LING 453a—Experimental Phonetics

Root Vowels and Affix Vowels: Height Effects in Kyrgyz Vowel Harmony

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1 Overview

1.1 Question

The primary goals of this experiment are to (1) determine whether a vowel harmonised with a "high" vowel in Kyrgyz is any different from the same vowel harmonised with a "low" vowel, and (2), more generally, to determine whether there is a difference between root vowels and affix vowels. A secondary goal of this experiment is simply to determine the relative acoustic properties of Kyrgyz vowels, an important problem that should be addressed for this and future acoustic studies of Kyrgyz.

1.2 Background

Kyrgyz, a Turkic language of Central Asia, is generally considered to have the following vowel phonemes: /i/, /iː/, /y/, /yː/, /e/, /eː/, /œ/, /œː/, /ɑ/, /ɑː/, /o/, /oː/, /ɯ/, /ɯː/, /u/, /uː/.[1] In addition, there ap-

[1] By Turcologists often written as i, ii, ü, üü, e, ee, ö, öö, a, aa, o, oo, ı, ıı, u, uu.

pears to be an /a/ phoneme,[2] though its status as distinct from /ɑ/ in most dialects is questionable.[3]

Ignoring long vowels (this will be discussed later), the vowel phonemes of Kyrgyz are generally assumed to fall in a vowel chart roughly as indicated in table 1.

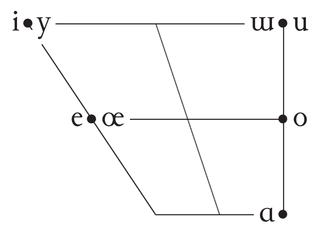

Table 1: Traditionally assumed vowel inventory of Kyrgyz

Kyrgyz exhibits both front/back and rounding progressive vowel harmony. In front/back harmony, the /a/ phoneme alternates with /e/, and /o/ alternates /œ/. In rounding harmony, /e/ rounds to /œ/, and /a/ rounds to /o/ (though only after /o/, and not after /u/, as demonstrated in table 2). While these four vowels form a phonological quartet (i.e., the height of /a/ and /o/ are considered to be the same) which could be described with three binary features (e.g., ±back, ±low, and ±round), the generally assumed phonetic properties of the vowels are not so binarily divisible.

The problem discussed above gives reason to investigate the phonetic properties of Kyrgyz vowels, and while the measurements taken here could be useful to a phonetic analysis of the rounding harmony system or for making theoretical claims about the feature system of vowels in Kyrgyz, those are not the focus of this study.

The issue of why /u/ doesn't round /a/ has been the basis of some literature, and is considered in typologies of rounding harmony. Washington (2006a) appeals for a phonetic study of the vowel system of Kyrgyz to determine whether the system more closely resembles the generally assumed phonetic

[2] Written in Turcology literature as /ä/.

[3] Because of this, /a/ is not considered in this paper, and /ɑ/ will be written as /a/ in this paper.

stem	-(s)I	-LAr
-i	-i-si	-i-ler
-y	-y-sy	-y-lœr
-e	-e-si	-e-ler
-œ	-œ-sy	-œ-lœr
-a	-a-sɯ	-a-lar
-o	-o-su	-o-lor
-ɯ	-ɯ-sɯ	-ɯ-lar
-u	-u-su	-u-lar

Table 2: Rounding of /I/ and /A/—morphemes `-(s)I` and `-LAr`

system (where all non-high vowels are mid except for /a/), or the generally assumed phonological system (where all non-high vowels are low).

Additionally, and of relevance to the primary interests of this experiment, only two of the three phonological dimensions of the vowels (that is, ±back and ±round, but not ±high) have a phonological effect on the following vowel. This study is primarily interested in whether there is a phonetic effect of height.

2 Hypotheses

As mentioned above, there are two primary questions which this study will attempt to answer:

1. Is a vowel in Kyrgyz which is harmonised with a high vowel any different from the same vowel when harmonised with a low vowel?

2. Is there a difference in quality between vowels in word roots in Kyrgyz and those in affixes?

The two questions—which are looking for height effects and morphological effects, respectively—are difficult to separate. First of all, the question on morphological effect really doesn't answer anything else; that is, if a difference in vowel quality between roots and affixes is found, it is unknown as to whether it's due to differences in stress,[4] syllabic structure, harmonising vowel, morpheme type, or any number of other factors.

In this case, an attempt will be made to control for everything but the preceding harmonising vowel; however, the cause can still not be known for sure. If effects of the height of the preceding vowel are found, then it actually further complicates the question of whether there is an intrinsic difference in vowel quality of root morphemes and affix morphemes, since it adds a variable identified to have known effects. Because of this, and the general nature of this second question, the question of height effects is of primary interest, and the question of morphological effects will be discussed, but cannot be answered by this paper. Perhaps the findings of this study along those lines will be useful to a future study that attempts to answer this question.

That said, what is actually being looked for is whether there is a measurable and consistent difference between vowels which follow a high vowel and vowels which follow a low vowel. This can be stated as conditions to test for:

H1 If the average vowel space for a given vowel in an affix is different when following a high vowel and when following a non-high vowel, and there is some consistency to this difference for all vowels, then it can be said that the height of the harmonising vowel has some effect on the quality of the vowel following it, and that quality difference may then be quantified.

H0 If the average vowel space for a vowel following a high vowels and that of the same vowel following

[4] While the present study assumes that stress could affect not just vowel quality, but could also play a role in how vowel quality is affected (e.g., stressed vowels could be more affected by adjacent vowels than unstressed vowels), a study on coärticulation in Turkish (Inkelas *et al.*, 2001) found that stress did not play a role in coärticulation effects seen for /a/.

a low vowel do not differ consistently, then it cannot be said that the height of the harmonising vowel has an effect on the quality of the vowel following it, and the difference is either due to outside variables or to the variable range of the harmonised vowels in question.

3 Experiment Design

For this study, a wordlist was compiled for elicitation. The wordlist was designed in an attempt to control for factors such as stress and prosody differences, voicing differences, and adjacent consonants produced in varying places in the mouth—all of which can have an effect on aspects of vowel quality. The grammatical category was also controlled for—just in case it also has an affect (such as on the "tightness" or "boundness to the root" of the types of morphemes it takes)—unlike in Preston Bulyko (2002)'s similar experiment for Turkish.

The roots comprising the wordlist were all in the form of /CVz/, where /C/ varied as needed to find an appropriate word, but was limited to dental sounds (only /s/ and /t/, in this case) and post alveolars (only /ʤ/ in this case),[5] and /V/ varied to all phonemic vowels of Kyrgyz.[6]

Because the monophthongal long vowels in Kyrgyz historically all derive from diphthongs (which in turn historically derive from /Vb/ and /Vɡ/ combinations)[7]—not to mention the fact that in some dialects they still behave phonetically and phonologically as diphthongs (Somfai Kara, 2003, 10)—they have somewhat limited distribution and cannot be said to be in completely free alternation with their

[5]There was one unfortunate exception, which is the word /boz/. Other /Coz/ roots in Kyrgyz were verb stems, and one noun stem that I found in a dictionary was unknown to my informant, so I was forced to change it. The word /boz/ isn't a word that will be found in a dictionary, though; it apparently is a back formation from /bozor/.

[6]With the exception, of course, of the front /a/—which may be due to semi-regular regressive vowel harmony, and so occurs only in first syllables—and also long vowels, whose status as distinct phonemes, while generally accepted, is not new enough in the language for there to be very many minimal pairs, or words in the form this study was interested in.

[7]Somfai Kara (2003, 10)

short vowel counterparts. This caused woe in the construction of a wordlist for this experiment, and consequently long vowels were ignored.

Only noun roots were chosen, to control for effects of grammatical category, and so that the suffixes used could be consistent.[8] To these roots were added two suffixes: the accusative suffix /-NI/ (where /N/ becomes /d/ after voiced non-vowels—including after the final /z/ of the selected roots, and /I/ is harmonised among the high vowels: /i/, /y/, /ɯ/, and /u/), and the locative suffix /-dA/ (where /A/ varies harmonically between the non-high vowels: /e/, /œ/, /a/, and /o/). The wordlist of 8 words, combined with the 2 suffixes, yielded the following 16 forms: /sizdi/, /sizde/, /ʤyzdy/, /ʤyzdœ/, /ʤezdi/, /ʤezde/, /sœzdy/, /sœzdœ/, /sazdɯ/, /sazda/, /bozdu/, /bozdo/, /sɯzdɯ/, /sɯzda/, /tuzdu/, and /tuzda/.

Natural, easy-to-understand sentences were constructed around these forms, which should elicit a slightly less formal register than Preston Bulyko (2002, 10-11)'s "Ahmet said ____" sentences. Prosody was controlled for by making sure the word in question was the first word of a finite phrase, which was preceded by a subjectless clause having the rough meaning of "(While/when) doing...," or "Having done...,", ending in a vowel, and typically exhibiting rising intonation at the end. The following word was chosen to start with a consonant from the same pool as the ones which were chosen to begin the word roots (in this case, only /s/, /t/, /ʤ/, and /ʧ/ were used).

See the appendix A for a list of sentences elicited.

[8] There was one exception to this: the word /siz/ is not a noun, but a pronoun—a 2nd person formal personal pronoun, to be exact. What effects this might have on the experiment are unknown.

4 Procedure

4.1 Elicitation process

The constructed sentences for elicitation were randomised with five repetitions. Nine filler sentences were also added, also with five repetitions each. These filled 13 pages using a sans-serif 18-point font. There were an additional four sentences on each page—two at the beginning and two at the end—which were randomly drawn from the nine filler sentences and used as padding.

One native and well-educated speaker of Kyrgyz[9] read all of the pages in the sound booth in the phonetics lab at the University of Washington.[10] This was recorded with a 44.1kHz sampling rate, 16-bit bitrate, and monophonic sound. It was later segmented into files containing the audio for each page, and since the experiment is concerned only with vowels, those files were downsampled to 11.025kHz, the Nyquist frequency of which is a little more than 5500Hz—near the ceiling of where vowel formants are generally found.

4.2 Measurements

When measuring vowels, the first and last occurrence of each word was ignored, and the middle three occurrences were measured using Praat. For each word from the wordlist, pitch and formant measurements were taken for both vowels—that in the root, and that in the affix. An approximate midpoint of intensity for each vowel was identified using the waveform display and intensity contour as guides. A script was used to select 20ms of the vowel around that (10ms before and 10ms after)

[9]At this point, I'd like to acknowledge Elmira Köchümqulova—who doesn't mind having her name associated with the data—and thank her for her help coming up with with the final sentences and her time spent in the recording booth.

[10]Ideally, data would've been elicited from more informants, and none of the informants would have had any contact with the wordlist prior to the recording session.

and take the average values for F0, F1, F2, and F3 across that time. Only F1 and F2 were necessary for this experiment, but extra measurements were taken at little extra cost in case further information was desired later.

Several problems were encountered during this process. Affix vowels averaged around 50ms long, though some were as short as 35ms. This makes it almost impossible to avoid effects from surrounding consonants, some of which were post-alveolars, which exhibited strong transition effects. Because the vowels were so short, the 20ms window length was decided to be the best trade-off between length (ideally, I would've wanted about 50ms of the vowel to measure) and "pureness" of the vowel—even the 20ms midpoint of most affix vowels showed prominent signs of being affected by adjacent consonants.

Some vowels—especially high vowels between voiceless sounds in the word roots[11]—were somewhat devoiced, sometimes to the point that only 20ms could be identified as being a vowel, and even that was quiet. The informant had read many of the pages twice, so in cases like this, the data point was taken from the other page, which was never the first or last occurrence of the word. Also, when the visual intensity cues resulted in a vowel's midpoint that obviously included some of one of the surrounding consonant (and not just formant transitions, which was basically impossible to avoid), the midpoint was shifted away from that edge as far as needed, though as little as possible. In all of these cases, there was plenty of vowel after the intensity peak, so it's unlikely that this introduced any bad measurements.

Often the /z/ at the end of the root of a word would become an approximant (in all the measured data, only one or two /z/s that actually looked like fricatives were noted), and the following /d/ did not

[11] My informant's dialect apparently exhibits some sort of devoicing, either word-finally, stem-finally, or syllable-finally. This is a known phenomenon in some dialects, but I'm unable to determine much about its dialectal distribution from the literature.

show signs of full closure. This created what appeared to be a long vowel or diphthong, consisting of the root vowel followed by the approximantised /z/,[12] which either had two peaks of intensity or a gradual fall-off before the /d/. At times it was difficult to know where the vowel ended and the approximant began, but sticking to the method of measuring from the first intensity peak seemed accurate for the most part.

For some vowels—particularly after /s/, with a potential tendency among high vowels as well, but sometimes with low vowels or in the affix (where there was no /s/) as well—the formants were wildly misidentified by the formant tracker. For these data points, the formant tracker was set to identify 4 formants instead of the normal 5. The values were then inspected by hand; if the the LPC estimation seemed correct, the values it returned were used instead of the hand-gathered values.[13] This can be justified in that an LPC calculation is much more consistent and reliable—and hence more desirable—than a reading drawn from a mouse click on an FFT readout, where the resolution of potential data points is limited by the dimensions of the window and other such factors.

In the end, all the default settings in Praat were generally used, with only a few modifications—e.g., the Pitch tracker was set to look between 100 and 300Hz (which made it easier to quickly identify the word to measure in given sentence of data), the dynamic range of the spectrogram was set to 85dB (since either the informant read quietly, or the microphone was too far from her), and as discussed, the formant tracker's LPC settings were adjusted to look for only 4 formants at times. The only setting which wasn't consistent for all measurements was the LPC setting.

[12]This diphthong would then have falling pitch. The drop in pitch was consistently observed throughout the data, and was rarely less than 20Hz. It was even observed in the unusually short devoiced vowels, one time dropping about 30Hz in 20ms! Richard Wright (personal communication, 04 December, 2006) suggested the possibility that this is a sign of tonogenesis in Kyrgyz.

[13]This was the case 100% of the time.

5 Findings

The following graphs depict vowels plotted along axes of F1 and F2. The "space" that each vowel takes up is shown by an oval. These ovals have as their midpoint the mean F1×F2; their tilt is determined by a best squares fit "line estimate" through all the datapoints, and the a and b radii of the ovals are calculations of the standard deviation of F1 and F2 when rotated back to the origin of the ellipse.[14]

Figure 1 presents the vowel space of root vowels in the data measured. Phonologically back vowels can easily be separated from front vowels along F2, and exhibit what might be identified as a significant height distinction along F1 between the pairs which differ phonologically only in height (the average /ɯ/ is 334.58Hz higher than the average /a/, and the average /u/ is 154.90Hz higher than the average /o/)—although it is also interesting to note that the back round vowels are slightly higher than their non-round counterparts, especially /o/ as compared to /a/ (by 233.50Hz along F1). The difference between /a/ and /o/ in backness is also much greater than that between /ɯ/ and /u/ (by 183.96Hz along F2).

The front vowels, however, show little height distinction, with a 69.40Hz difference between the mean F1s of /y/ and /œ/ and a 13.69Hz difference between the mean F1s of /i/ and /e/; they vary almost exclusively along F2, with a difference of 218.77Hz between the mean F2s of /y/ and /œ/ and a 360.23Hz difference between the mean F2s of /i/ and /e/. Rounded vowels are consistently further back—the difference between the mean F2 of non-round vowels and that of round vowels is 351.70Hz. It is interesting to note that /i/ is barely higher than /e/ (by only 13.69Hz, as noted), and is much further back (by 360.23Hz).

[14]I'd like to acknowledge and thank Alex Amann, Christian Thalmann, Tristan McLeay, and Paul Washington for time spent assisting me with different aspects of plotting these ovals. I really need to take stats. And I should probably brush

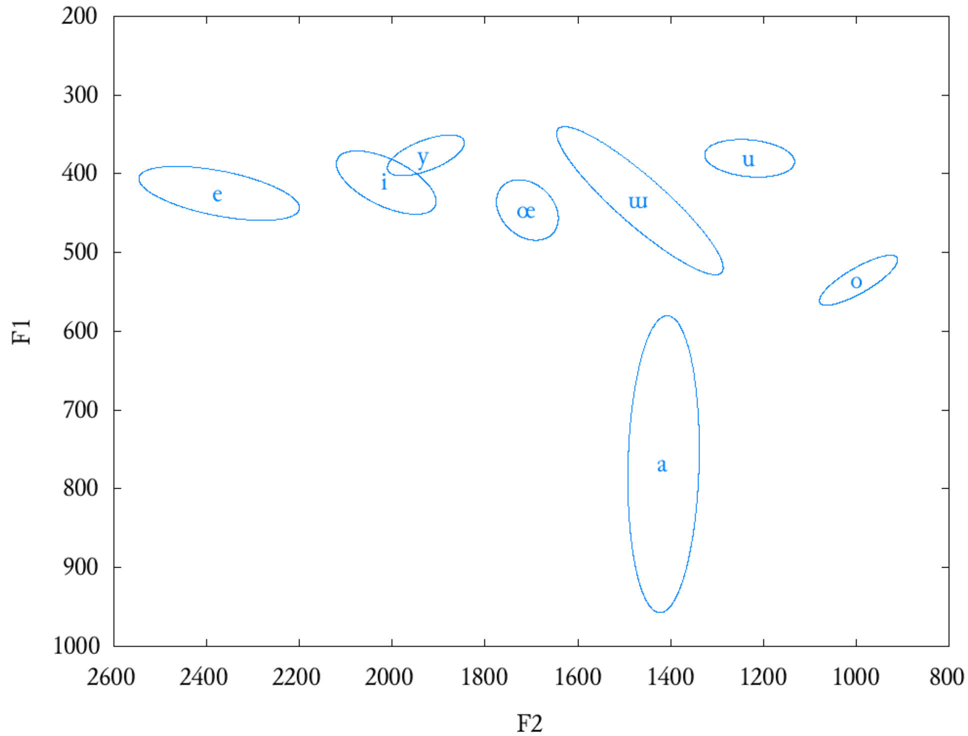

Figure 1: The vowel space of vowels found in roots

Figure 2 presents the vowel space of affix vowels in the data measured, plotted along the same coördinate window as root vowels were in figure 1. Grouped together, the midpoints of all the front vowels and the midpoints of all the back vowels form fairly even four-point boxes. Parallelograms of different shapes are formed along the other two phonological dimensions as well: high and non-high vowels grouped separately, and rounded and unrounded vowels grouped separately. If each vowel is attached by a line to the vowels it varies with along each of the three phonological dimensions, a two-dimensional representation of the common three-dimensional cube representation of Turkish vowels is produced.

As noted in figure 1, all rounded vowels are further back than their unrounded counterparts. Unlike in figure 1, height distinctions between front vowels are present and clear in F1 (84.68Hz difference between average /i/ and /e/, 114.87Hz between /y/ and /œ/) and vowels of the same roundness hardly differ in F2; however, this vowel space is much more compressed in both dimensions than that for root vowels—that is, all vowels appear somewhat centralised: the span between the mean F1s of /y/ and /a/ is 279.88Hz, as opposed to 392.10Hz for the aforementioned root vowels, and the span in between the mean F2s of /i/ and /o/ is 766.52Hz as opposed to 1378.34Hz between /e/ and /o/ for root vowels. It's interesting to note that the space for the vowel /ɯ/ overlaps with all other vowels' spaces, except for that of /a/. A trend seen some in figure 1 is present here as well—that round vowels are slightly higher than their unrounded counterparts, especially /o/ as compared with /a/, which shows a 91.76Hz difference in F1.

Figure 3 shows two vowel spaces for unrounded vowels: one for unrounded vowels after high vowels, and another for unrounded vowels after non-high vowels. The vowel spaces are fairly different,

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up on my trig.

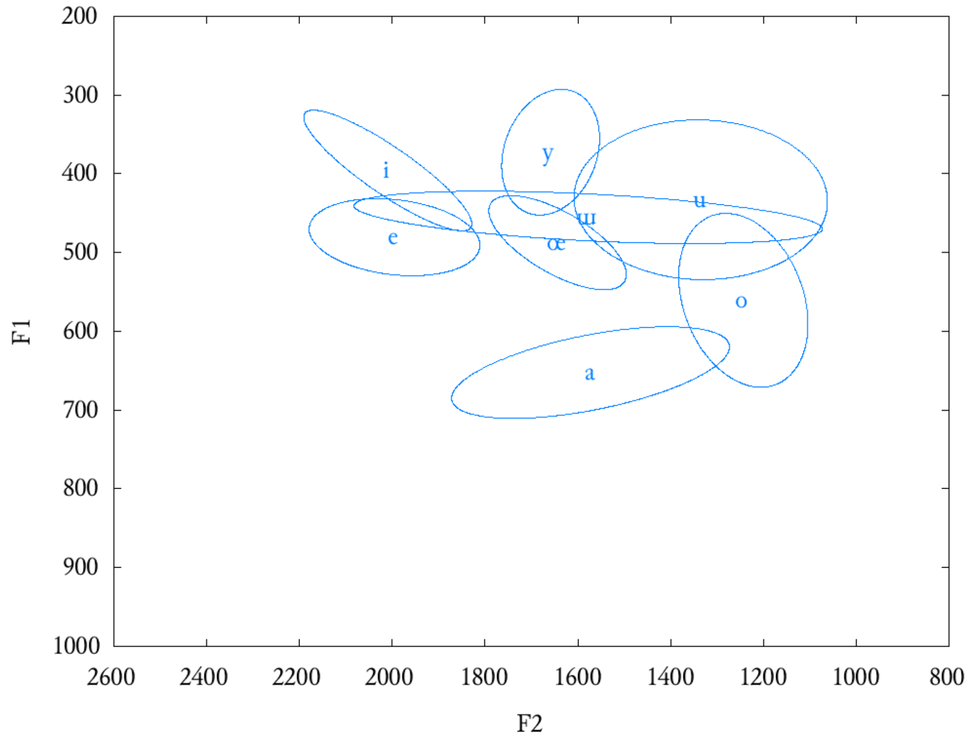

Figure 2: The vowel space of vowels found in affixes

but there doesn't seem to be a consistent pattern to the differences, except possibly that besides /ɯ/, the vowels are more centralised after non-high vowels, or that except /e/, the vowels are all slightly lower after non-high vowels. Since /a/ is unrounded, but half the data points that went into the plot are after a rounded vowel (/u/), it should be mentioned that no significant difference seemed to exist between the F1×F2 vowel spaces for /a/ after /u/ and /a/ after /ɯ/, so they were treated identically as high vowels and merged in this graph.

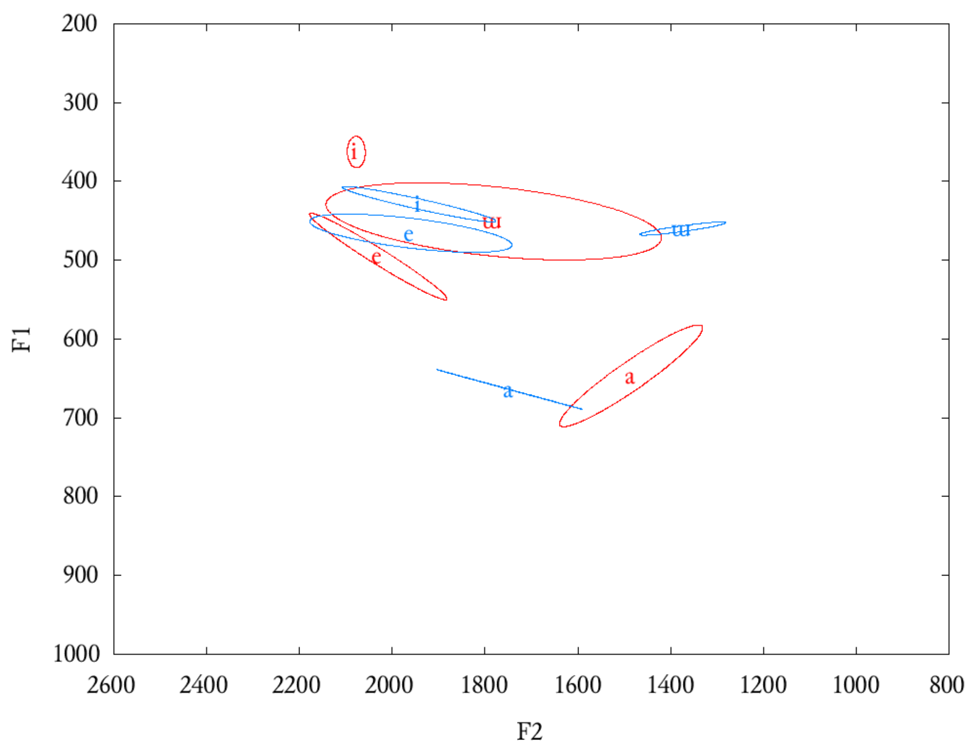

Figure 3: The vowel space of unrounded affix vowels harmonised with high vowels (red), and non-high vowels (blue)

Figure 4 shows two vowel spaces for rounded vowels: one for rounded vowels after high vowels, and one for rounded vowels after non-high vowels. There are no tokens for /o/ after a high vowel—and hence no plot of it—because of the asymmetry of the vowel system mentioned in section 1.2. For the remaining vowels, there seems to be a strong trend towards rounded vowels being higher after a high vowel than after a non-high vowel: /y/ harmonised with a high vowel has a 72.35Hz lower F1 than when harmonised with a non-high vowel, /œ/ differs by 51.63Hz, and /u/ differs by 57.66Hz.

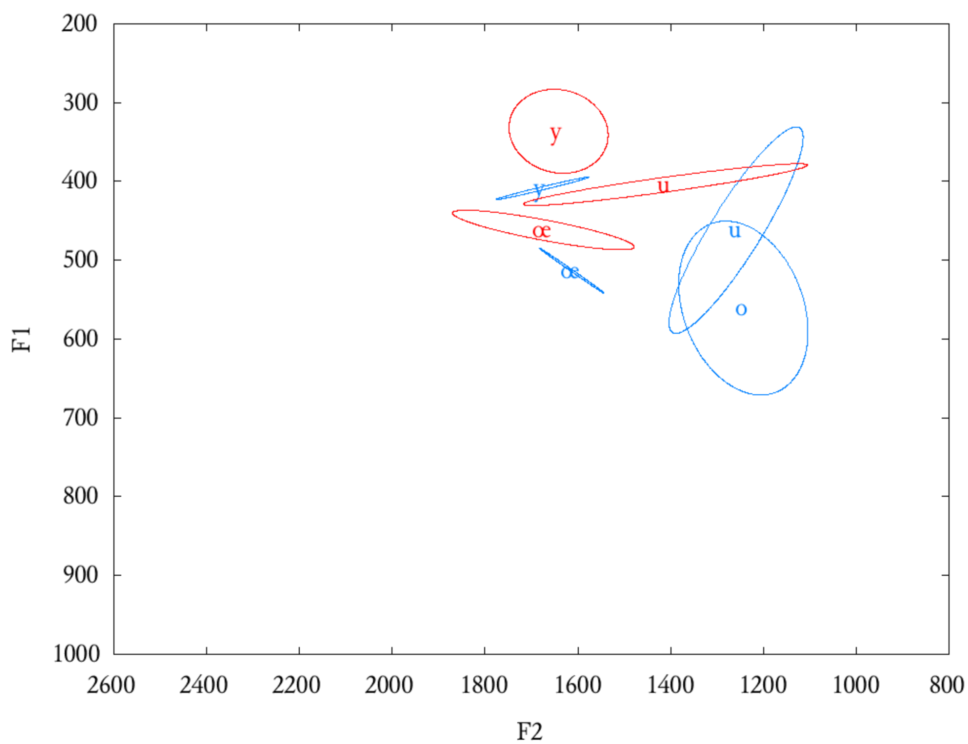

Figure 4: The vowel space of rounded affix vowels harmonised with high vowels (red), and non-high vowels (blue)

6 Conclusions

6.1 Asymmetry

One of the purposes for gathering this data, though not part of this experiment, was to determine what the vowel space of Kyrgyz was like, so that the phonetic and phonological aspects of Kyrgyz vowels could be compared. The primary phenomenon in mind was the asymmetry of the vowel harmony system (that /a/ doesn't round after /u/), and the supposed phonetic asymmetry (that /a/ is low, and other non-high vowels aren't). The findings of this study may support the idea that phonetically, /a/ is much lower than /o/, its phonetically round counterpart, though it may also be stated that most unrounded vowels are slightly lower than their rounded counterparts in the data presented. At this time, no claim is being made as to whether there is a correlation between the phonological asymmetry of /a/ and the apparent phonetic asymmetry of /a/, but this is certainly an area requiring further investigation and experiments better geared towards it.

6.2 Morphological Effects

A glance at figures 1 and 2 shows how different vowels in monosyllabic noun stems are from the vowels in their suffixes. However, the cause of this is still a mystery, and was not something that this experiment was able to determine. The most likely cause is stress. It has been argued that Kyrgyz has two different kinds of stress in a word, due to two heads for stress: the first syllable, and the last syllable Washington (2006b). In this experiment, roots were the first syllable and the affixes were the last syllable; each would have received a different type of stress (which, unfortunately, was not measured). If this is the case, these had different effects on the vowel space. In roots, the variation in height of non-low vowels is compressed significantly from what would be expected, and high vowels—especially /i/—are quite centralised. In affixes, the entire vowel space is more compressed, but looks more like either a typical phonetic or phonological vowel space. Perhaps these are both forms of reduction due to lack of different kinds of stress. This, like the problem of asymmetry discussed above, is something that a more appropriate experiment could be designed to measure.

6.3 Height Effect

The primary question of this experiment was whether the height of a root vowel could phonetically affect the height of an affix vowel, which is phonologically harmonised to it in the dimensions of ±round and ±back. H1 was stated such that if a consistent pattern of height difference is found for all vowels, then some effect of vowel height can be posited and quantified. While there wasn't one consistent effect on all vowels, it seems that round vowels (in this case, only three of the eight vowels of the language) are consistently higher after a preceding high vowel than after a preceding non-high vowel, as measured by an average difference in F1 of 60.55Hz. It would seem that /i/ also fits this trend, but it cannot be generalised that all front vowels do, or that all high vowels do, and certainly not that all unrounded vowels do; not fitting any pattern, this fact might as well be chance. One shortcoming of this experiment is seen here: only three data points were used to compute most of the ovals in figures 3 and 4. A future experiment would ideally record multiple speakers and the datasets would be treated together, or divided along variables such as sex and dialect to control for them.

Assuming there is a trend for a height effect on round vowels, then one might follow Inkelas *et al.* (2001)'s conclusion for /a/ in Turkish (that regressive harmony is potentially coming into the language), and posit that height harmony may be entering Kyrgyz, at least for round vowels. Further laboratory studies with more breadth should certainly be conducted to verify this trend, and more theoretical studies may look into the implications of or reasons for this effect.

A Elicited sentences

The 16 elicited sentences from which data was drawn are included here.

(#) phonemic IPA transcription, with measured word underlined
morphemic breakdown
native Kyrgyz orthography, with measured word underlined
English translation

The sentences are formatted as above.

(1) yj–gœ kel–gen–de, siz–di sejrek kœr–œ–byz
home–DAT come–GER–LOC you.FORM–ACC rarely see–PRES–1st.SG
Үйгө келгенде, сизди сейрек көрөбүз.
"Coming home, we rarely see you."

(2) ɯrda–p ʤat–qan–da, siz–de ʤaqʃɯ sezim bol–o–t
sing–PART PROG–GER–LOC, you.FORM–LOC good feeling be–PRES–3rd.SG
Ырдап жатканда, сизде жакшы сезим болот.
"While singing, you'll have good feelings."

(3) kyzgy–gœ qara–ʁan–da, ʤyz–dy suː menen ʤuː–du
mirror–DAT look–GER–LOC, face–ACC water with wash–PAST
Күзгүгө караганда, жүздү суу менен жууду.
"While looking in the mirror, [s/he] washed [his/her] face with water."

(4) beʃ–barmaq ʤe–gen–de, ʤyz–dœ saqal maj–la–n–ɯʃ–a–t
five–finger eat–GER–LOC, face–LOC beard grease–VERB–PASS–REC–PRES–3rd.SG
Бешбармак жегенде, жүздө сакал майланышат.
"While eating *beshbarmaq* ('five-fingers'—a meat and noodle dish), the beard on [one's] face gets greasy."

(5) ʤer–di qaz–ʁan–da, ʤez–di taː–p al–dɯ–m
earth–ACC dig–GER–LOC, copper–ACC find–PART take–PAST–1st.SG
Жерди казганда, жезди таап алдым.
"Digging [in] the ground, I found [some] copper."

(6) kœp saqta–l–ʁan–da, ʤez–de sarɯ tys pajda bol–o–t
much keep–PASS–GER–LOC, copper–DAT yellow colour appear–PRES–3rd.SG

Көп сакталганда, жезде сары түс пайда болот.
“If it’s kept/saved for a long time, a yellow colour appears on copper.”

(7) ʤajloː–ʁo kœʧ–kœn–dœ, saz–dɯ saʁɯzʁan bas–ɯp
summer–pasture–DAT move–GER–LOC, swamp–ACC raven press–PART
ket–ip–tir
leave–EVID.PAST–3rd.SG

Жайлоого көчкөндө, сазды сагызган басып кетиптир.
While moving to the *jayloo* (summer pasture), the swamp was full of ravens.

(8) ʤol–do ʤyr–gœn–dœ, saz–da ʤaman ʤɯt ʤɯt–ta–n–dɯ
road–LOC walk–GER–LOC, swamp–LOC bad smell smell–VERB–PASS–PAST

Жолдо жүргөндө, сазда жаман жыт жыттанды.
“Walking [down] the road, a bad smell was smelled in the swamp.”

(9) ʤaʃ bala menen syjlœ–ʃ–kœn–dœ, sœz–dy taq syjlœ–ʃ kerek
young child with speak–REC–GER–LOC, word–ACC exact speak–REC need

Жаш бала менен сүйлөшкөндө, сөздү так сүйлөш керек.
“Conversing with a young child, one must say words precisely.”

(10) qatuː syjlœ–gœn–dœ, sœz–dœ ʤɯluː–luq qal–ba–j–t
harsh speak–GER–LOC, word–LOC warm–NOUN stay–NEG–PRES–3rd.SG

Катуу сүйлөгөндө, сөздө жылуулук калбайт.
“Speaking harshly, warmth doesn’t remain in [one’s] word[s].”

(11) kiːz sal–ʁan–da, sɯz–dɯ ʤaː–p qal–dɯ
felt put–GER–LOC, wetness–ACC cover–PART stay–PAST

Кийиз салганда, сызды жаап калды.
“Having put down the felt [item], the wetness was covered.”

(12) ʤamʁɯr ʤaː–ʁan–da, sɯz–da tur–ʁan bol–bo–j–t
rain precipitate–PART–LOC, wetness–LOC stand–GER be–NEG–PRES–3rd.SG

Жамгыр жааганда, сызда турган болбойт.
“When it rains, [one] mustn’t stand in the wetness.”

(13) ʃorpo bɯʃɯr–ʁan–da, tuz–du ʧeŋge–l–de–p sal–dɯ
soup cook–GER–LOC, salt–ACC measure–PASS–VERB–PART put–PAST

Шорпо бышырганда, тузду чеңелдеп салды.
“Having made soup, salt was measured into it.”

(14) ʤaŋɯ qaz–ɯl–ʁan–da, tuz–da taʃ bol–o–t
new dig–PASS–GER–LOC, salt–LOC rock be–PRES–3rd.SG

Жаңы казылганда, тузда таш болот.
“When it’s freshly dug up, salt may have stones in it.”

(15) at-tar ʧurqa–ʁan–da, boz–du to:–don kœr–y:–gœ
horse–PL run–GER–LOC, dust_stirred_up_by_horses–ACC mountain–ABL see–GER–DAT
bol–o–t
be–PRES–3rd.SG

Аттар чуркаганда, бозду тоодон көрүүгө болот.
"When (the) horses run, the dust they stir up may be seen from the mountain."

(16) at ʧab–ɯʃ bol–ʁon–do, boz–do sarɯ at
horse race–REC be–GER–LOC, dust_stirred_up_by_horses–LOC yellow horse
kœr–yn–bœ–dy
see–PASS–NEG–PAST

Ат чабыш болгондо, боздо сары ат көрүнбөдү.
"When the horses were raced, the yellow horse wasn't visible in the dust they stirred up."

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