev* (pronounced with an open vowel) – ‘dev’ (a fictional monster) and *def* // *tef* (pronounced with a close vowel) – ‘tambourine’. Thus, the variants of *e* have not developed into individual phonemes in the Turkish literary language as they did in the Azerbaijani, Kazakh, and other Turkic languages (Sevortyan, 1955).

*Phoneme **e** in the Uzbek language*. *e* is an unlabialized close non-reducible long sound (*э*). According to V.V. Reshetov (1961), in the modern Uzbek orthography, at the beginning of the word and syllable, the grapheme *e* conveys an iotated sound that consists of *j*+*e*. For example, *er* – ‘earth’, *elka* – ‘shoulder’, *elim* – ‘glue’, *elkan* – ‘sail’, etc. The non-iotated *e* (orthographic *э*) is only encountered at the beginning of the word in the Uzbek language, excluding dialects. For example, *er* – ‘husband, man’, *erk* – ‘spoilt child’, *ega* – ‘master’, *ešik* – ‘door’, etc. Exceptions include words borrowed from the Russian or through the Russian language, in which *e* could be positioned in any syllable: *poetik*, *poema*, *ekonomika*, etc.

Examples: Kazakh *el* – 'country', *ерке* – 'spoilt child', Turkish *evren* – 'universe', *emir* – 'order', Uzbek *eng* – 'sleeve', *ečmoq* – 'untie'.

Phoneme O

In the Proto-Turkic language, the phoneme *O* probably had both long (*O:*) and short (*O*) variants. In modern languages, the length of this vowel is preserved in the Turkmen language. Other languages, including the ones under consideration in this study, feature its short variant, albeit altering due to the instability of its position. According to experts, the Tatar, Bashkir, and, to some extent, Chuvash languages are characterized by the transformation of the short *Ō* into *u* (for example, *ot* – 'grass' > Tatar *ut*, Bashkir *ut*; Kazakh *togyz* – 'nine' > Tatar *tugyz*, etc.). As for the languages under consideration – Kazakh, Turkish, and Uzbek – the position of *O* in them is stable. In terms of the transformation of long *o:* into the diphthong *uo*, this phenomenon is encountered at the beginning of words in the studied languages (for example, in the Kazakh language). The transformation of the Proto-Turkic long *o:* into the short *o* in Turkic languages is considered a common phenomenon, while the reverse process is selective. At that, experts (B.A. Serebrennikov and others) claim that the short *o* that resulted from the long *o:* undergoes the same changes that the original short *o* does. Long *o:* was not encountered in non-first syllables and affixes in the Proto-Turkic language (Sevortyan, 1955).

*Phoneme **o** in the Kazakh language*. The instrumental analysis of the vowel *o* in the Kazakh language characterizes it as follows. During the articulation of *o*, the tongue is retracted. The tip of the tongue is located almost at the base of the lower incisors; the anterior of the dorsum is sunken, which apparently provides the width of the front resonator required to articulate back vowels. The posterior of the dorsum is elevated toward the soft palate; the middle part is curved as in the pronunciation of *a*; the lips are protruding and rounded. The vowel *o* is a diphthong with a *w*-like beginning and a stationary part that is identical to the format structure of the vowel *i* (Dzhusupov, 1991).

*Phoneme **o** in the Turkish language*. According to E.V. Sevortyan (1955), the vowel *o* in the literary Turkish language more so than any other Turkish vowel is open and is pronounced slightly similar to the Russian *o* in the word *бело* – 'white'. Unlike the Russian, Kazakh, and Uzbek dialectical *o*, the Turkish *o* is not a diphthong, i.e. it lacks the *u* element that is the start of the pronunciation of Russian and Kazakh *o*. Turkish examples: *tok* – 'full', *yok* – 'no', *moloz* – 'crushed stone'. Turkish *o* maintains its property in an unstressed syllable, for example, *oda* – 'room' pronounced as [oda], not [ada], which means 'island', the verb *olmak* – 'to be' pronounced as [olmak], not [almak], which means 'to take', etc. The reduced pronunciation of the Turkish *o* under the influence of "akanye" is often encountered among Russian speakers (Sevortyan, 1955).

*Phoneme **o** in the Uzbek language* and its dialects is relatively more complex. Firstly, it is related to the "okanye" in the Uzbek language. Secondly, its pronunciation is associated with the growing number of back vowels due to the divergence of the typical Turkish back *a*. According to V.V. Reshetov (1961), the wide vowel *o* appeared as a back vowel. It is not encountered as an independent vowel in territorially adjacent Turkic languages or Uzbek dialects characterized by "akanye". The emergence of this sound created the "okanye" phenomenon in the city dialects of Tashkent and Fergana and, consequently, in

the literary Uzbek language. However, the development of the open *o* from the back *a* did not occur identically in all urban dialects. The analysis of the "okanye" in the biggest Uzbek cities that laid the foundation for the literary language draws several conclusions regard the way different variants of ∪ *a*, *ä* formed in the Tashkent, Samarkand, Fergana, and other dialects and in the literary language. For example, Tashkent *jomon*, *bozor* // Fergana *jomän*, *bozär*, Samarkand *jamon*, *bazor*, etc. The orthoepy standards of the literary language mostly reflect the pronunciational characteristics of the Tashkent dialect. This opinion is supported by multiple examples (Reshetov, 1961). Thus, the phoneme *o* constitutes one of the main phonetic peculiarities of the Uzbek language, which is not typical for other languages.

Examples: Kazakh *oraq* – 'sickle', *bolys* – 'volost', Turkish *kol* – 'hand', *otyz* – 'thirty', Uzbek *ontör* – 'fourteen', *oγlym* – 'my son'.

Phoneme ö

The Proto-Turkic short *ɵ* has been preserved in all Turkic languages. For example, Old Turkic *öl* – 'to die' > Kazakh *öl* // Turkish *öl*, Old Turkic *kör* – 'to see' > Kazakh *kör*, // Turkish *gör*, etc. (Serebrennikov, 1986).

Phoneme ***ö*** *in the Kazakh language* is characterized as follows. During the articulation of *ö*, the tongue is located in the middle of the mouth. The tip of the tongue is slightly pressed against the lower incisors. Its mid part is elevated toward the posterior of the hard palate. The convex of the dorsum edges and the base of the tongue is similar to the pronunciation of *ä*. The vowel *ö* is a diphthong, the format structure whereof has a *w*-like beginning, while the stationary part is identical to the format structure of the vowel *ü* (Iskhakov, 1955).

Phoneme ***ö*** *in the Turkish language*. When characterizing the phoneme *Ɵ* (originally *ö*), E.V. Sevortyan (1955) notes that it generally corresponds with the more open French *ei* or German *ö*. Examples: *kök* – 'root', *ön* – 'front part, front', *söz* – 'word', *gök* – 'sky'.

Phoneme ***ö*** *in the Uzbek language*. The phoneme *Ɵ<ö*, which is one of the main phonemes of both the Proto-Turkic language and many modern Turkic languages, is lacking in the Uzbek language. It was reduced due to the convergence of three phonemes – *i, u, ü* – and is currently a substitution for six phonemes – *ö - o*, *i - y*, *ü - u*, which remained independent in "jeking" and "yeking" dialects of the Uzbek language. The phonemes *u i ў* in the literary Uzbek language vary between the front and back status in the horizontal plane and distribute their characteristics between the extremes of their historical sources. Thus, due to convergence, the Old Turkic vowels *ö* and *o* merged into the phoneme *o* (*ў* in Uzbek orthography), which naturally increased the number of homonyms in this language. The Uzbek language does not use a single type of vowel harmony (it is subjected to neither labial vowel harmony nor lingual vowel harmony alterations) (Reshetov, 1961).

Examples: Kazakh *öte* – 'very', *ölke* – 'land', Turkish *gözütok* – 'unselfish'.

Phoneme ü (γ)

The phoneme *Y* retained both long (in the Yakut and Turkmen languages) and short variants (in all other languages). In some languages (for instance, Turkmen, Tofa, and other languages), the Proto-Turkic long *Y:* may correspond

to the diphthong *üj*. Examples: Turkmen *sütjt* – 'milk', Tofa *üjš* – 'three', etc. In all other languages, *Y* is the result of reduction of the original Proto-Turkic long *Y*. This group of languages includes the ones under consideration – Kazakh (*kuš* – 'strength'), Turkish (*süt* – 'milk'), and Uzbek (*süt* – 'milk').

The reflection of Proto-Turkic *Y* in modern Turkic languages produced different reflexes: *ü* > *i*: Old Turkic *tutun* – 'smoke' > Chuvash *tïdïym*; in Crimean Tatar, the Old Turkic *ü* depalatized and produced *ü*: *kurek* – 'spade', *juz* – 'one hundred', etc. The vowel *ü* is not encountered at the end of words in old Turkic languages. With the exception of the Kyrgyz language, the Proto-Turkic form of this phoneme was preserved in all Turkic languages. Modern Turkic languages, including the ones under consideration, are in the same state as the old Turkic languages that used the short pronunciation of the vowel at the beginning of the word (Serebrennikov, 1986).

Instrumental analysis gives the *vowel* ***ü*** *in the Kazakh language* the following articulation and acoustic characteristics. Its articulation is as follows: the tongue is located in the middle of the mouth, slightly protruded; the tip of the tongue is pressed against the lower incisors. The mid part of the dorsum is elevated not directly toward the back of the hard palate, but slightly backward, to the edge of the soft palate. The front part and base of the tongue are slightly sunken. The pharyngeal resonator is stronger than the mouth one. The lips are protruded, rounded, and tense. The vertical position of the tongue is relatively high, but noticeably lower that with front vowels. *ü* is a central, front, labialized vowel. In terms of acoustics, the spectrum of *Y* (*ü*) is characterized by a concentration of energy in low frequencies, the upper boundary whereof is about 1200 Hz (Dzhunisbekov, 1991).

Phoneme ***ү (ü)*** *in the Turkish language*. According to E.V. Sevortyan (1955), this phoneme in the Turkish language corresponds to the open German *ü*, as in the word *füllen* – 'to fill', or the French *i*, as in the word *bureau*. Turkish examples: *gün* – 'day, sun', *ütü* – 'iron', *ün* – 'fame, popularity'.

Phoneme ***ү (ü)*** *in the Uzbek language*. This phoneme is encountered in the Proto-Turkic language and many modern Turkic languages; however, it is absent from the Uzbek language, which is the result of convergence of three phonemes – *ö, y, ü* – that reduced it, which also contributed to the fact that the literary Uzbek language became devoid of vowel harmony. The transformation of *ü* (*Ö*) into a qualitatively new phoneme was described in detail in the work of V.V. Reshetov (1961). According to him, the Uzbek phoneme *u* has different tone in different positions. The vowel *u* varies between the back and front tone, which is explained historically by the origin of this phoneme as a merging of back *u* and front *ü*. It is a substitution for the mentioned pair of labialized vowels and has variants next to the front *k* and *g*: *gül* – 'flower', *kul* – 'ash', *kuz* – 'autumn', *kulču* – 'laughter', *gunoh* – 'guilt', *ukki* – 'eagle owl', etc., and back *q, ү, h*: *qul* – 'slave', *үül* – 'chain, basis', etc. The phoneme *u* becomes a front one next to *j*: *uj* – 'house', *kui* – 'melody'. This phoneme can also be reduced in combinations. Thus, the phoneme *ü* (*Ü*) in the Uzbek language is officially absent and acts only as a replacement for the phoneme *u* (Reshetov, 1961).

*Examples***:** Kazakh *tüs* – 'dream', *kün* – 'day, sun', Turkish *önlük* – 'front', *opus* – 'kiss', Uzbek *ükä* – 'younger brother', *gümon* – 'suspicion'.

Phoneme u (ұ)

The Old Turkic short *u* at the beginning of words is preserved in many modern Turkic languages, including the ones under consideration: Kazakh *qus*, Uzbek *kuš*, Turkish *guş* – 'bird'. Different opinions have been expressed concerning this vowel. F.G. Iskhakov (1955) defines it as the graphic *ö*, short reduced vowel that is a labialized pair of the vowel *y*; A.M. Shcherbak (1970) defines it as a "super-short vowel" in the Uzbek language. In certain Turkic languages, the phoneme *u* is long, which is not the case in the Kazakh and Uzbek languages. Neither do the Kazakh or Uzbek language have the secondary length of this phoneme, which results from the reduction of certain groups of sounds concentrated in one place. Examples: Kyrgyz *tu* – 'banner' > Gagauz *tuy, bul* – 'to choke', *bugyl*, etc.

Phoneme Ұ (U) in the Kazakh language. The articulation of this vowel is as follows: the tongue is slightly retracted; the anterior of the dorsum is sunken, which is apparently typical for labialized back vowels. The posterior of the dorsum is elevated toward the soft palate. The mid part of the dorsum is slightly sunken. Lips are protruded, rounded, and tense. The vertical position of the tongue is relatively high, but noticeably lower that with the front vowels. *ü* is a central, front, labialized vowel. Therefore, *Ұ* (*U*) is considered a back, close, labialized vowel (Serebrennikov, 1962).

Phoneme ***u*** *(ұ) in the Turkish language*. According to E.V. Sevortyan (1955), the vowel *Ұ* (originally *U*) is virtually identical to the Russian *У*. Examples: *un* – 'flour', *dolu* – 'full, filled', *kutu* – 'box', etc.

In the Uzbek language, the phoneme ***u*** (*ұ*) is officially absent, having transformed into *y, ұ, ý*.

Examples: Kazakh *utus* – 'win', Turkish *mahsûs* – 'perceptible', *ulu* – 'great', Uzbek *qunғiz* – 'beetle'.

Phoneme y

In modern Turkic languages, the vowel *y* is mostly short, although, according to B.A. Serebrennikov, it used to be long in the distant past. Special studies found that the short *y* in its Proto-Turkic state was preserved in many modern Turkic languages, including the ones under consideration: Kazakh *qys* – 'to squeeze', Turkish *qyl* – 'hair', *qyzyl* – 'red', etc. Kazakh and Uzbek languages feature examples of the Proto-Turkic short *y*: Kazakh *qys* – 'winter', *qyzyl* – 'red' // Uzbek *qyš*, *qyzyl*. The long version of *y* is encountered in such modern languages as Chuvash (for example, *hir* – 'girl') and Turkmen (for example, *is* – 'work'). In other languages, the phoneme *y* is generally shortened (Serebrennikov, 1986).

Phoneme ***y*** *in the Kazakh language*. *y* (originally *Y*) is a back, close, unlabialized vowel with the following acoustic and articulation characteristics. In terms of acoustics, the vowel *y* is characterized by an amplification of a wide range of frequencies. A typical feature of the spectrum is the narrowing of the frequency amplification band. The vowel *y* also has other phonological features that are regulated by the vowel harmony timbre of the syllable (Dzhusupov, 1991).

Phoneme ***y*** *in the Turkish language*. Short, back, narrow, unlabialized vowel with two tones – back and front – *kylmak* – 'to do', *açylyr* – 'open'.

Phoneme ***y*** *in the Uzbek language*. This phoneme is lacking in the Uzbek literary language. A frontal shift in the articulation resulted in each vowel pair of the typical Turkic vocalism – *y - i, u - ü, o - ö* – producing one indifferent sound of respective height. Thus, two vowels – wide *y* and narrow *ï* – formed in the Uzbek literary language a single indifferent *i*, which replaced both sounds, thus reducing the total number of vowels to six (Reshetov, 1961).

*Examples***:** Kazakh *ydys* – 'dishes', *ystyq* – 'hot', Turkish *aksamin* – 'yesterday', *aldigi* – 'taken', Uzbek *yamyir* – 'rain'.

Phoneme ï (i)

Specialized literature characterizes this phoneme differently. In most Turkic languages, the phoneme *i* at the beginning of the word maintains its proto-language short version. This is found in all old Turkic languages – Orhon-Yenisei, Old Uyghur, and other written artifacts – and in all modern languages. For example, Old Turkic *ič* – 'interior' > Old Uyghur *ïč*, Orhon-Yenisei *ir*, Yakut *ïs*, Azerbaijani *ïč*, Turkmen *ïč*, etc. In some Turkic languages, including Kazakh, the old short *i* transformed into a reduced open *i*, which is perceived acoustically as a sound between *e* and *y*: Kazakh *kïr* – 'mud', *bïl* – 'to know', *bïr* – 'one', etc. The long *I:*, like other vowels, has been preserved only in the Turkmen and Yakut language. Therefore, the languages under consideration do not feature the long vowel *i* (Serebrennikov, 1986).

Phoneme ***ï*** *(i) in the Kazakh language*. According to the experimental analysis, the vowel *i* in Kazakh is a central, close, unlabialized vowel with the following characteristics. It is encountered in all positions in words. Examples: *iz* – 'trace', *kilit* – 'key', *tïršïlïk* – 'life' (Dzhusupov, 1991). In most Turkic languages, the proto-language vowel *I* is preserved at the beginning of the word, while its long variant *I:* is found in only two languages – Yakut (*ki:r* – 'to enter', *bi:l* – 'small of the back', *ti:s* – 'tooth') and Turkmen (*gi:r – bi:l – ti:š*). In all other cases, modern Turkic languages, including the three under consideration – Kazakh, Turkish, and Uzbek – use this phoneme only in short form in first syllables. This study was unable to determine the reason behind this. However, the secondary length that is observed in some Turkic languages is of a different nature – a result of condensation of groups of similar sounds. For example, *I:* - 'good' in Gagauz resulted from the condensation of Kazakh *igï – izgï*, Turkish *birli* – 'his union' resulted from the condensation of Kazakh *bïrlïk*, etc.

Phoneme ***ï*** *(i) in the Turkish language*. According to E.V. Sevortyan (1955), the vowel *ï* is the most stable vowels in Turkish, unlike many other Turkic languages, especially the Kipchak languages, in which this vowel is unstable. The pronunciation of the Turkish *i* is similar to the Russian *И* in the word *мир* – 'world, peace' or *скидка* – 'discount'. Examples: *iki* – 'two', *keçi* – 'goat', *gemi* – 'ship'.

Phoneme ***ï*** *(i) in the Uzbek language*. This phoneme is lacking in the Uzbek literary language. Due to a shift toward the front backness, it acquired a tone between *I* and *y*, i.e. it was conveyed with the common indifferent mid *i*.

*Examples***:** Kazakh *is* – 'business', *ini* – 'younger brother', Turkish *isitmak* – 'to heat', *ič* – 'drink'.

Phoneme i

The phoneme i in Turkic languages does not require special physiological or acoustic characterization. Despite occurring in all Turkic languages, the vowel *i* has different origins. In the Proto-Turkic language, the long *ī* was opposed to short *i*; however, in the Middle Proto-Turkic period, this opposition was neutralized when the long *ī* and short *i* merged into a single sound of normal length. Examples: Turkish *bir* – 'one', Kazakh *sirek* – 'rarely', Uzbek *igna* – 'needle' (Serebrennikov, 1986).

Phoneme ***i*** *in the Kazakh language*. In the Kazakh language, *i* produces two phonemes – diphthongs that do not have variations or variants. Written as <*i*>, the diphthongs *i* ^{ï} and *y*^{ï} are invariants and have two functionally significant variants: *y*^{ï} - *i* - *y*^{ï} invariant of back-palate vowel harmony: *qiyq* (trimmings), *tiyn* (coin).

Phoneme ***i*** *in the Turkish language*. *i* is a front, narrow, unlabialized phoneme with two tones: narrow *i* is encountered especially often in front of *n* – *bin* – 'thousand', *inci* – 'pearls'. Wide *i* is found in unstressed syllables: *Bunun gibi* – 'like this', *asker idi* – 'we was a soldier'. In the currently declining "bookish" pronunciation of Arabic and Persian words, long *î* sometimes acquires distinctive meaning: *azîm* – 'great', *azim* – 'intention' (Kononov, 1976).

Phoneme ***i*** *in the Uzbek language*. *i* is a front unlabialized sound, similar to the Kazakh and Karakalpak *i*. The palatal variant of *i* in the Uzbek language has two main tones: front close, with a length similar to the simple stressed Russian *i* in a close syllable and a back open short variant (Reshetov, 1961).

*Examples***:** Kazakh *it* – 'dog', *ine* – 'needle', Turkish *cift* – 'couple', *ihtar* – 'reminder', Uzbek *ketti* – 'left', *oladi* – 'takes'.

Discussion and Conclusion

This study confirms G.P. Torsuyev's (1962) phonological concept that the structure of phoneme combination represents the articulatory and acoustic connections between phonemes that constitute a word. Thus, the combination structure characterizes regular articulatory and acoustic relations of phonemes that determine the qualitative modification in the phonemic structure of the word. The structure of phoneme combination deals with sound-phonemes and forms their connected sequence; the material of the syllabic structures is the connected sequence of sound-phonemes, which it subdivides into word-sections (Torsuyev, 1962).

The contrastive-comparative study of vowel phonemes in the Kazakh, Turkish, and Uzbek languages found identical and specific features of these units, which demonstrate vowel harmony in Turkic languages. The peculiarities of vowels were investigated by individual phonemes based on their Proto-Turkic state and data provided in the characterizations of phoneticians. It was found that vowel harmony in the compared languages was achieved through the functioning of a system of phonemes: a, ä, e, o, ö, ü (ɣ), u (ұ), y, ï, i, which have the following features:

- unlabialized phoneme a is featured in all compared languages (it can be long or short in Turkish and unlabialized or strongly labialized in Uzbek);
- phoneme ä is a short close mid unlabialized vowel and has an ə-ə variant in the Turkish language;

- phoneme e is encountered in all positions in words (in the Turkish language, it has two tones – narrow and wide, in the Uzbek language, it belongs to the "yeking" dialects);

- phoneme o is encountered in the first syllable (in the Turkish language, it has two tones: open and close; in the Uzbek language – a semi-narrow vowel between o-w, denoted by ý; in the Kazakh language – hard mid vowel encountered only in the first syllable);

- phoneme ö is encountered in first syllables and is lacking in the Uzbek language;

- phoneme ü (ү) in the Kazakh language has a soft variant u, in the Turkish language, it has two tones – narrow and wide, in the Uzbek language, it as an u variant;

- phoneme u (ұ) in the Turkish language has a short and long form, in the Kazakh language, the phoneme is used at the beginning of syllables and transforms into y in the second syllable, in the Uzbek language, the phoneme was two forms – u, ü;

- phoneme y in the Kazakh language is hard, in the Turkish language, it is softened depending on the adjacent phonemes, in the Uzbek language it is lacking and replaced by the phonemes и, ї;

- phoneme ї is used in all positions in words (in Kazakh and Turkish, it has a short form i, in the Uzbek language it is absent);

- phoneme i is encountered at the beginning of words (in the Kazakh language, it has the form of y, ї; in the Turkish and Uzbek language it produces a sound between i-e);

The analysis of common and distinguishing features found that of the compared languages, Turkish and Kazakh preserved the classic Proto-Turkic eight vowels.

Implications and Recommendations

The significance of this study is that it comprehensively analyzed the phonetic peculiarity of Turkic languages – vowel harmony. Determining the specific properties of phonemes in the Kazakh, Turkish, and Uzbek languages, as well as their similarities and differences, contributes in developing the theory of vowel harmony as a specific phenomenon of Turkic languages, which, in addition to the common ancient characteristics, acquired certain distinguishing features during their historical development. Determining invariant and variant features and typological characteristics of the vowel structures of words in the three studied languages by such parameters as roundness (narrow, wide, medium), backness (back, forward, middle), labialization and unlabialization helped outline a holistic linguistic picture of the problem of vowel harmony in Turkic languages in the diachronic aspect.

The practical value of this study is that its theories and conclusions can be used to develop special academic courses of Turkic languages and the theoretical phonetics course. The methods used in this study can be used in a comparative characteristic of vowels in other languages.

Disclosure statement

No potential conflict of interest was reported by the authors.

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