

Kazakh Phonology

Edward J. Vajda

Although Kazakhstan is now an independent country, information about the Kazakh language remains largely inaccessible to English speakers. The present work provides a general introduction to the language and a thorough description of its phonology. Kazakh sounds are described with reference to the letters of the Cyrillic alphabet presently in use in the Republic of Kazakhstan. Kazakh words appear in bold face type, followed by phonetic transcriptions enclosed in brackets []. Standard symbols of the International Phonetic Alphabet have been used for transcription, and any instances where no IPA symbol exists to represent particular nuances of Kazakh sounds have been noted. The transcriptions are not intended as transliterations: they reflect pronunciation rather than spelling, and apparent inconsistencies between orthography and pronunciation are carefully explained in the section "Native Kazakh Phonology." Particular attention has been devoted to three aspects of the phonology which previous studies have examined inadequately: the status of diphthongs and diphthong-like vowels, the phonetic nature of the "hard" vs. "soft" distinction in vowels, and the interdependence of synharmony and stress.

I. Preliminary Discussion

1. Turkic and Altaic Languages

Kazakh is a member of the Turkic language family, which consists of about 40 languages distributed across Asia from Turkey to northern Siberia. The tribal predecessors of the Kazakhs seem to have coalesced by the 16th Century into a single ethnic group with a single language (Krader 1962:123). At various times in the past this people and language have been called Kirgiz, Kirgiz-Kaisak, or Kipchak (Krader 1962:124-125). Today the language and people are both known in English as Kazakh, after the Kazakhs' own ethnonym: **қазақ** [qɑzɑq]. After

Turkish and Uzbek, Kazakh has the largest number of speakers of any Turkic language, over eight million as of 1992. Most speakers of Kazakh live in the vast Republic of Kazakhstan, though more than one million live in China's Xinjiang Province, and about 150,000 live in western Mongolia. Kazakh belongs to the northwestern (also called Kipchak or Aralo-Caspian) branch of the Turkic language family (Comrie 1990:188). The closely related Karakalpak language is spoken in neighboring Uzbekistan. Languages somewhat less similar are Kyrgyz (formerly known as Kirgiz), with a few million speakers, most of whom live in the Republic of Kyrgyzstan; Tatar, spoken by a few million people, mostly in the Republic of Tatarstan on the Volga River; and Nogai, spoken by a small population north of the Caucasus mountains. Also belonging to the northwestern branch of Turkic is the extinct language of the Kipchaks, (known also as the Cumans, or Polovtsy) who harried Kievan Rus in the 12th and early 13th centuries.

The Turkic languages of today share many similarities in grammar and phonology which clearly indicate recent descent from a common ancestor. This ancestor, called Common Turkic, is thought to have been spoken about 1500 years ago somewhere to the north or west of present day Mongolia. There is still a considerable degree of mutual intelligibility among languages of the northwestern branch of Turkic, a lesser degree of intelligibility with languages of the other branches of Turkic.

Many scholars group Turkic, Tungus-Manchu, and Mongolian languages together in a single family called Altaic, in which some scholars also include Korean and Japanese. Disagreement arises, however, about whether the features shared by these languages derive from common ancestry or from centuries of intensive contact. A number of scholars have noted the lack of a shared core vocabulary among the various families included in Altaic. Shcherbak (1970:12) and Comrie (1981:39-42) have demonstrated that contact and borrowing have indeed helped spread certain features among these languages. Most of these shared features are typological and seem to have developed on the basis of areal diffusion. The individual words and

morphemes which Altaic languages have in common might also have been spread through borrowing rather than through descent from a common ancestor.

Although the Altaic theory is open to question, most languages of central and northern Asia, including Kazakh, nevertheless exhibit a striking number of shared features. Altaic morphology is strongly agglutinative, with a very large number of suffixes and postpositions and virtually no prefixes or prepositions. Words in Altaic languages can be extremely long and often convey concepts that require entire phrases in English. One of numerous possible examples is the following single Kazakh word **қам-сыз-дан-дыр-ыл-ма-ған-дық-тан** [qam-səz-dan-dər-əl-ma-ɣan-dəq-tan], which means *in view of the fact it wasn't guaranteed*. (Suffixes are set off by hyphens here, although these words are normally written without them.) Multiple suffixes can be added, one after another, to a single stem, as in these Kazakh examples: **бала** [bala], *child*; **бала-лар** [bala-lar], *children*; **бала-лар-ымыз** [bala-lar-əməz], *our children*; **бала-лар-ымыз-ға** [bala-lar-əməz-ɣa], *to our children*. Kazakh suffixes not only mark seven grammatical cases in the noun, but also convey a number of concepts expressed in English by prepositions or personal pronouns: **әнші** [ənʃɪ], *singer*; **әнші-мін** [ənʃɪ-mɪn], *I am a singer*. Altaic languages have no grammatical gender; the concepts *he*, *she*, and *it* are conveyed by a single word, such as the Kazakh word **ол** [ɒl]. Adjectives do not agree with nouns in Altaic languages. All Altaic languages are "left-branching," with dependent words preceding the head noun or verb. They adhere to the syntactic pattern of subject-object-verb, rather than subject-verb-object, as in Indo-European languages.

No less striking than similarities in morphology is the close affinity between the sound systems of various Altaic languages. Phonologically, open syllables predominate, consonant clusters are generally lacking, high vowels tend to devoice or otherwise reduce between voiceless consonants, and only certain vowels may co-occur in the same word--a feature known as vowel harmony. In many Altaic

languages, the first vowel of a word governs the choice of vowels in the following syllables. Turkic languages exhibit two types of vowel harmony. The first is based upon whether lip rounding occurs in the production of vowels and is called labial harmony. Rounded vowels in word-initial position are generally followed by rounded vowels in the remaining syllables of the word. Unrounded vowels in word-initial position are followed by unrounded vowels. The second type of vowel harmony in Turkic languages involves a contrast in tongue position and is called lingual harmony. The type of lingual harmony believed to have been part of Common Turkic is based on tongue position. Each word of Common Turkic is thought to have contained only front vowels or only back vowels. Vowel harmony differs somewhat between Turkic languages, but there is always some form of labial and lingual harmony. Kazakh exhibits a type of lingual harmony based on two opposing sets of vowels traditionally called "soft" and "hard" vowels. The "soft" and "hard" vowel sets in modern Kazakh correlate historically with front and back vowels of Common Turkic.

Vowel harmony also affects the pronunciation of the consonants, which assimilate the features of lip rounding or tongue position from adjacent vowels. In most native Kazakh words, every consonant and vowel belongs to the same harmonic type: either "soft" unrounded, "hard" unrounded, "soft" rounded, or "hard" rounded. Homogeneity of articulatory features affecting all the sounds in a given syllable or word is known as synharmony. The presence of some variety of synharmony both unifies the Altaic languages, and sets them apart typologically from neighboring language families, which lack this feature altogether.

2. Writing Systems

Before the 17th Century, the written language of the area inhabited today by the Kazakhs was Chagatai, the precursor of modern Uzbek. Chagatai was written with Arabic letters, and these were later borrowed to write Kazakh. In terms of phonetics, the Arabic alphabet was poorly suited to Kazakh, which, like other Turkic languages, contains a rather large number of vowels. A reformed

Arabic script, adopted in 1924, included new symbols for vowels and other specifically Kazakh sounds and discontinued a number of letters representing sounds that Kazakh lacked. The revised Arabic script, however, was soon abandoned, as the Soviet authorities sought to distance the Turkic speaking Muslims within the USSR from their traditional Islamic ties. The languages of all Muslim peoples living within the borders of the Soviet Union received new alphabets based on Latin orthography. A Latin-based alphabet was adopted for Kazakh by government decree in 1929 (Nadzhip 1959). This new alphabet, which originally contained fewer than thirty letters, was reformed in 1938 with the addition of several letters. By this time, however, Cyrillic alphabets were beginning to replace Latin ones for all Turkic languages in the USSR. A Russian-based alphabet was adopted for Kazakh in 1940. This alphabet consisted of 42 letters: the 33 letters of the Russian alphabet, followed by letters devised specially for Kazakh. In 1952, some minor changes were made in the shape of certain letters, and the non-Russian letters were interspersed so that each followed the letter closest to it in pronunciation. For example, the non-Russian letter *к* was placed after letter *к*. The first English language dictionary of Kazakh (Shnitnikov 1966) follows the pre-1952 ordering of letters. Aside from letters used for certain diphthongs and letters used only in borrowed words, the Kazakh version of Cyrillic reflects the meaningful phonetic contrasts of the language with a fair degree of economy. The Kazakhs living in the Xinjiang Province of the Peoples Republic of China never adopted Cyrillic, preferring instead Latin and Arabic. The Xinjiang Kazakhs have since abandoned Latin; they adopted a further-reformed Arabic script in 1982 (Geng 1980).

Below are the 42 letters of the Cyrillic alphabet used today in the Republic of Kazakhstan. The transcription symbols indicate the most common pronunciation(s) of each letter. Letters confined to Russian loan words are not given a transcription symbol; their pronunciation will be discussed in greater detail below. The precise phonetic nature of the terms "soft" and "hard"--traditionally (and incorrectly) assumed to refer to "front" and "back" vowels

in Kazakh--will be dealt with extensively in the second half of this work.

Letter	Approximate Pronunciation	Transcription Symbol
А а	Low back "hard" vowel	[ɑ]
Ә ә	Low front "soft" vowel	[æ]
Б б	Voiced bilabial stop	[b]
	Voiced bilabial fricative (between vowels)	[β]
В в	Russian letter [v], occurring only in Russian loan words	
Г г	Voiced velar stop	[g]
	Voiced velar fricative (between vowels)	[ɣ]
Ғ ғ	Voiced uvular fricative	[ʁ]
Д д	Voiced alveolar stop	[d]
Е е	Diphthongoid unrounded "soft" vowel	[ɛ̞]
Ё ё	Russian letter [jo], occurring only in Russian loan words	
Ж ж	Voiced alveopalatal fricative	[ʒ]
З з	Voiced alveolar fricative	[z]
И и	Diphthong consisting of a mid-high front "soft"	
	vowel + front glide (in "soft" words)	[ɪj]
	Diphthong consisting of an upper-mid central "hard"	
	vowel + front glide (in "hard" words)	[əj]
Й й	Alveopalatal approximant	[j]
К к	Voiceless velar stop, aspirated	[k]
Қ қ	Voiceless uvular stop, aspirated	[q]
	Voiceless uvular fricative (between vowels)	[χ]
Л л	Lateral alveolar approximant	[l]
М м	Bilabial nasal stop	[m]
Н н	Alveolar nasal stop	[n]
Ң ң	Uvular nasal stop (in "hard" words)	[ŋ]
	Velar nasal stop (in "soft" words)	[ŋ]
О о	Diphthongoid rounded "hard" vowel	[ɔ̞]
Ө ө	Diphthongoid rounded "soft" vowel	[ɔ̞̥]

П п	Voiceless bilabial stop, aspirated	[p]
Р р	Alveolar flap	[r]
С с	Voiceless alveolar fricative	[s]
Т т	Voiceless alveolar stop, aspirated	[t]
У у	Bilabial approximant (after vowels only)	[w]
	Diphthong consisting of a mid-high central "soft"	
	rounded vowel + glide (in "soft" words)	[ɥw]
	Diphthong consisting of a mid-high back "hard"	
	rounded vowel + glide (in "hard" words)	[ɯw]
Ү ү	Mid-high back rounded "hard" vowel	[ʊ]
Ү ү	Mid-high central rounded "soft" vowel	[ɥ]
Ф ф	Russian letter [f], occurring in Russian or Arabic loans	
Х х	Occurs in some foreign loan words = К к	[q], [χ]
Һ һ	Voiceless glottalic approximant	[h]
Ц ц	Russian letter [tɕ], occurring only in Russian loan words	
Ч ч	Russian letter [tʃ], occurring only in Russian loan words	
Ш ш	Voiceless alveopalatal fricative	[ʃ]
Щ щ	Russian letter [ʃtʃ], occurring only in Russian loan words	
Ъ ъ	Russian "hard sign," occurring only in Russian loan words	
Ы ы	Upper-mid central unrounded "hard" vowel	[ə]
І і	Mid-high front unrounded "soft" vowel	[ɪ]
Ь ь	Russian "soft sign," occurring only in Russian loan words	
Э э	Russian letter [ɛ], occurring only in Russian loan words	
Ю ю	Front glide + mid-high central rounded "soft"	
	vowel + back glide	[jɥw]
	Front glide + mid-high back rounded "hard"	
	vowel + back glide	[jɯw]
Я я	Front glide + low back "hard" vowel	
	(in synharmonically "hard" words)	[jɑ]
	Front glide + low front "soft" vowel	
	(in synharmonically "soft" words; rare)	[jɛ]

3. Kazakh Dialects

Aside from sometimes substantial areal differences in vocabulary, Kazakh shows only relatively minor dialectal differences. For instance, Kazakh speakers in the west and north use the alveopalatal fricative [ʃ], while speakers in the eastern and southern areas replace [ʃ] with the affricate [tʃ]: *шалғы* [ʃɑlɣə] or [tʃɑlɣə], *braid*; *әнші* [ʌnʃɪ] or [ʌntʃɪ], *singer*. The literary standard recognizes [ʃ]. Another difference involves the use of non-initial [d] in the west and north vs. [l] in the south and east: *тірідей* [tɪrɪdʲɪj] or [tɪrɪlʲɪj], *alive*; *маңдай* [mɑndɑj], or [mɑnlɑj], *forehead*. Once again, the northern and western variant [d] is considered standard literary pronunciation. A few other sound variations occur, but the non-literary variants are extremely localized. Some linguists (Amandzholov 1953) believe that the northwestern dialect served as the basis for the formation of the literary standard in the 17th and 18th Centuries. The minor regional differences evident in Kazakh pronunciation today are probably based on old tribal divisions (Schwarz 1984:20). Other linguists see these variations as having derived through contact with neighboring languages (Sauranbayev 1982; Kenesbayev 1962:8-9).

4. Influence of Other Languages on Kazakh

Besides relatively recent borrowings from Russian, foreign words in Kazakh are chiefly of Arabic, Persian, Chinese, or Mongolian origin. Mongolian and Chinese influence on Kazakh is limited to lexical borrowing. The influence of Arabic and Persian, though more extensive, is also chiefly lexical. Most Arabic borrowings pertain to civic or religious matters: *сағат* [sɑɣɑt], *clock*; *ғылым* [ɣəlɐm], *science*; *жайһап* [ʒɑwɧɑr], *gem*. Arabic loans have been numerous enough, however, to lead to the adoption of a few phonetic features such as the sounds [ħ] and [ʕ], as well as the use of [ɰ] in word-initial position. The Arabic sound [f] yields [p] in Kazakh. Arabic [f] is normally spelled with *п* in

in modern Kazakh, rarely with **ф**, as in **ғафу етіңіз** [ɣɑfʊ ɛtɪŋɪz], *to show mercy*. International words of Arabic or Persian origin are also written with the letter **ф** instead of **п**, following the Russian spelling: **феллах** [fɛlɫɐk], *fellah*, **ферзь** [fɛrɫɪ], *queen (in chess)*. Turkic languages spoken south of Kazakhstan, particularly modern Uzbek and Turkmen, show more extensive Arabic and Persian influence.

During the past two centuries, Russian has, without doubt, exerted the strongest influence upon both written and spoken Kazakh. Eight letters--**в, ё, ц, ч, щ, ь, ь, э**--appear exclusively in Russian loans or international words borrowed under the influence of Russian; they do not represent sounds of native Kazakh. (The letter **ф** could also fit into this group, except for the rare cases mentioned above where it appears in older loans from Arabic.) The presence of these letters in the Kazakh alphabet attests to the pervasive Russian influence upon the language. Before 1917, one out of every 23 or 24 words (4.4%) found in the Kazakh press was a Russian loan (Khasanov 1987:81). Since the pre-1917 literacy rate was low, however, Russian words tended to be borrowed on the basis of oral contact rather than through written material. Most of these early borrowings underwent considerable phonetic assimilation as they were adapted to the rules of Kazakh phonology. Their present spellings in Cyrillic, consequently, reflect Kazakh rather than Russian phonology. Thus, Russian **завод** [zavɔt], *factory*, became **зауыд** or **зауыт** [zawəɫ] in Kazakh, and **кровать** [kravʌtʲ], *bed*, became **кереует** [kɛrɛjɛwɛɫ]. (Since the Russian sound [v] is absent from Kazakh, it was usually altered to [w] in such early borrowings.) The Russian [f], also lacking in Kazakh except for in a few Arabic loans, usually became [p] in Russian words adopted into Kazakh: **картофель** [kʌrtɔfɪlʲ], *potatoes*, became **картон** [kʌrtɔp]; and **штраф** [ʃtrɐf], *penalty*, became **штрап** [ʃtrɐp]. The Russian sounds [ʃtʃ], [tɕ], and [tʃ] became [ʃ] in Kazakh: **ящик** [jɐʃtʃɪk], *box*, became Kazakh **жәшік**

[ʒʌʃɪk]; чайник [tʃajɲɪk], *teapot*, became шайнек [ʃajɲɪk]; почта [pɔtʃtə], *post office*, became пошта [pɔʃtə]; and церковь [tsɛrkəʃ], *church*, became шіркеу [ʃɪrkɪʃw]. Russian loans adopted during the last 50 years of Soviet rule, however, were generally borrowed under the influence of written Russian and often kept their original Russian spelling. Kazakh speakers fluent in Russian often pronounce these words as they are pronounced in Russian rather than in accordance with the sound pattern of their native language. The following Kazakh words are examples of loans which retained their original Russian spelling in modern Kazakh orthography (transcriptions reflect Russian pronunciation): вагон [vʌɡɔn], *railway car*; фабрика [fabɾɪkə], *factory*; ёлка [jɔlkə], *Christmas tree*; щи [ʃtʃɪ], *cabbage soup*; чемодан [tʃimʌdʌn], *suitcase*; цирк [tsɪrk], *circus*; электричество [ɛlɪktrɪtʃɪsvə], *electricity*; ноль [nɔʃ], *zero*; съезд [sɟɛst], *congress*. In other instances, the spelling is Russian but the pronunciation Kazakh. Surnames ending in ов or ев are invariably pronounced [əp] or [ɪp], even by speakers fluent in both languages: Естаев [jɪstɛjɪp], *Yestaev (a surname)*. The process of deleting the Slavic suffixes ов or ев from Kazakh surnames, however, is already underway. Now that it seems Russian will lose its prestige status in Kazakhstan, the future of Russian loan words should prove worthy of investigation. In the Soviet period, older phonetic spellings like зауыд and зауыт *factory*, gave way to normalized Russian spellings like завод; the newest tendency is to pattern the orthography once again after native Kazakh pronunciation.

Three other Kazakh letters **h**, **ə**, and **x**, occur in older loans taken mainly from Arabic and Persian. These words are now felt by Kazakhs to be part of the native lexicon rather than foreign words. The letter **h** denotes a voiceless glottalic approximant similar to English [h]: айдаһар [ajdahar], *dragon*; әріп [ərɪp], *letter (of the alphabet)*; қаһарман [qaharman], *hero*. Unlike the nine letters restricted to Russian loans, the letter **h** is always pronounced [h] and

cannot be replaced in speech by any other Kazakh sound. Similarly, the letter ә is always pronounced [ʌ]. Thus, [h] and [ʌ] may be considered as more or less assimilated into the sound system of native Kazakh. The letter х, on the other hand, has no unique sound of its own; it is pronounced identically to the letter қ regardless of whether it appears in older borrowings or in recent loans from Russian. In word-initial or syllable-final position, both х and қ are pronounced as the uvular stop [q]: *хат* [qɑt], *letter*; *қаз* [qɑz], *goose*; *тарих* [tarəj q], *history*; *халық* [qɑl əq], *population*; *жақшы* [ʒɑqʃ ə], *good*; *қазақ* [qɑzɑq], *Kazakh*. Between vowels or sonorants, х and қ are pronounced as the uvular fricative [χ]: *Райхан* [rɑjχɑn], *Raikhan (a female name)*; *ақыл* [ɑχəl], *mind*. Since [q] and [χ] are in complementary distribution regardless of whether х or қ represents them, descriptions of Kazakh which treat these sounds as separate phonemes are in error. The letter х could easily be deleted from the alphabet and replaced by қ; the letter һ could not, since no other letter of the alphabet denotes the sound [h].

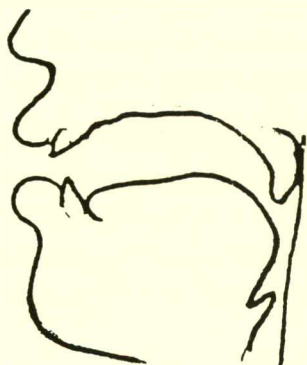
II. Native Kazakh Phonology

1. Vowels

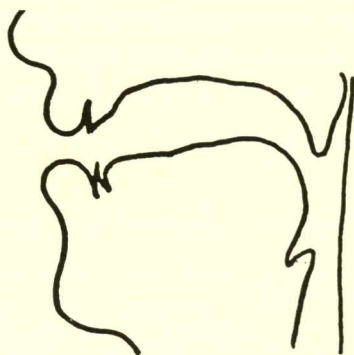
The modern Cyrillic alphabet, unlike the Arabic script originally used for Kazakh, contains a separate letter for each vowel. Nevertheless, most descriptions of Kazakh, including the Academy Grammar (Kenesbayev 1962) which still represents the most comprehensive work on the language available, give incorrect point of articulation features for some of the vowels. The first accurate description of Kazakh vowels appeared in 1972 (Dzhunisbekov). This study provides precise acoustic measurements of vowels and describes their articulation on the basis of X-rays (radiograms) of the oral tract. Previous studies relied mostly on the subjective similarity of Kazakh vowels to the vowels of Russian or other Turkic languages, rather than upon actual phonetic analysis. The only

detailed description of Kazakh to appear in English previously (Krueger 1980) represents a condensed version of the Academy Grammar and older Soviet materials, and reproduces the inaccuracies of these earlier descriptions. Since Kazakh vowels differ from vowels found in English, Russian, and other western languages, each vowel must be described in detail.

The letter **a** represents a low back vowel. The IPA symbol [ɑ] is appropriate, although this symbol does not mark the significant degree of tongue root retraction characteristic of the Kazakh vowel. During the articulation of Kazakh [ɑ], the tongue root is considerably retracted, so that the tongue tip does not touch the lower incisors. The center of the back portion of the tongue is raised slightly, but never higher than the lower teeth. Except for the degree of tongue root retraction, Kazakh [ɑ] is not unlike the English vowel in the word *all*.



Radiogram of Kazakh [ɑ],
after Dzhunisbekov (1972:47).



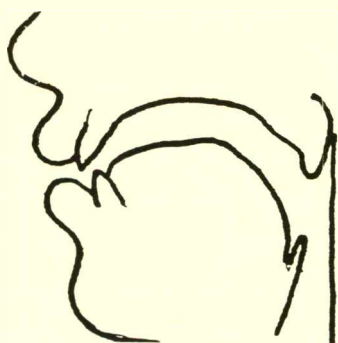
Radiogram of English [ɑ] in
all, after Edwards (1986:58).

The vowel [ɑ] is very common and may appear in any syllable: **ал** [ɑl], *take*; **қала** [qɑlɑ], *city*; **шағала** [ʃɑʋɑlɑ], *seagull*. It appears in roots as well as suffixes: **қала-лар** [qɑlɑ-lɑr], *cities*; **қала-ға** [qɑlɑ-ʋɑ], *to the city*.

There are two environments in which the letter **a** is pronounced [ɶ], rather than [ɑ]. The first is between [ʃ] and [ɶ], or [ʃ] and [j]: **шаш** [ʃɶʃ], *hair*; **шай** [ʃɶj], *tea*. The second is in borrowed words, where the letter **a** appears in a word

together with a "soft" vowel: **китап** [kɪtʌp], *book*; **күман** [kʉmʌn], *doubt*.

The vowel letter **ә** always represents a low front vowel which will be transcribed as [ʌ]. The Kazakh [ʌ] is often compared to the English vowel in the word *and*, though the latter is articulated with less spread of the lips. In the production of Kazakh [ʌ], the tongue root is advanced forward and the tongue tip remains close to the lower incisors. The front-central portion of the tongue is raised above the top of the lower teeth. X-ray analysis confirms that [ʌ] is somewhat higher than [ɑ], the only other low vowel in the language (Dzhunisbekov 1972:47).



Radiogram of Kazakh [ʌ], after
Dzhunisbekov (1972:48).

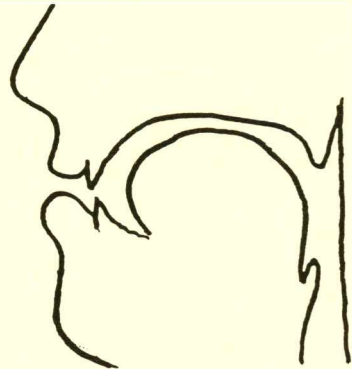
The letter **ә** is restricted to older borrowings from Persian and Arabic, although native speakers tend to perceive such words as native rather than borrowed. It appears almost exclusively in initial syllables: **әйел** [ʌjʲɪl], *woman, wife*; **әп** [ʌp], *every*; **ipә** [ɪrʌ], *highly*; **сәт** [sʌt], *success*. In rare instances, this letter appears in second syllables: **ipә** [ɪrʌ], *highly*; **сipә** [sɪrʌ], *probably*. The letter **ә** never appears in suffixes; instead, the letter **е** replaces **ә** in suffixes added to "soft" stems: **ат-тар** [at-tar], *horses*; vs. **ит-тер** [ɪjtʲɪr], *dogs*. The letter **і** represents a mid-high front vowel which can be transcribed as [ɪ], although this symbol usually denotes a vowel produced slightly closer to the front of the mouth, such as the vowel in the English word *it*. Kazakh [ɪ] is almost a central vowel. In the

production of Kazakh [ɪ], the lips are slightly tensed but unrounded, and the entire mass of the tongue is raised toward the back portion of the hard palate. In the production of the vowel in the English word *it*, the back portion of the tongue is not raised in this fashion. Kazakh [ɪ] differs from the high central vowel in the Russian word **сын** *son*, usually transcribed as [ɨ], in having a more fronted articulation, as shown by the radiograms provided on the next page.

The letter *i* may appear in any syllable: **іні** [ɪnɪ], *younger brother*; **тіл** [tɪl], *language, tongue*; **бірінші** [bɪrɪnʃɪ], *first*. It appears in roots as well as suffixes, **тіл-і** [tɪl-ɪ], *his/her language*.



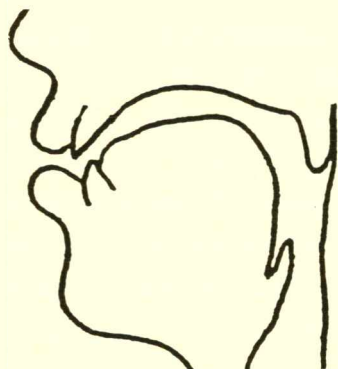
Radiogram of Kazakh [ɪ],
after Dzhunisbekov (1972:53).



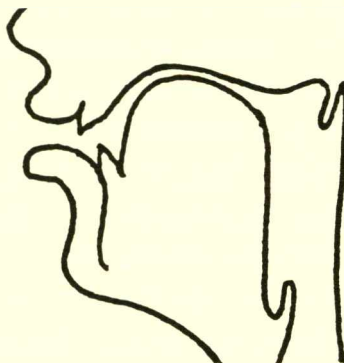
Radiogram of Russian [ɨ] in **сын**,
after Avanesov (1972:32).

The letter *γ* represents a mid-high central vowel pronounced with distinct lip rounding. The vowel [ʊ] has often been erroneously taken for the sound of the German letter *ü* or the French *u*, which represent high front rounded vowels. The contrast between the Kazakh mid-high central vowel [ʊ] and the German or French high front vowel [y] appears clearly in the radiograms provided below. The letter *γ* appears almost exclusively in initial syllables: **γй** [ʊj], *dwelling*; **жγз** [ʊz], *hundred*; **сγт** [sʊt], *milk*; *γ* never appears in affixes. However, the letter *i* in a syllable after a

rounded vowel is pronounced [ɯ] because of labial harmony: Үй-і [ɯj - ɯ], *his/her dwelling*.

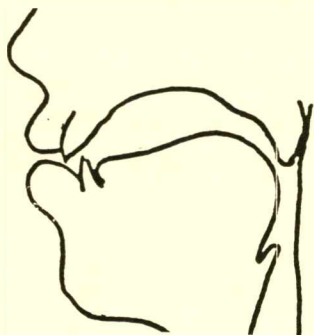


Radiogram of Kazakh [ɯ],
after Dzhunisbekov (1972:55).



Radiogram of French [y],
after Delattre (1948:2).

The letter Ү represents a mid-high back vowel pronounced with strong lip rounding. The anterior portion of the tongue is tensed and flattened, with considerable retraction of the tongue root. This vowel has been transcribed as [ʊ], although the degree of tongue root retraction is not conveyed by the IPA symbol [ʊ] or by any other available symbol. The feature of tongue root retraction distinguishes Kazakh [ʊ] from the vowel in the English word *full*, which is also a mid-high back rounded vowel.



Radiogram of Kazakh [ʊ],
after Dzhunisbekov (1972:54).

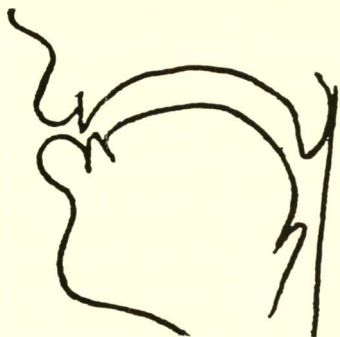


Radiogram of English [ʊ] in *full*;
after Edwards (1986:57).

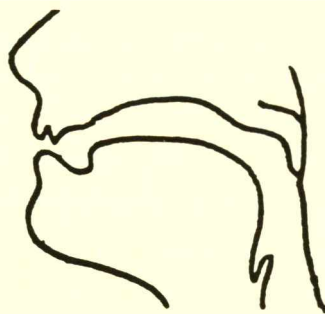
The letter Ү, like Ү, appears almost exclusively in initial syllables: ұл [ʊl], *son*; құлақ [qʊlɑq], *ear*; жұма [ʒʊmɑ],

Friday. The letter **ы** in a syllable after a rounded vowel is pronounced [ʊ] because of labial harmony: **ұл-ы** [ʊl-ʊ], *his/her son*.

The letter **ы** represents an upper-mid central unrounded vowel, which can be transcribed with the IPA symbol [ə], although this symbol more commonly indicates a mid rather than an upper-mid central vowel. During the articulation of Kazakh [ə], the entire mass of the tongue is raised slightly above the top of the lower teeth, distinguishing it from Kazakh [ɑ], a low vowel. As can be seen in the radiogram given below, Kazakh [ə] is articulated without flattening the anterior portion of the tongue, and the lips are spread wider than for other vowels.



Radiogram of Kazakh [ə],
after Dzhunisbekov (1972:52).



Radiogram of the first vowel in *about*;
after Edwards (1986:71).

Assigning tongue height features such as [+/-high] to Kazakh [ə] is problematic. Dzhunisbekov describes [ə] as a high vowel (1972:52), although, as the radiogram above indicates, the tongue blade is considerably lower than for the other high (actually mid-high) vowels, [ɪ], [ʊ], and [ʉ]. Nevertheless, like the other mid-high vowels of Kazakh, [ə] has a low first formant and devoices in unstressed position between two voiceless consonants. In the following examples, the voiceless vowels--which have not been marked elsewhere in the present article--are transcribed using a subscript period [·]: **қысқа** [qə̟sqɑ], *short*; **құштар** [qʊ̟ʃtar], *birds*; **кітап** [kɪ̟tɐp], *book*. Devoicing is part of a more general reduction of unstressed high vowels

(including [ə]), which shorten in rapid speech almost to the point of elision. Acoustic and phonological evidence allow [ə], which in absolute phonetic terms is an upper-mid vowel, to be grouped with the mid-high vowels.

The Kazakh vowel [ə] presents an additional problem with regard to traditional explanations of Kazakh phonology. Most older descriptions of Kazakh treat [ə] as a back vowel. The feature [+back], in turn, has traditionally served to explain the behavior of Kazakh "hard" vowels as a single class of sounds. However, the radiogram provided above clearly shows that Kazakh [ə] is not really a back vowel. In the production of Kazakh [ə], the entire blade of the tongue is raised nearly equally, whereas in a true back vowel only the dorsal portion of the tongue is so raised. The three remaining "hard" vowels, [ɑ], [ʊ], and [ɯ], are back vowels, since the dorsal portion of the tongue is clearly higher during their articulation. This has led Dzhunisbekov (1972:72), in referring to the feature of horizontal tongue position, to describe [ə] as a "mixed" vowel, rather than a back vowel, although in terms of vowel harmony [ə] is clearly in the "hard" vowel group. A recent textbook of Kazakh (Kozhakhmetova 1989) likewise describes [ə] as a "mixed" (смешанный) vowel, neither front nor back. The radiogram given above indicates that the Kazakh vowel [ə] is a central rather than a back vowel.

The letter **ы** may appear in any syllable: **ырысты** [əɾəstə], *fortunate*. This letter appears in many suffixes, where it functions as the "hard" variant of **и**: **ат-ы** [ɑt-ə], *his/her horse* vs. **ит-и** [ɪt-ɪ], *his/her dog*.

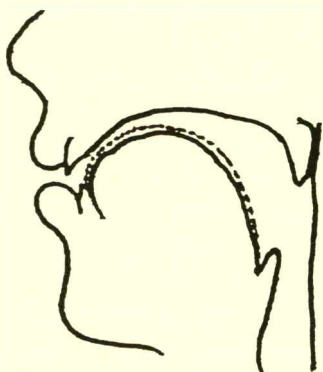
2. Diphthongoid Vowels

There are no long vowels in Kazakh; length does not play any phonological role in the language. Dzhunisbekov (1980: 17-21), however, has demonstrated with acoustic analysis that the three Kazakh vowels normally represented by Cyrillic letters **е**, **о**, and **ө** are not true monophthongs but rather consist of an initial glide element

plus a second element which is clearly vocalic. The two components are each distinctly audible in word-initial position. After consonants the glide elements are shorter and more difficult to hear, but spectrographic analysis has confirmed that *e*, *o*, and *ə* represent heterogenous sounds here as well. In phonetic terms, these letters clearly represent diphthongs of single vowel length. Even in word-initial position, these vowels are not longer than the six Kazakh monophthongs. In fact, the monophthong [ɑ] is actually longer than [wə], [wɔ], and [jɪ]. But in phonological terms, *e*, *o*, and *ə* cannot be treated as diphthongs since they behave as single units. Dzhunisbekov (1980:21) calls them "phonemic diphthongs." Historically, these vowels derive from monophthongs, and they continue to behave as single phonological units in modern Kazakh despite their divisibility into two phonetically heterogenous segments.

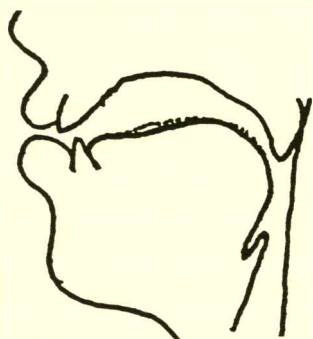
The letter *e* represents a mid-high vowel which is often misidentified as identical to the vowel in the French word *treis*. Consequently, the sound of the Kazakh letter *e* has often been transcribed incorrectly as [e]. The Kazakh vowel is pronounced with the entire mass of the tongue raised toward the hard palate, retreating slightly after the initial onset, so that the vowel changes perceptibly as it is produced. Only the second component can be lengthened in emphatic speech. The most precise phonetic transcription of this sound seems to be a digraph with a ligature: [jɪ̯], although such a symbol does not follow IPA usage. The ligature is necessary because the vowel behaves phonologically like a single segment rather than like a diphthong consisting of two separate segments. The radiogram given below shows that the second component of this vowel is nearly identical to the Kazakh [ɪ]. The diphthongoid vowel represented by the Kazakh letter *e* differs considerably from the vowels of European languages. In the production of Kazakh [jɪ̯], the corners of the mouth are tense and somewhat drawn together. The second component of [jɪ̯] is a mid-high front vowel which

shouldn't be confused with the upper-mid front vowel [e] of European languages.



Comparison of [ɪ], solid line, with the second component of Kazakh [jɪ], dotted line; after Dzhunisbekov (1980:18).

The vowel letter *o* represents a sound which most sources on Kazakh improperly identify the mid-back rounded vowel [ɔ]. As in the case of Kazakh [jɪ], this vowel is not a homogenous sound, but rather a combination of an initial glide element [w] followed by a vocalic element nearly identical to the Kazakh vowel [ʊ]. The most precise phonetic transcription of this sound, therefore, would be a digraph with a ligature: [wʊ̯]. Once again, the ligature is necessary because [wʊ̯] is of single vowel length and does not behave as a combination of two separate sounds.



Comparison of [ʊ], with the second component of Kazakh [wʊ̯], after Dzhunisbekov (1980).

Compared to the vowel [ɔ] in the English word *or*, Kazakh [wʊ̯] is pronounced with more retraction of the tongue toward the pharynx, just as in the case of Kazakh [ʊ].

Kazakh [wɔ] appears only in word-initial syllables: жоқ [ʒwɔq], *no*; ол [wɔl], *he, she, it*; олар [wɔlɑr], *they*.

The vowel letter ө represents yet another vowel of mixed quality. In articulatory terms, this vowel is a combination of an initial glide element similar to [w] and a vocalic element similar to the Kazakh vowel [ɘ]. The most precise phonetic transcription of this sound would be, once again, a digraph with a ligature: [wɘ̯]. The Academy Grammar and all dictionaries of Kazakh incorrectly identify [wɘ̯] as a front vowel similar to the sound of the German letter ö. Kazakh [wɘ̯] is produced with even more tenseness in the lips than for Kazakh [wɔ]. The entire mass of the tongue is farther forward in the mouth and there is no flattening or tensing of the anterior portion of the tongue. The Kazakh letter ө is restricted to initial syllables and does not occur in affixes, although the letter е in non-initial syllables may be pronounced [wɘ̯] due to labial harmony: өзен [wɘ̯zɘ̯n], *river*; үйрек [wɘ̯jrɘ̯k], *duck*.

The diphthongoid vowels [wɘ̯], [wɔ], and [jɪ̯] cannot be divided into separate phonological units without greatly complicating the description of the Kazakh sound system. To treat them as combinations of two separate segments-- [jɪ̯] as [j + ɪ̯], [wɔ] as [w + ɔ], and [wɘ̯] as [w + ɘ̯]--would yield striking exceptions to several phonological rules. A basic feature of Kazakh is the complete lack of syllable-initial clusters, even in connected speech. Treating the first phonetic element of vowels [wɘ̯], [wɔ], and [jɪ̯] as a glide would assert that Kazakh contains syllable-initial clusters; thus, көз [kwɘ̯z], *eye*, would begin with the cluster [kw]; топ [twɔr], *net*, would begin with the cluster [tw]; and мен [mjɪ̯n], *I*, would begin with the cluster [mj]. Third, when the diphthongoid vowel [jɪ̯] becomes [wɘ̯] following a rounded vowel, the glide element changes along with the vocalic element: үй-лер [ɘ̯j + lwɘ̯r], *dwelling*s. If the Kazakh letter е really represents [j + ɪ̯], the glide element [j] should not

become [w], since such a change does not occur in words containing separate segments [j] + [ɪ]. The word **ҮЙ-ІМ** *my dwelling*, for example, is pronounced [ɯjɯm], not *[ɯwɯm]. Finally, since the diphthongs [ɔw] and [ɯw] occur frequently enough to be written with their own special letter, **у**, the absence from Kazakh of ***оу** (if considered as [wɔw]) and ***өу** (if considered as [wɯw]) would be inexplicable.

A historical perspective on the Kazakh vowel system provides additional reasons for considering the three diphthongoid vowels as single phonological units in modern Kazakh. These vowels derive historically from monophthongs, not from two adjacent and separate sounds. Compare the Kazakh **көз** [kɯʊz], *eye*, with the Turkish **göz**, where the letter **ö** represents the mid-high front rounded vowel [ö]. In word-initial position, the Kazakh vowels represented by letters **е**, **о**, and **ө** begin with a short but distinctly audible glide element: **екі** is actually pronounced [jɪkɪ], *two*; **от** is pronounced [wɔt], *fire*; and **өң** is pronounced [wɯŋ], *appearance*. Except as components of diphthongoid vowels, the sounds [j] and [w] are not otherwise found in word-initial position in native Kazakh words. The word-initial [j] inherited from Common Turkic became [ɜ] in Kazakh. Thus, Kazakh has an initial [ɜ] where other Turkic languages have [j]. Compare the Turkish **yel** [jɛl], *wind*, and **yedi** [jɛdi], *seven*, to the Kazakh **жел** [ɜjɪl], *wind*, and **жети** [ɜjɪtɪ], *seven*. Word initial [j] in pre-1917 Russian loans underwent a similar conversion to [ɜ]. For example, the Russian word **ярмарка** [jarmarka], *fair*, became **жәрмеңке** [ɜarmɛŋkɛ]. In no case, however, did the first component of [jɪ] become [ɜ]. The true glide [j] is clearly phonologically distinct from the first component of the diphthongoid vowel [jɪ].

In modern Kazakh, the vowels [wɔ], [wɯ], and [jɪ] continue to behave phonologically as single sounds. Treating them as diphthongs consisting of two phonologic-

ally divisible sounds leaves unexplained the behavior of [j] after "soft" vowels, adds inexplicable restrictions on the addition of [w] after the vowels [ʊ] and [ɘ], and, finally, creates unique and striking exceptions to Kazakh syllable structure. The case for not dividing the diphthongoid vowels of Kazakh into separate phonological units parallels the case for not dividing the English affricates [tʃ] and [dʒ]. Despite being divisible into two consecutive phonetic segments, the affricates derive historically from single sounds and continue to function as single segments in modern English. There should be no doubt that the three diphthongoid vowels of Kazakh are the phonological equivalents of monophthongs. Phonetically, it is possible to decrease the number of vowel segments in Kazakh to six. Phonologically, the number is clearly nine, three of which-- [wɘ], [wʊ], and [jɪ]--are diphthongoid in nature. The vowels represented by letters *е*, *о*, and *ө*, should be transcribed using ligatures: [wɘ], [wʊ], and [jɪ]. To transcribe them as [ə], [o], and [e], as has been done in every major work on Kazakh produced thus far, erroneously suggests that these vowels are phonetically homogenous, like the mid vowels normally transcribed by these symbols.

3. True Diphthongs

Several other letters of the Kazakh alphabet represent two or three phonetic segments in sequence. The letters *я*, *и*, *у*, and *ю* are involved in rendering the glides [j] and [w] in combination with various vowels. Unlike the situation with the three diphthongoid vowels described above, however, these letters represent combinations of sounds acting as separate phonological units. In other words, these letters represent true diphthongs.

The letter *я* represents two separate sounds: [j] + [a]: *аяз* [aj az], *frost*; *аяқ* [aj aq], *leg*; *үя* [ʊ ja], *nest*. In rare instances, the letter *я* may represent [j] + [ɤ]: *яки* [j ɤ ki], *or*. The two sounds represented by this letter may even

belong to separate syllables: **аяқ** [ɑ-jɑq], *leg*; **яң** [ʊ-jɑ], *nest*. The combination [j] + [ɑ] is undoubtedly a diphthong.

The letter **и** represents a diphthong consisting of the front glide [j] preceded by either the "hard" vowel [ə] or the "soft" vowel [ɪ]. If "soft" vowels, or the letters **к** and **г**, appear in the same word, the letter **и** represents the "soft" vowel [ɪ] + [j]: **тиін** [tɪjɪn], *squirrel*; **иһи** [ɪjɪɲɪ], *needle*; **иіс** [ɪjɪs], *smell*; **сирек** [sɪjɪrɪk], *rare*. If another "hard" vowel or the letters **қ** and **ғ** appear in the word, then **и** represents the "hard" vowel [ə] + [j]: **тиын** [təjən], *kopek*; **иық** [əjəq], *shoulder*; **қи** [qəj], *cut*; **сирақ** [səjɪrɑq], *knee*. The digraph **ый** occasionally represents [əj] in certain monosyllables to avoid ambiguity: **тый** [təj], *forbid* vs. **ти** [tɪj], *touch*. The letter combination ***ий** never occurs, although [əj] or [ɪj] would be best represented if the letter **и** was replaced in all cases by either **ый** or **ий**. The other seven Kazakh vowels are always written separately before the glide [j], which is written in such combinations with the letter **й**: **айна** [ɑjɪnɑ], *mirror*; **әйел** [əjɪjɪl], *woman*; **ойын** [ʊjɪjɪn], *game*; **үй** [ʊjɪ], *dwelling*; **ұйым** [ʊjɪjɪm], *organization*.

The letter **у** has two functions. After a vowel letter, **у** represents a single sound, the back rounded glide [ʊ]: **тау** [tɑʊ], *mountain*; **бау** [bɑʊ], *garden*. In this position, the letter **у** fulfills a unique function and cannot be replaced by any other Kazakh letter. In word-initial position or after a consonant, however, **у** represents [ʊ] preceded by one of the rounded vowels [ʊ] or [ʊ̣]. In this position, the letter **у** could be expanded into a digraph: **үү** for [ʊ̣ʊ], and **ұу** for [ʊʊ]. As in the case of the letter **и**, the synharmonic nature of the word as a whole usually indicates which diphthong the letter **у** represents. If another "soft" vowel or the velars **к** [k] and **г** [g] appear in the word, **у** represents the "soft" vowel [ʊ̣] + [ʊ]: **сурет** [sʊ̣rɪt], *picture*; **үәде** [ʊ̣ɛdɪ], *oath*. If another "hard" vowel or the uvulars **қ** [q] and **ғ** [ɣ] appear

in the word, *y* represents the "hard" vowel [ʊ] + [w]: *суық* [sʊwʊq], *cold*; *айы* [aʊwʊ], *to overturn*; *оқы* [ʊwχʊw], *to read*; *аяқ* [ʊwɑq], *trifle*; *қы* [qʊw], *swan*. Ambiguity arises in the case of monosyllabic words where there are no clues about synharmony. The speaker must simply know that in certain monosyllabic words the letter *y* conceals the "hard" vowel [ʊ]: *ты* [tʊw], *banner*; *су* [sʊw], *water*; *у* [ʊw], *poison*. In other monosyllables, the letter *y* conceals the "soft" vowel [ɥ]: *ты* [tɥw], *Oh!* When suffixes are added to such words, the "hard" or "soft" vowel of the suffix reflects the synharmonic nature of the hidden root vowel: *туы* [tʊwʊ], *his banner*; *сулай* [sʊwɫɑw], *to moisten*; *уыт* [ʊwʊt], *antidote*. Nevertheless, ambiguity could be avoided altogether if the sound combinations [ʊw] and [ɥw] were always written *ɣy* and *yy*. Three other vowels--[jɪ], [ɑ], and [ɛ]--which appear before [w] are represented by their own separate letter + *y*: *дей* [dʲɪw], *to tell*; *тай* [tɑw], *mountain*; *ая* [ɑwɑ], *air*; *жей* [ʒʲɪw], *to eat*; *әуен* [ɛwʲɪn], *refrain*. The combinations **oy* [ʊwʊ], **öy* [ʊwɥw], **by* [ɛw] and **iy* [ɪw] do not occur in Kazakh, although *ey* is pronounced [ʊwɥw] in a few words because of labial harmony: *күей* [kʊwɥw], *son-in-law*; *төртеу* [tʊwɪrtɥw], *group of four*.

The letter *ю* represents a combination of three sounds: an initial front glide [j], one of the high vowels [ʊ] or [ɥ], and the back glide [w]. As with the letter *y*, the letter *ю* represents [jʊw] in synharmonically "hard" words: *аю* [ɑjʊw], *bear*; *ою* [ʊwʲjʊw], *ornament*; *үю* [ʊjʊw], *to curdle*. In synharmonically "soft" words, the letter *ю* represents [jɥw]: *үю* [ɥjɥw], *to gather into a pile*; *кею* [kʲɪjɥw], *to scold*; *кию* [kɪjɥw], *to put on clothing*. In the word *кию*, the letter *к*, which occurs only in "soft" syllables, reveals the synharmonic nature of the two vowels hidden in *и* and *ю*. The letter *ю* could be replaced with the letter combinations

ӳӱ and ӳӱ, although, once again, synharmony removes much of the potential for ambiguity.

4. Consonant Assimilations

Depending upon the nature of the adjacent vowels, every Kazakh consonant has four synharmonic variants: "soft" rounded, "hard" rounded, "soft" unrounded, and "hard" unrounded. Even the glide [w] has a slightly less rounded variant in the vicinity of an unrounded vowel and a slightly more rounded variant in the vicinity of a rounded vowel. The difference between synharmonic variants of consonants is in most cases rather slight. The "soft" and "hard" variants of consonants articulated with the dorsal portion of the tongue (velars and uvulars) are more striking. The velars [k] and [g] appear only in conjunction with "soft" vowels. In conjunction with "hard" vowels, they are replaced by uvulars [q] and [ɣ]. Despite the fact that these sounds are in complete complementary distribution, each is represented by its own separate letter of the Kazakh alphabet: к and г represent the velars [k] and [g], and қ and ғ represent their uvular counterparts [q] and [ɣ]. The voiced pair [g] and [ɣ] differ in manner as well as point of articulation, since the uvular is a fricative rather than a stop. The velar nasal stop [ŋ], which appears in "soft" syllables, and the uvular nasal stop [ɴ], which appears in "hard" syllables, are also in complete complementary distribution. Both [ɴ] and [ŋ] are represented by a single letter ң; the remaining consonants likewise use one letter to represent both "hard" and "soft" variants. These synharmonic variants are slight in comparison to the velars and uvulars and have not been marked in transcription.

In native Kazakh words, only seventeen consonant sounds appear in contrastive distribution. These include three bilabial stops: п [p], б [b], м [m]; two glides: ӳ [j], у [w]; two liquids: р [r], л [l]; two alveopalatals ш [ʃ], ж [ʒ]; five alveolar stops: н [n], т [t], д [d], с [s], з [z]; and the three uvular/ velar pairs discussed above: қ [q] and к [k]; ғ [ɣ]

and **г** [g]; and **н** [n/ŋ]. The voiceless stops [q], [k], [t], and [p] are aspirated. The modern Cyrillic alphabet represents Kazakh consonants with no ambiguity: taking into consideration synharmonic variation, each consonant letter is pronounced exactly as written except where a few additional assimilatory processes are at work.

Kazakh consonants are affected by several assimilatory processes in addition to the ubiquitous effects of synharmony. One such process is the spirantization of certain obstruent stops between vowels or sonorants. In this phonetic environment, [b] becomes the bilabial fricative [β], and [g] becomes the velar fricative [ɣ]. The other voiced stop, [d], is unaffected by spirantization, as are the voiceless stops [p] and [t]. The voiceless uvular stop [q] becomes the fricative [χ] between vowels or sonorants: **оқу** [ʊχʊʊ], *to read*. In this position, the letter **х** (found only in borrowed words) is also pronounced [χ] rather than [q]: **Райхан** [rɑjχɑn], *Raikhan (a female name)*. Spirantization also affects word-final [p], [k], or [q], which become [β], [ɣ], and [ʁ] before a word beginning in a vowel: **қап әкел** [qɑβ ʌkʲɪl], *Take the bag*, **ақ ешкі** [ɑʁ ʲɪʃkɪ], *white goat*.

Another phonological process affecting Kazakh obstruents is voicing assimilation. Obstruent stops assimilate by voice to any preceding obstruent stop or fricative. The effect is reflected in the orthography, except in the case of compound words: **Жүнісбеков** [ʒʉnɪsβʲɪkɪp], *Dzhunisbekov (a surname)*. Obstruent stops also devoice in word-final position: [ʁ/g] devoices to [q/k], and [b] devoices to [p]. Because the effect of word-final devoicing is reflected in the orthography, the letters **р/г** and **б** (as well as **д**) never appear as the last letter of a native Kazakh word. When a consonantal suffix is added to a word ending in a devoiced obstruent, the suffix takes on a voiceless initial consonant: **балық-тар** (not **-дар**) [balʌqtɑr], *fish (plural)*. Stems ending in voiced fricatives, which do not devoice in word-final position, require suffixes beginning in voiced consonants:

қыз-дар [qəz-dar], *girls*, vs. **қап-тар** [qap-tar], *bags*; **дос-тар** [dʊs-tar], *friends*; **қыз-ға** [qəz-ɣa], *to the girl*, vs. **ат-қа** [at-qɑ], *to the horse*. Thus, every consonant suffix has a voiced and a voiceless variant (each of which also has "soft" and "hard" synharmonic variants). Borrowed words may end in the letters **р**, **д**, and **б**; however, such letters are pronounced voiceless and require the voiceless variants of consonantal suffixes: **завод** [zawəʔt], *factory*; **завод-тар** [zawəʔt-tar], *factories*; **педагог** [pɪdagok], *teacher*; **педагогтар** [pɪdagok-tar], *teachers*. Word-final obstruents do become voiced again whenever a vocalic suffix is added: **балық** [baləq], *fish*, vs. **балығы** [baləɣə], *his fish*. Progressive voicing and devoicing of obstruent stops also occurs across word boundaries, but here the changes are never reflected in the orthography: **Қош бол** [qʊʃ pʊʊl], *good bye*; **ақ бала** [aq paɭa], *towheaded child*; **керек дене** [kʲɪrʲɪk tʲɪnʲɪ], *it turns out to be needed*.

Fricatives behave differently than stops with regard to voicing assimilation. The fricatives [s] and [z], pronounced in succession, undergo regressive voicing assimilation. The first fricative assimilates to the second, rather than the second to the first (as with stops), producing the geminate consonants [s:] and [z]: **сегіз сөз** [sʲɪɣɪs:ɯz], *eight words*; **тұзсыз** [tʊsɪʊz], *without salt*. The voiced fricatives [z] and [ʒ] remain voiced in word-final position: **тұз** [tʊz], *salt*; **сөз** [sɯz], *word*. **мұқтаж** [muqtɑʒ], *need*. Fricatives are thus the only voiced obstruents to appear in word-final position, since all stops devoice obligatorily in this position. Fricatives are never affected by adjacent obstruent stops, although fricatives do cause voicing assimilation in a following obstruent stop: **сегіз қой** [sʲɪɣɪz ɣʊʊj], *eight sheep*; **жас гүл** [ʒɑs kʊɭ], *young flower*.

Alveolar and palatoalveolar fricatives occur in clusters across word and syllable boundaries, where they invariably produce geminates. The alveolar fricative [z] before [ʒ] produces the geminate palatoalveolar [ʒ:]: **бес**

жиріт [bʃɪzɪɣɪt], *five fellows*; **көз жұмы** [kʷɔzɔmʊw], *to close ones eyes*. The alveolars [s] and [z] before [ʃ] produces the geminate palatoalveolar [ʃ:]: **басшы** [bɑʃ:ə], *leader*; **сөзшен** [sʷɔʃʷɔn], *eloquent*. Finally, the combination **с + ж** undergoes progressive and regressive assimilation simultaneously, also resulting in [ʃ:]: **Досжан** [dʷɔʃ:ɑn], *Doszhan (a male name)*, **бес жан** [bʃɪʃ:ɑn], *five souls*.

Other consonants may be written double over morpheme boundaries. In Russian loan words, double letters represent single consonants. In native Kazakh words, double letters always represent geminate consonants. These sounds invariably occur across morphological boundaries. Geminate sonorants and fricatives are pronounced twice the length of single consonants: **нанның** [nɑn:əɳ], *of bread*; **ыссы** [əs:ə], *hot*. Geminate obstruent stops are pronounced with a delayed release: **тәтті** [tʌt:ɪ], *sweet*; **қаққа** [qɑq:ɑ], *by half*; **жаппа** [ʒɑp:ɑ], *don't close*. The consonants [b], [d], and [ʋ] never occur as geminates.

5. Inventory of Kazakh Phonemes

Based on the discussion of Kazakh sounds provided above, Kazakh contains 27 phonemes in all, excluding sounds such as [f] or [v] which appear only in Russian loan words and which many speakers replace with native Kazakh sounds such as [p] or [b]. There are 18 consonant phonemes: /p/, /b/ (with allophones [b] and [β]), /t/, /d/, /s/, /z/, /ʃ/, /ʒ/, /h/, /l/, /r/, /j/, /w/, /m/, /n/, /ŋ/ (with allophones [ɳ] and [ŋ]), /k/ (with allophones [k], [q], and [χ]), /g/ (with allophones [g], [ɣ], and [ʋ]). Kazakh has nine vowel phonemes, a large number compared to the number of consonants, as is typical for a Turkic language. The three diphthongoid phonemes--/wɔ/, /ʃɪ/, and /wɔʃ/--which are not found in other Turkic languages, can be divided phonetically (but not phonologically) into combinations of other phonemes. Contrasts involving the vowel phonemes are strictly determined by synharmony: four of the

vowels--/ɑ/, /ə/, /ʊ/, /ʊ̯/--appear only in synharmonically "hard" words; the remaining five--/ɪ/, /ɛ/, /ʃɪ/, /ʊ̯ɛ/, /ʊ̯/--are limited to "soft" words. The phonological basis for the terms "hard" and "soft" will be clarified after based upon the following discussion of synharmony and other phonological processes affecting the structure of words, morphemes and syllables in Kazakh.

III. Morphophonology

1. Word and Syllable Structure

No consonant clusters appear in initial position in native Kazakh words. The clusters of consonant letters written at the beginning of borrowed words are usually pronounced with a vowel before the cluster or inserted between the two consonants: **класс** [kəɫɑs], *class*; **шляпа** [əʃɫɑpɑ], *hat*. Kazakh speakers fluent in Russian, however, may follow the Russian norm and pronounce syllable-initial clusters.

A Kazakh word may begin with any vowel, but certain consonants are restricted in word-initial position. The back nasal [ŋ/ɴ] never occurs in this position. The liquids [ɭ] and [ɽ] occur as the first sound of native words only rarely. Even in such cases they may be preceded by a vowel in speech: **лак** [ɭɑq] or [əɫɑq], *kid goat*; **рай** [ɽaj], or [əɽaj], *condition*. Foreign words spelled with initial **р** or **л** may also be pronounced with an initial vowel: **радио** [əɾadiə], or [ɾadiə], *radio*; **Рим** [ɽɪm] or [ɪɽɪm], *Rome*. Also not occurring at the beginning of native words are the sounds [g] and [ʁ]. The letter **г** written at the beginning of Russian loans is usually pronounced [q]: **гастроном** [qɑstəɾanəm], *grocery store*. Word initial **г** in loans from Arabic and other Southwest Asian languages is always pronounced [ʁ]: **ғасыр** [ʁasər], *century*; **ғылым** [ʁələm], *science*. Words beginning with the sound [ɳ] are also exclusively of foreign origin, either recent Russian loans or

early loans from eastern languages: **нан** [nɑn], *bread*; **намаз** [nɑmɑz], (*Moslem*) *prayer*.

Kazakh words may end in a vowel, a single consonant, or in certain restricted types of consonant clusters. The first consonant of syllable-final clusters invariably is a sonorant, the second, a voiceless obstruent. The liquids [l] and [r] may precede any voiceless obstruent, i.e., [p], [t], [k/q], [s], [ʃ]. Only [lt] and [rt] are common as word-final clusters: **бұлт** [bʊlt], *cloud*; **кілт** [kɪlt], *key*; **қарт** [qart], *old man*; **ымырт** [əmərt], *dusk*. The remaining possible combinations of liquid + voiceless obstruent in Kazakh are restricted to onomonopoeitic words, reduplications, or other special words, such as **қарқ-қарқ** [qarq qarq], which denotes the sound of laughter. The non-liquid sonorants [j], [w], [m], [n], and [ŋ] occur in word-final clusters only before voiceless stops which share the same point of articulation, producing such homorganic clusters as the alveolar cluster [nt], or the velar cluster [ŋk]: **қант** [qant], *sugar*; **реңк** [rɛŋk], *shade*. Non-homorganic combinations occur in written Kazakh over morpheme or word boundaries, but in speech, the nasals assimilate to the point of articulation of the following consonant, producing homorganic clusters. Thus, the letters **н** and **ң** may be written before labial consonants, but in this environment they are invariably pronounced as the labial [m] **Құрманбек** [qurmanbek], *Kurmanbek* (a male name). Similarly, the letters **м** and **ң** are pronounced as the alveolar [n] before alveolar consonants: **маңдай** [mandaj], *forehead*; the letters **м** and **н** are pronounced as the velar [ŋ] or the uvular [ɴ] before velars or uvulars: **бұрынғы** [burɯŋɯ], *former*; **Аманқұл** [amanqʊl], *Amankul* (a male name).

In Kazakh, syllabification is strictly phonological and does not necessarily coincide with morphological boundaries: consonants carry over to any following syllable whenever that syllable begins in a vowel. In the following examples, the syllable breaks, marked with hyphens, do not

coincide with morpheme boundaries, which are marked with plus signs: *шаш+ы* [ʃʌ-ʃə], *his hair*; *жоғ+алу* [ʒwɔ-ɤal t], *to disappear*; *қап әкел* [qɑ-βʌ-kʲɪ l], *Take the bag*. *ақ ешкі* [ɑ-ʏjɪʃ-kɪ], *white goat*. Syllable breaks divide most consonant clusters, even those which occur within the same morpheme: *бұлт+ы* [bʊl-tʊ], *his cloud*; *кентім* [kʲɪn-tɪm], *my city*. Closed syllables may occur only in utterance final position, as in *жоқ* [ʒwɔq], *no*, or before a syllable beginning in another consonant, as in *жақшы* [ʒɑq-ʃə], *good*.

2. Synharmony

Synharmony has a greater effect on Kazakh word and syllable structure than any other phonological feature. Two types of vowel harmony are involved: labial harmony, based on lip rounding; and lingual harmony, based on an opposition between "soft" and "hard" vowels. The phonetic composition of each individual Kazakh word is strictly limited because only certain vowels may co-occur. The initial-syllable vowel affects the rest of sounds in the word so that each word belongs to one of four synharmonic types: "hard" rounded, "soft" rounded, "hard" unrounded, or "soft" unrounded. Synharmony plays a major role morphologically in an agglutinative language such as Kazakh, where every suffix has several synharmonic variants. In addition, synharmony interacts with the prosodic features of the language in a way understood only recently. Dzhunisbekov (1987) has demonstrated that Kazakh and other Turkic languages with synharmony are typologically distinct from intonation languages, such as English, as well as from tone languages, such as Chinese. The uniqueness of Kazakh and other languages with synharmony becomes apparent only after a more detailed discussion of this interesting feature.

Labial harmony, the lesser component of synharmony, affects certain vowels in Kazakh but not others. The low vowels [ɑ] and [ʌ] are entirely unaffected by labialization, even directly after an initial rounded vowel: *олап* [wɔlɑr], *they*; *шүбә* [ʃɤbʌ], *doubt*. The remaining

three unrounded vowels--[jɪ], [ɪ], and [ə]--become rounded in syllables immediately following a rounded vowel, but labialization is never reflected in writing. In a syllable following a rounded vowel, the letter *е*, which normally represents [jɪ], is pronounced [wɘ]: *өзен* [wɘzɘn], *river*; *үйрек* [wɘjɪrwɘk], *duck*. The letter *і*, normally pronounced [ɪ], becomes [ɘ] in this position: *үзік* [ɘzɘk], *part*; *өмір* [wɘmɪr], *fate*; *өлім* [wɘlɪm], *death*. The letter *ы*, normally pronounced [ə], becomes [ʊ]: *орын* [wɒrʊn], *place*; *отын* [wɒtʊn], *firewood*. Labial harmony affects third- or fourth-syllable vowels less strongly than second-syllable vowels. In the following words, although the transcription does not reflect it, the final-syllable vowels are pronounced with weaker lip rounding than the vowels in the first two syllables: *үйректөр* [wɘjɪrwɘktwɪr], *ducks*; *өзендер* [wɘzɘndwɪr], *rivers*. The vowels [jɪ], [ɪ], and [ə] in third or fourth syllables are never labialized after a low vowel [ɑ] or [æ]: *достарым* [dʊstɑrəm], *my friends*; *шүбәлі* [ʃɘbæɪɪ], *doubtful*. Another exception to labial harmony involves the infinitive ending *у*, the only Kazakh suffix containing a rounded vowel. This morpheme often produces words in which an unrounded vowel precedes a rounded vowel: *кепу* [kɪɪpɘw], *to dry out*; *тепу* [tɪɪrɘw], *to gather*. Otherwise, if the first syllable of a Kazakh word contains an unrounded vowel, all the vowels in the word are unrounded: *мылықтарымыз* [mɘlɘqtɑrɘmɘz], *our guns*; *терезелеріміз* [tɪɪrɪɪzɪɪɪɪrɪmɪz], *our windows*. In Turkic languages with full labial harmony such as Kyrgyz, each word contains only rounded vowels or only unrounded vowels. In Kazakh, labial harmony tends to affect the root vowels of multisyllabic words, leaving suffix vowels less affected or not affected at all.

Lingual harmony, on the other hand, operates much more completely in Kazakh. If the first vowel in a word is "soft"--[jɪ], [æ], [ɪ], [wɘ], or [ɘ]--then all the vowels in the word are "soft." If the first vowel in a word is "hard"--[ɑ], [wɒ], [ə], or [ʊ]--then all the vowels in the word are "hard."

Because only "soft" vowels may follow an initial "soft" vowel and only "hard" vowels may follow an initial "hard" vowel, each Kazakh suffix must have at least two phonological variants. One variant contains a "soft" vowel (е [jɪ̣] and і [ɪ]) and is added to "soft" stems; the other contains a "hard" vowel (а [ɑ] and ы [ə]) and is added to "hard" stems: **аға-лар** [ɑɑ-ɫɑr], *older brothers*, vs. **іні-лер** [ɪɪ-ɫjɪ̣r], *younger brothers*; **аға-сыз** [ɑɑ-səz], *without an older brother*, vs. **іні-сіз** [ɪɪ-sɪz], *without a younger brother*. Certain compounds and foreign words contain mixtures of "soft" and "hard" vowels. In such words the suffix harmonizes with the last vowel of the stem: **итбалық** [ɪjtɐɫəq], *sprat (literally, dog + fish)*, yields **итбалықтар** [ɪjtɐɫəqtɑr], *sprat (plural)*; **қадір** [kɑdɪr], *respect*, yields **қадір-ден** [kɑdɪrdjɪ̣n], *from respect*.

Lingual harmony operates as a progressive assimilation during suffixation, the most important word building technique in Kazakh. Words may also be formed by combining two roots. If both roots are content morphemes, a compound is produced in which each root preserves its synharmonic qualities, occasionally resulting in mixtures of "soft" and "hard" vowels: **күнбағар** [kʉnbɑɑr], *sunflowers*; **қаныпезер** [qɑnəpjɪ̣z-jɪ̣r], *bloodthirsty*. With compounds the two parts continue to function as separate synharmonic units, and suffixes harmonize with the "hardness" or "softness" of the second root. A second type of compound, called a blend, is produced when one of the roots is a function word. The two morphemes are blended together into a single synharmonic unit, and the syllable-initial vowel assimilates to the vowel inherited from the second word; **бүгін** [bʉɣʉn], *today*, is a blend of the function word **бұл** [bʉɫ], *this*, and the content word **күн** [kʉn], *day*. The "hard" vowel [ʉ] of the first word "softens" to [ɣ] in the blend. In blends, synharmony operates as a regressive assimilation.

3. Tongue Root Position

Although the "hard/soft" distinction is an important one in Kazakh, no phonetically meaningful definition of the terms "soft" and "hard" has appeared in previous literature. Traditionally, the features "soft" and "hard" correlate with the horizontal tongue features "front" and "back" which seem to have played an important role in Common Turkic phonology. Linguists writing about Kazakh from a position of greater familiarity with Turkish, Uzbek, or another Turkic language with an opposition of front and back vowels tend to assume that Kazakh contains a similar opposition. Soviet linguists adopted the terms "soft" and "hard" to describe Kazakh lingual harmony under the influence of linguistic terminology current in the study of Russian and other Slavic languages. In the historical development of Russian, a type of syllabic synharmony developed when front vowels began to co-occur with "soft" (palatalized) consonants and back vowels with "hard" (non-palatalized) consonants (Ivanov 1990). Soviet linguists assume that lingual harmony in Kazakh has much in common with the vowel/consonant interaction evident in the Old Russian, where front vowels palatalized following consonants and back vowels left consonants unpalatalized. Hence the terms "soft" and "hard" were applied to what were thought to be front and back vowels in Kazakh.

Accurate descriptions of the articulatory features of Kazakh vowels, however, show that not all of the "soft" vowels are front vowels. The "soft" vowels [ʉ], and [ɤ], incorrectly described as front vowels in most works on Kazakh, are in fact central vowels. One vowel in the "hard" group, [ə], is also a central vowel, which means that the "soft" group cannot be defined as [-back]. Despite the fact that three of the four "hard" vowels are back vowels, the "soft/hard" opposition in Kazakh clearly involves some feature in addition to horizontal tongue position. Features such as [front], [central], and [back] are not the phonetic basis for lingual harmony in Kazakh.

Dzhunisbekov's acoustic and articulatory analysis of Kazakh vowels (1972, 1980) can be used to demonstrate that the "hard" and "soft" type of vowel harmony in Kazakh

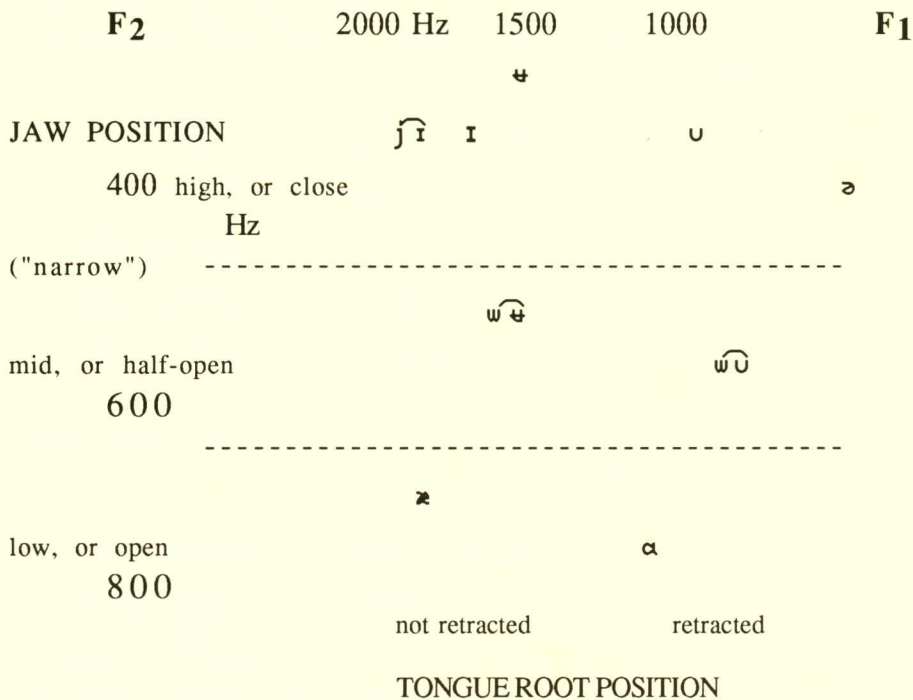
is actually based on the tongue root position. The radiograms provided earlier show that the Kazakh "hard" vowels [ɑ], [ʊ], [ə], and [ɔ], while only three are actually back vowels, all exhibit tongue root retraction and constriction of the pharynx. This distinguishes them as a group from the "soft" vowels [æ], [ɪ], [jɪ], [ɘ], and [ʊɘ], which exhibit no tongue root retraction or constriction of the pharynx. In the production of "soft" vowels, the mass of the tongue is advanced forward slightly compared to the "hard" vowels. The "soft/hard" opposition in Kazakh depends not upon the horizontal tongue position, but rather upon the position of the tongue root and the concomitant widening or narrowing of the pharyngeal resonator. The feature of [+/-retracted tongue root] separates the Kazakh vowels into two opposing synharmonic classes: the "soft" vowels are [-retracted tongue root], the hard vowels [+retracted tongue root]. Lingual harmony in Kazakh is a type of tongue root harmony. It is not a type of palatal harmony, as commonly believed.

The feature of [+/-retracted tongue root] also correlates with acoustic data provided by Dzhunisbekov (1972:66). Acoustic measurements in the table below are given in hertz.

	Formant 1	Formant 2	Formant 3
<i>"hard" (tongue-root retracted) vowels</i>			
[ʊ]	300-500	900-1100	1200-1500
[ʊ]	500-700	850-1100	1400-1600
[ə]	400-500	1000-1200	1500-1700
[ɑ]	700-800	1000-1200	1500-2000
<i>"soft" (non-retracted) vowels</i>			
[ɘ]	300-400	1300-1500	1700-2000
[ʊɘ]	400-700	1400-1500	1800-2000
[æ]	500-800	1500-2000	2500-3000
[ɪ]	300-500	1700-2000	2300-2500
[jɪ]	300-500	1900-2100	2400-2800

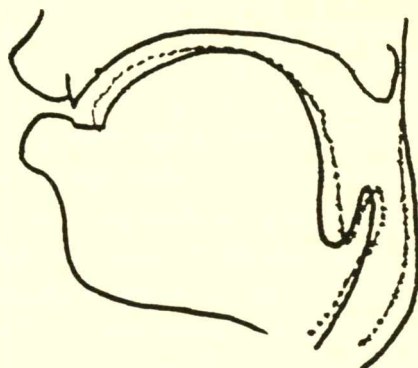
The vowels pronounced with a retracted tongue root--[ɑ], [ɤ], [ʊ], and [ɯ̹]--regardless of their other articulatory features, all show low values for F₂. The highest value, 1200, is reached by [ɑ] and [ɤ]. A low value for F₂ in Kazakh vowels, therefore, correlates with a narrowed pharyngeal resonator. Vowels lacking tongue root retraction all have second formants of 1400 or above, which demonstrates that a high value for F₂ correlates with a widened pharyngeal resonator. The horizontal tongue features of [+/-back] partly correlate with the feature of [+/-retracted tongue root], but cannot account entirely for the distribution of energy for F₂.

The following chart compares measurements for the first two acoustic formants of each of the nine Kazakh vowels (Dzhunisbekov 1972:70). Values for the first formant (shown in the chart by vertical arrangement) correlate with the jaw position. Values for the second formant (shown in the chart by horizontal arrangement) correlate with the tongue root position.



Tongue root harmony occurs in a few other language groups, most notably in West African and Mon-Khmer languages. Examining these occurrences provides insights into Kazakh. In African languages with tongue root harmony such as Abuan (Smith 1992:232), the opposition is one of [+/- advanced tongue root] rather than [+/- retracted tongue root], as in Kazakh. Both of these types of tongue root harmony correlate with differences in tongue height as well as in the size of the pharyngeal resonator. Tongue height plays no independent phonological role in Kazakh, being merely a reflex of the position of the tongue root, but it is observable nevertheless. The chart above illustrates that the tongue root retracted vowels of Kazakh are articulated with the tongue relatively lower in the mouth than their tongue root neutral ("soft") counterparts. The vowel [ʊ] for example, is lower than [u]; the same is true for [ə] vs. [ɪ], [wʊ] vs. [wɪ], and [ɑ] vs. [ɟɪ] or [ɶ]. The same correlation of tongue root position and vowel height has been noted in Even, a Tungus language spoken in Siberia (Ard 1981). In other Tungus languages, the tongue height has apparently replaced the tongue root position as the primary basis for vowel harmony. A natural correlation seems to exist across languages between tongue height and the tongue root position. That such a correlation is evident in Kazakh, as well, lends additional proof that the "hard" vs. "soft" distinction in Kazakh is based on tongue root position.

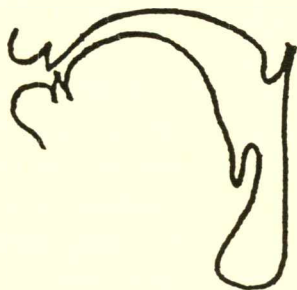
Another cross-language correlation exists between the tongue root position and the enlargement or constriction of the pharynx. Twi, an African language with vowel harmony, contains a set of vowels "in which the root of the tongue is drawn forward and the larynx is lowered, so that the part of the vocal tract in the pharynx is considerably enlarged," and another set of vowels "in which there is no advancement of the tongue root or lowering of the larynx" (Ladefoged 1982:206). Compare the size of the pharyngeal resonator in Ladefoged's depictions of Twi vowels with Dzhunisbekov's (1972:67) radiograms of Kazakh [ɟɪ], the vowel with the greatest tongue root advancement and Kazakh [ɑ], the vowel with the greatest tongue root retraction.



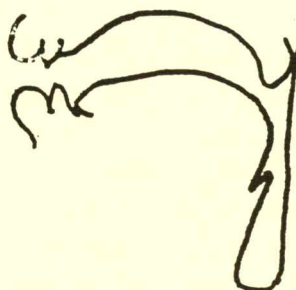
Twi [e] _____

Twi [i] - - - - -

In Twi, the advancement of the tongue root seems to be the dominant feature; vowels lacking this feature show only minor tongue root retraction and should be thought of as [-advanced tongue root]. In Kazakh, the feature of tongue root retraction is more marked than the feature of tongue advancement. Kazakh "soft" vowels, therefore, should be thought of as [-retracted tongue root], since the tongue root is not significantly advanced beyond neutral position.



Kazakh [ʃɪ̞],
second component



Kazakh [ɑ]

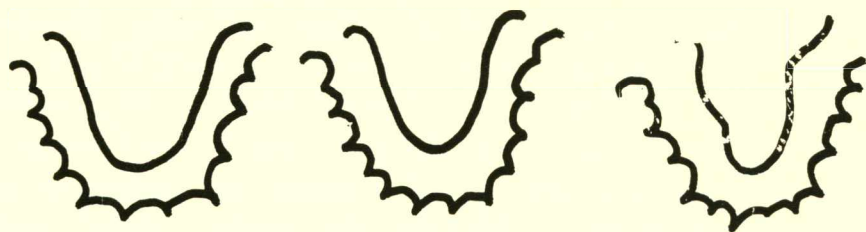
While it is obvious that the position of the tongue root must be taken into consideration in any discussion of Kazakh synharmony, the question arises as to what to call the retracted and non-retracted vowels of Kazakh. The terms "wide" and "narrow" suggested by Ladefoged (1982) to describe similar vowels in African languages cannot be used since Soviet linguists writing about Kazakh use the terms "wide" and "narrow" to describe vowel and jaw height. The Russian term *широкий*, "wide," corresponds to the more commonly used English terms "broad" or "open"

and usually refers to the vowels [ɑ], [ɶ], [ɯ], and [ɘ], which are somewhat longer acoustically than the other Kazakh vowels. The Russian term узкий, "narrow," which corresponds to the English term "close," refers to the Kazakh vowels [jɪ], [ɪ], [ə], [ʊ], and [ɘ], which are shorter acoustically and are subject to devoicing and reduction in unstressed syllables. Because the terms "wide" and "narrow" have a different meaning in the literature on Kazakh, it is best to retain the traditional terms "soft" (жуан) and "hard" (жіңішке) and simply give them an accurate definition with respect to Kazakh: "soft" vowels should be understood as [-retracted tongue root], "hard" vowels as [+retracted tongue root]. Although not done in the present article, the IPA diacritical mark [̠], which indicates tongue root retraction, should be written beneath Kazakh "hard" vowels: [ɑ̠], [ɶ̠], [ʊ̠], and [ɘ̠].

4. Synharmonic Variants of Consonants

Incorrect descriptions of the "soft/hard" opposition in Kazakh vowels also involve misconceptions about the phonetic nature of the "soft/hard" distinction in Kazakh consonants. Soviet linguists have assumed that Kazakh synharmony involves a distinction between palatalized and unpalatalized consonants. In Kazakh, however, the "soft" and "hard" consonantal variants occur because the feature [+/-retracted tongue root] is assimilated from the vowels. The feature of palatalization is only marginally involved.

True palatalization in consonants is produced by raising the front central portion of the tongue toward the palate, approximating the articulatory position of the glide [j]. Acoustically, the effect of palatalization is an increase, both in volume and intensity, of the upper formants. Consonants adjacent to Kazakh "soft" vowels exhibit these correlates of palatalization only before the vowel [jɪ]. Palatograms taken by Dzhunisbekov (1980:47-48) of Kazakh consonants pronounced before various "hard" and "soft" vowels reveal palatalization only before the vowel [jɪ].



[n] before [ə]

[n] before [ɪ]

[n] before [jɪ]

It is understandable that at least some degree of palatalization assimilation would occur before Kazakh [jɪ] since palatalization naturally occurs before [j] in many languages. The terms "palatalized" and "unpalatalized," indeed, have no place in Kazakh phonology except with regard to consonants preceding the vowel [jɪ]. The association of front vowels with palatalized consonants and back vowels with non-palatalized consonants plays no other role in Kazakh and has very little to do with synharmony.

Since only one of the "soft" vowels, [jɪ], actually causes palatalization of a preceding consonant, the tongue root position, which affects all consonants in a given word, plays a far more important role in Kazakh synharmony. In proximity to a tongue root advanced vowel, consonants are pronounced with the mass of the tongue relatively farther forward in the mouth, but not raised toward the palate as in the case of true palatalization. Consonants adjacent to a tongue root retracted vowel are compensatorily articulated farther back in the oral cavity. The effect is most noticeable in the production of back consonants, where the change in the point of articulation results in the opposition between the velars [k], [g], and [ŋ], which are relatively more advanced, and the uvulars [q], [ɢ], and [ʁ], which are relatively more retracted. The traditional explanation of Kazakh synharmony as palatalization by front vowels leaves unexplained why such different sounds as velars and uvulars should be synharmonic variants, while variants of the remaining consonants are much less striking. The

effect of tongue root retraction easily accounts for the distribution of velars and uvulars, since the position of the tongue root affects back consonants to a greater degree than consonants articulated at the front of the mouth. The "hard" consonants of Kazakh, including the uvulars [q], [ʁ], and [ŋ], are actually tongue root retracted, or pharyngealized consonants. The "soft" consonant variants, including the velars [k], [g], and [ŋ], are actually tongue root advanced, or non-pharyngealized consonants. Dzhunisbekov (1980:7) has shown that the consonant [j], which by definition is always palatalized, itself exhibits "hard" and "soft" variants--a fact that is illogical if "hardness" were understood as [-palatalization] rather than [+retracted tongue root]. In Kazakh, where tongue root retraction (along with lip rounding) provides the basis for synharmony, the "hard" consonants are phonologically marked and the "soft" consonants are unmarked. In Slavic languages, where palatalization before front vowels distinguishes "soft" from "hard" consonants, the "soft" consonants are the marked members of the opposition.

The synharmonic variants of consonants are given special transcription symbols in the examples below, although elsewhere in this article only the velars and uvulars have been specially marked. Consonants pronounced with assimilatory lip rounding are marked with a superscript [°], and "hard" consonants are underlined. Remember that these features for consonants are completely predictable based on their vocalic environment. Palatalization of consonants before [jɪ], another redundant phonetic feature, is marked with a subscript [,].

- 1.) "Hard" [+tongue root retracted], unrounded (a [a], or ы [ə]): қызыл [qəzə[°]], red; таныстық [tənəstəq], acquaintance; қабырға [qəbərɤa], rib.

2.) "Soft" [-tongue root retracted], unrounded (e [j̣ɪ̣], ə [ɤ̣], or i [ɪ̣]): кемпір [kɛj̣ɪ̣mpɪṛ], *old woman*; тілшілер [tɪ̣ɪ̣lʃɪ̣lʃɪ̣ṛ], *linguists*; әдемі [ɤ̣ɤ̣dɛj̣ɪ̣mɪ̣], *beautiful*.

3.) "Hard" [+tongue root retracted], rounded (ʏ [ʊ], o [wʊ], or a [ɑ]): құлын [qʊlɪ̣ṇ], *colt*; құрылған [qʊrɪ̣lɣaṇ], *established*; ондұқтың [wʊṇdʊqʊtʊṇ], *group of ten*.

4.) "Soft" [-tongue root retracted], rounded (ү [ʉ], ө [wʉ], or ә [ɤ̣]): күміс [kʉmɪ̣ṣ], *silver*; өмір [wʉmɪ̣ṛ], *fate*; өнер [wʉṇɛ̣ṛ], *art*; күндерде [kʉṇḍɛ̣ṛḍɛ̣wʉ], *in these days*.

As a phonological process, synharmony greatly restricts the possibilities for phonetic diversity within Kazakh syllables and words. Each syllable is uniformly "hard," "soft," rounded, or unrounded. Since it is the syllable-initial vowel that sets the synharmonic tone for each word, contrasts involving all nine Kazakh vowels are only possible in initial syllables. Replacing the initial vowel alters the phonetic shape of every sound in the word: тыс [tɤ̣ṣ], *outside, besides*; тіс [tɪ̣ṣ], *tooth*; түс [tʊ̣ṣ], *side, time*; and түс [tʉ̣ṣ], *dream, noon, color (of a horse)*. Because of synharmony, entire syllables, rather than individual sounds, function as contrastive phonological units.

5. Synharmony and Stress in Kazakh

In Kazakh, synharmony gives definition to words as phonological units. In many European languages, the placement of stress defines words as units in much the same way. In a language with dynamic word stress, each word has its own stress, and a change in the place of stress usually alters the meaning of the word, such as in the Russian word *дома* [dɔ́mə], *at home*, vs. [dʌmá], *houses*; or English *récord* and *recórd*. Occasionally, stress alternations produce synonyms, as with the Russian word *творог* [tvóɾək/tʌɾók], *cottage cheese*, which can be pronounced with the stress on either syllable with no change in

meaning. Synharmonic alternations in Kazakh also occasionally produce synonyms rather than words with new meanings, such as **ажым** [ɑʒəɲ] and **әжим** [əʒɪɲ], both of which mean *wrinkle*. Synharmony in Kazakh functions in much the same way as word stress in European languages.

Dzhunisbekov (1980, 1987) has demonstrated that Kazakh and other Turkic languages have rhythmic, or phrasal stress rather than word stress, as commonly believed. Rather than being a property of each individual word, the rhythmic stress of Kazakh marks off syntactically relevant segments of the sentence. Depending upon the meaning of the sentence as a whole, a Kazakh word might have no stress at all. The vowels in unstressed syllables do not differ in quality from stressed vowels. However, unstressed vowels are much shorter than stressed vowels: the low vowels [ɑ] and [ɶ] reduce by more than 50%, and the mid-high vowels [ɪ], [ə], [ʊ], and [ʊ] reduce almost to the point of elision. Unstressed syllables may elide completely when words in a phrasal group are merged together in speech. If two vowels meet over a word boundary, the unstressed vowel tends to disappear: **торы ат** [tʊɾɑ́t], *bay horse*. Such strong reduction of unstressed vowels is widespread among all Central Asian languages with synharmony (Shcherbak 1970:58). Dzhunisbekov believes that because synharmony and word stress both serve essentially the same purpose, the presence of one excludes the presence of the other in the same language. In other words, the presence of synharmony in Kazakh allows stress to operate on a syntactic rather than a lexical level.

Scholars have traditionally asserted the existence of syllable-final word stress in Kazakh. This analysis, however, cannot explain the existence of many words in Kazakh with stress on a non-final syllable and words that lack stress entirely. If all words were end stressed, the final vowel in the first word of a phrase like **торы ат** [tʊɾɑ́t], *bay horse*, would not be expected to elide. Recognizing that stress is the property of the phrase rather than of the word explains why stress is not on the final syllable of every word. In a Kazakh sentence, the presence

or absence of stress does not alter lexical meaning, but instead alters the grammatical relationship between words, often changing the meaning of the entire utterance, as in the following example cited by Dzhunisbekov (1980:65): **Ат қора маңында жүр** [at qɔɾa maɳanda ʒʊr]. If the first word, [at], *horse*, receives its own stress, the sentence means *The horse is by the stable*. If the first word is treated as part of the phrase *by the stable*, the sentence has no surface subject and means *Someone is by the (horse) stable*. Notice that the lexical meaning of the word [at], *horse*, remains unchanged regardless of the presence or absence of stress; what changes is its syntactic role in the sentence. Stress in Kazakh does not distinguish one lexical item from another but rather divides words into syntactic units called rhythmic groups. Each rhythmic group has one stress, regardless of how many words it contains. The stress falls on the final syllable of the rhythmic group. A word pronounced in isolation is equivalent to a rhythmic group and receives its own stress, giving rise to the popular misconception that Turkic languages have final-syllable word stress.

The syntactic role of stress in Kazakh can also explain why certain words pronounced in isolation are not end-stressed. Because certain suffixes denote predication, words in Kazakh may function as complete sentences, the subject and predicate as two parts of a single word. In such word-sentences, it is the last syllable of the predicate, not the subject, that receives the rhythmic stress. This explains the placement of stress in the following words and many more like them: **баласыз** [baɭasɔ́z], *your child*, and **баласыз** [baɭasɔz], *You are a child*; **алма** [almá], *apple*, and **алма** [alma], *Don't take*. Kazakh stress serves to define syntactically meaningful units within single words just as it does within phrases and sentences.

The following sentence, cited by Dzhunisbekov (1987), provides a final example of the syntactic role of Kazakh stress: **Қонақтардың аттарына шөп сал** [qɔɳaqtardəŋ at:arəna ʃɔp sal], *Give the guests' horses hay*. The stress

on the word **ат-таp-ы-на** (to) *their horses*, can fall on any of the last three syllables. In each case the stress imparts a specific nuance of meaning. Stress on the syllable **таp** (the plural morpheme) means *Give hay to all the horses, not just to one*. Stress on the syllable **ы** (the possessive morpheme *their*) means *Give hay to the guests' horses, not to anyone else's*. And stress on the final syllable **на** (the case ending) means *Give the hay to the horses. Don't just put it anywhere*. A change in the position of the stress does not alter the meaning of the individual words in the sentence; instead, the meaning of the entire sentence is changed.

Although synharmony does not operate across word boundaries, it interacts with the prosodic system of Kazakh by allowing stress to assume a predominantly syntactic role in the language. Languages with synharmony have rhythmic stress; they differ fundamentally from both stress/intonation languages and tone languages.

IV. Summary and Comments

Synharmony is clearly the dominant feature of Kazakh phonology, even interacting with morphology and syntax. Synharmony rigidly defines the sound shape of words and syllables, and little about Kazakh can be fully understood without a complete understanding of every aspect of synharmony. It dictates the sound shape of Kazakh suffixes and affects word building in other ways as well. An understanding of synharmony also provides a solution to a difficult problem in Kazakh orthoepy by rendering a key to pronouncing the diphthong letters **и**, **у**, and **ю**. Finally, the role played by synharmony in the lexicon permits stress to assume a predominantly syntactic function in Kazakh, similar to the function of intonation in European languages. The interdependence of phrasal stress and synharmony distinguishes Kazakh and other Central Asian languages typologically from other languages of Europe and Asia.

The present article has shown that the phonetic basis for the main component of synharmony--the "soft/hard" opposition--is not the horizontal position of the tongue, as previously believed. Phonetic measurements of Kazakh

consonants and vowels support the view that synharmony in Kazakh depends upon the tongue root position, not upon the horizontal position of the tongue. This conclusion counters the long held assumption that "no matter how different the vowel harmony is in various Turkic languages, one feature is present in all of them, namely, the opposition of back vs. front vowels" (Poppe 1965:182). Historically, tongue root position in Kazakh is no doubt connected with horizontal tongue position. However, the development of central vowels in modern Kazakh has led to a partial neutralization of the original Turkic opposition between front and back, leaving the concomitant opposition of advanced vs. retracted tongue root as the primary phonetic basis for synharmony.

The tongue root position is known to be phonologically relevant in only a few linguistic areas: certain languages of West Africa, the Mon-Khmer languages of Southeast Asia, and one Tungusic language of Siberia; we now know that the tongue root position also plays a major phonological role in at least one Turkic language: Kazakh. Although many other Turkic languages contain both velars and uvulars, and uvulars show at least some degree of tongue root retraction, the feature [+/-retracted tongue root] is phonologically redundant in the presence of a clearly defined opposition of front and back vowels. Careful phonetic study should be undertaken to determine whether lingual harmony in other modern Central Asian languages involves only the horizontal tongue position, as the textbooks say, or has evolved into a system based upon the tongue root position, as is the case in modern Kazakh.

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