REGULAR DISHARMONY IN KIRGHIZ

C. Douglas Johnson
University of California, Santa Barbara

The vowels of a word may disagree in the value of some harmonic feature not only through lexical exception-
ality but also because of some supervening phonetic
principle. Disharmony arising from the latter cause,
which we will call regular, occurs in many languages and
takes many forms. Here we consider the implications of
regular disharmony in the Kirghiz language as described
by Wurm (1949), Hubert and Poppe (1963), and
Junusaliev (1968).

1. The Kirghiz vowel system. Kirghiz makes a
phonological distinction between long and short vowels.
For convenience but not from any theoretical conviction
we will write long vowels as geminates. There are eight
phonologically distinctive vowel qualities:

\[ \varepsilon \quad \varepsilon \quad \varepsilon \quad \varepsilon \quad \varepsilon \quad \varepsilon \quad \varepsilon \quad \varepsilon \]

However, these vowels are fully distinctive only in roots.
In suffixes it is necessary to distinguish only four
underlying vowels: \( a, i, o, u \). Each of these vowels has
a number of alternant surface realizations whose selection
depends on the next preceding vowel in the word. The rules
governing the realization of \( a, i, o, u \) can be readily infer-
red from the following examples, each consisting of a verb plus three different suffixes -dI (definite past), -gān (past participle), and -UU (verbal noun).

bildę, bilgen, biliū 'know'
erdi, ergen, eriū 'give'
kiūlę, kīlgān, kīliū 'laugh'
kūrdę, kūrgān, kūriū 'see'
kūldę, kūlgān, kūliū 'do, perform'
aldę, algen, algu 'take'
tutu, tutkan, tutu 'hold'
boldę, bolgen, bolu 'be, become'

For the behavior of ₀ consider the nominalizing suffix -OO added to lower numerals, e.g. bīrō 'the one', ekō 'the two', ādō 'the three', törtō 'the four', altō 'the six'.

2. **Formalization.** If we assume that feature values which remain constant on the surface are underlyingly nonhigh, ₀ and ₄ must be underlyingly high, and ₀ and ₄ must be underlyingly round. ₀ and ₄ have both round and unround realizations but must be underlyingly nonround if they are to be distinguished from ₀ and ₄. Of the vowel quality features that have classificatory relevance in Kirghiz, then, only [baak] still remains of indeterminate underlying value in suffixal vowels. In light of known phonological universals the most natural fully specified values of these vowels are probably ₀, ₄, ₑ, ᵢ, and ᵤ, although there is little language-internal basis for this choice.

It is clear from the examples that the surface specification of the feature [baak] in suffixal vowels is governed by a palatal harmony rule PHP formalizable as follows:

(PHP) V + [baak] / [V, baak] C₄

In other words a vowel is back or front according as the next preceding vow subsumes three alt of the metavariabl variable. The rul lying suffixal vow tively, while PH the feature [baak]

The other fe sentation of suffix from the examples, ding vowel is ₀, ₄ rounded if the next formalize this sit rule:

(LH) V → [+r]

Conditi

The case ... uc₄A... the structural de: simple case of reg

3. **Multiple** account for the su even being mutuall examples, each cor phone boundaries: /

/at/A+rIbIadI/
/ayd₀₀nIn/ →
/k₄b₄t₀₀IAnIn/
/holmakoInAr/
/jol₄d₄/ →
/joll₄InIn/
next preceding vowel is back or front. The formulation
subsumes three alternative rules differing in the value
of the metavariable υ, which may be +, −, or a Greek letter
variable. The rules PH+ and PH− would presuppose under-
lying suffixed vowels /e ı ʊ ū/ and /a ı e u/, respec-
tively, while PHα would presuppose no particular value of
the feature [back] in suffix vowels.

The other feature that may vary in the surface represen-
tation of suffixed vowels is [round]. As can be seen
from the examples, A remains unrounded if the next prece-
ding vowel is a, but otherwise a suffix vowel becomes
rounded if the next preceding vowel is rounded. We can
formalize this situation as the following labial harmony
rule:

\[
(LH) \quad \nu \rightarrow [+\text{round}]/\begin{array}{c}
\nu \\
\text{ahigh} \\
\text{yhigh} \\
\text{back} \\
(+\text{round})
\end{array}
\]

Condition: \(\{a, e, y\} \neq (+, +, -)\)

The case \(\cdots \nu \nu \cdots\) and \(\cdots \nu \nu \cdots\), being a consequence of
the structural description of this rule, constitutes a
simple case of regular labial disharmony.

3. Multiple suffix vowels. The rules PH+ and LH
account for the suffix vowels of disyllabic words without
even being mutually ordered. Consider now the following
examples, each containing two or more suffix vowels (mor-
ophe boundaries omitted):

- /atlArbisd/ + attar+bi+sd/ = 'our horses (accusative)
- /ayd00nιIr/ + aydo+mn = 'of the ploughing'
- /k6to0lArIn/ + k6to+lorun = 'to their winter quarters'
- /bolm AskInAr/ + bolmoksan = 'you have to be their'
- /f6ldAr/ + f6lordan = 'in the paths'
- /f6lArInAr/ + f6lordan = 'of his paths'
The harmony rules PHv and LH account for these data too provided each keeps reapplying to its own output until it can make no further change (iterative application) and if PHv precedes LH. The necessity for iteration is intuitively obvious in the above examples but can be demonstrated more precisely. Iterative application of PHv will yield kelebeka + kelebeka + kelebeka + kelebeka and joldorda + joldorda + joldorda; iterative application of LH then yields joldorda + joldorda + joldorda. On the other hand if each rule applies noniteratively, even though applying simultaneously to all vowels meeting the conditions of the rule, some incorrect outputs must result. Suppose first that palatal harmony operates properly, however formulated, but that LH applies in noniterative simultaneous fashion. Then \*joldorda will be derived. Hence LH must iterate. Now suppose that PHv applies in noniterative simultaneous fashion, though labial harmony, however formulated, operates correctly. Then if A = e we must have v = a or +, and in either case \*joldorda will be derived; but if A = a we must have v = ù or -, and in either case \*kelebeka will be derived.

To see that LH must follow PHv in any strict linear ordering consider üyünö and Joyulgani. If LH preceded PHv one or the other of these forms could not be derived. If I = ù, then /üyina/ will surface as \*üyûne, but if I = ù, then /Joyulgani/ w: which appeared to I out to be ordered:

4. simultaneous underlying suffix: palatal harmony as (PHS) \( v \rightarrow [-] \)

In other words a \( [-] \) anywhere at all in necessarily part \( o \) than PHv but can a\( j \) and noniteratively kelebeka in a sin: application thereof incorrect foundating deiterizing palatalized to labial ha to generalize the the iterative rule ting this approach like the following (LHX)

\[
\begin{align*}
\text{V} & \rightarrow [+] \\
\text{Condit} &
\end{align*}
\]

Clearly all consonant to X depend onables. For example word, any vowel is \(+\), i.e. when a se
its tip' tips' having been lost' the future' one's his days' his home' 's own'
these data too
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if L preceded PHV
be derived. If
ie, but if i = v,
then /joyIgAnI/ will surface as *joiygonu. Thus rules
which appeared to be unordered in the disyllabic case turn
out to be ordered when longer sequences are considered.

4. Simultaneously applicable reformulations. Given
underlying suffix vowels /a i o u/ we could reformulate
palatal harmony as

(PHS)  V + [-back] / [V, -back] [i] 

In other words a suffixal vowel becomes front if preceded
anywhere at all in the word by a front vowel, which is
necessarily part of a root. This rule is not only simpler
than PHV but can apply to all suffix vowels simultaneously
and noniteratively, deriving, for example, kelaIQkta from
kelaIQkta in a single step. Our arguments for iterative
application therefore appear to rest on a flimsy, even
incorrect foundation. In fact, though, the technique for
determining palatal harmony cannot be successfully gener-
lized to labial harmony. The essence of that technique is
to generalize the term C of the structural description of
the iterative rule to include some or all vowels. Attempt-
ing this approach we come up with a labial-harmony rule
like the following:

(LHV)

V → [+round] / [+back] X_a

Conditions: (a, b, γ) ≠ (+, +, -)
and X is an appropriate class
of segments.

Clearly all consonants belong to X, but the vowels ad-
mitted to X depend on the values of the Greek letter vari-
ables. For example, when b = +, i.e. in a front-harmonic
word, any vowel is allowed in X. When (a, b, γ) = (+, +,
+), i.e. when a sequence ...αXβγ... is in question, non-
high vowels but not high ones must be excluded from \( \mathcal{X} \); e.g. /\text{dəx}in/ + /\text{dəx}arun/, /\text{dəb}la\text{r}i/ + /\text{dəb}la\text{r}i/. The simultaneously applied rule LH is thus already rather more complex than the iterative rule LH. What is worse, when \((a, \beta, \gamma) = (-, +, +)\), i.e. when a sequence \(\ldots \alpha X, \ldots\) is involved, there is no coherent way to define the segment class \(X\) at all. The derivation /\text{dəx}in/ - /\text{dəx}in/ + /\text{dəx}in/ \) implies that both \(A\) and \(I\) belong to \(X\), while /\text{dəx}in/ + /\text{dəx}in/ \) implies either \(A\) or \(I\) is not in \(X\). If we still insist on a simultaneously applicable rule we can apparently do no better than the following:

\[
\begin{array}{c}
V + [+\text{round}] \\
\begin{array}{c}
V \\
\vphantom{V}
\end{array}
\end{array}
\]  

\[
\begin{array}{c}
\begin{array}{c}
V \\
\vphantom{C}
\end{array}
\begin{array}{c}
C \\
\vphantom{C}
\end{array}
\begin{array}{c}
C \\
\vphantom{C}
\end{array}
\end{array}
\]  

\[
\begin{array}{c}
V \\
\vphantom{C}
\end{array}
\begin{array}{c}
V \\
\vphantom{C}
\end{array}
\begin{array}{c}
V \\
\vphantom{C}
\end{array}
\]

\[
\begin{array}{c}
\begin{array}{c}
C \\
\vphantom{C}
\end{array}
\begin{array}{c}
C \\
\vphantom{C}
\end{array}
\begin{array}{c}
C \\
\vphantom{C}
\end{array}
\end{array}
\]  

Condition: \((a, \beta) \neq (+, -)\)

On the other hand, the iterative rule LH will derive all the correct forms without difficulty or modification.

The differential susceptibility of the harmony rules to simultaneously applicable formulations results entirely from the different conditions of regular disharmony. Usually a word's vowels are all front or all back, and no special conditions exist which block the propagation of palatal harmony. The propagation of rounding is regularly blocked, however, under phonetically definable conditions, and it is the necessary blocking mechanism that creates such difficulties for a simultaneous formulation of labial harmony.

5. Phonetic detail. Although the feature \([^\text{low}]\) seems irrelevant to the phonological classification of Kirghiz vowels, a complete description must specify the value of this feature in phonetic representations. The sources consulted make it clear that vowels only a is harmony rules can on whether underl; rule (AA) will ma

\[\begin{array}{c}
V \\
\vphantom{V}
\end{array}
\]  

Condition: This rule must of rules. In fact, it is a feature having noKirghiz, AA might rule at all. All unordered redundant it can. We shall The feature harmony rules the of the suffix vow

\[\begin{array}{c}
V + [+] \\
\vphantom{V}
\end{array}
\]  

\[\begin{array}{c}
V + [-] \\
\vphantom{V}
\end{array}
\]  

Harmonically immediately befor ed vowels are son before y, and the can therefore be rule:

\[\begin{array}{c}
V + [+] \\
\vphantom{V}
\end{array}
\]  

In other words, entirely clear:
consulted make it reasonably clear that among the nonhigh vowels only a is low. As they stand, then, the vowel harmony rules convert 1 into ε/э/ə or ə/э/ə depending on whether underlying 1 is a or ə. A single A-adjustment rule (AA) will make the necessary changes:

\[
\text{(AA)} \quad \begin{array}{c}
\text{V} \\
\text{high} \\
\text{aback} \\
\text{round}
\end{array} \rightarrow \text{[y] low}
\]

Condition: y = + if and only if (a, ə) = (+, -)

This rule must of course apply after the vowel harmony rules. In fact, as a purely phonetic rule affecting a feature having no underlying classificatory function in Kirghiz, AA might be expected not to precede any other rule at all. Alternatively, AA might be thought of as an unordered redundancy rule, applying whenever and wherever it can. We shall presently disconfirm both views, however.

The feature [low] could also be adjusted by the harmony rules themselves if the underlying representation of the suffix vowels were /a ə u/:

\[
\text{(PH')} \quad \text{V} \rightarrow \text{[back, low]} / \text{(same context as PHv)}
\]

\[
\text{(LH')} \quad \text{V} \rightarrow \text{[round, low]} / \text{(same context as LH)}
\]

Harmonically expected a is fronted and somewhat raised immediately before y. According to Wurm all front unrounded vowels are somewhat raised beyond their normal height before y, and the particular behavior of a in that context can therefore be accounted for by the following fronting rule:

\[
\text{(AY)} \quad \text{V, [low]} \rightarrow \text{[back]} / \underline{y}
\]

In other words, a[y]. The scope of the rule is not entirely clear, in Wurm's data it never applies in an
initial syllable. At any rate, using \( \tilde{a} \) for the fronted \( a \), we can render some of Wurm's examples as follows: \( \text{kand\(\tilde{a}\)y} \) 'what kind of', \( \text{at\(\tilde{e}\)nd\(\tilde{a}\)y} \) 'like his horse', \( \text{ag\(\tilde{t}\)p\(\tilde{a}\)y} \) 'without saying'. The \( \tilde{a} \) of these words, though apparently in the lower mid range, is still distinct from the second \( e \) of \( \text{k\(\tilde{a}\)l\(\tilde{b}\)eyt} \) 'he does not come', which has a still higher articulation.

The fronting of \( a \) before \( y \) is not noted in either the standard orthography or the phonemic transcription of Hebert and Poppe, although the effects of vowel harmony are. The implication is that the rule \( AY \) which fronts \( a \) applies after labial harmony and in no way interferes with the derivation of \( o\) in the harmonically expected places. The available data is perfectly consistent with this view. Hebert and Poppe have many examples like \( \text{bol\(\tilde{b}\)oy} \) 'without being' and Wurm gives \( \text{ab\(\tilde{b}\)on\(\tilde{y}\)} \) 'like that (visible)', \( \text{t\(\tilde{b}\)oky} \) (\( \text{t\(\tilde{b}\)oy} \) in the dialect described) 'forest'. There is no suggestion in either source that the last vowel of these could ever be \( \tilde{\varepsilon} \), \( \varepsilon \), or \( \tilde{\varepsilon} \).

Note, finally, that the adjustment rule \( AA \) must precede \( AY \) if it is a separate rule at all. The reverse ordering would yield \( *\text{k\(\tilde{a}\)nd\(\tilde{e}\)y}, *\text{at\(\tilde{e}\)nd\(\tilde{e}\)y}, *\text{ag\(\tilde{t}\)p\(\tilde{e}\)y} \). The rules developed in this paper must therefore be sequenced as follows in a strict linear ordering:

1. Palatal harmony (\( PHU \) or \( PH' \))
2. Labial harmony (\( LH \) or \( LH' \))
3. Lowness adjustment (\( AA; \) superfluous with \( PH' \) and \( LH' \))
4. \( \text{ag\(\tilde{t}\)p\(\tilde{a}\)y} \) (\( AY \))

It can be seen now that \( AA \) cannot be last in the ordering nor freely applicable at all derivational stages, and that a surface contrast among three vowel heights exists in the context \( _{---y} \), where \( i, e, \) and \( \tilde{a} \) all occur.
or the fronted is follows:

\( vors\)'. \( anptay\)

though apparently from the second a still higher

bed in either the description of vowel harmony which fronts say interferes all expected consistent with samples like \( iday \) 'like that described';

or sources that \( i\), or \( e\).

the \( AA \) must pre-
The reverse \( anptay\). The rules sequenced as

- with \( PH^\prime\) and \( LH^\prime\)
- last in the
- the national stages, 
- all heights 
- all occur.

5. The effect of \( AH \) on the polysyllabic case. Wurm (1949:101) says that vowels following the derived \( AH \) are normally front in the dialect he describes; e.g. \( k\ell\breve{b}\ddot{a}ynin \) (\( k\ell\breve{b}\ddot{a}ym\dot{n} in the literary language) 'I do not make'. We cannot, however, derive this example from its underlying representation /\( k\ell+\breve{b}\acute{a}+y+\ddot{m}in/ on the standard view (Chomsky and Halle 1968:341 and passim) that a rule must be applied completely before any later rule is considered and cannot be returned to after any later rule has in fact applied. Applied by that convention, the rule sequence established above would always yield \( k\ell\breve{b}\ddot{a}ym\dot{n} \), which is either non-

occurent or only a variant pronunciation in the dialect described by Wurm.

A natural revision of the ordering convention would allow certain sets of rules to apply iteratively in the manner of single rules. Thus an iterative rule sequence would apply completely to some single segment if it could do so nonvacuously, then to another segment, and so on until it could not apply nonvacuously to any segment.

Vaccity of application would be tested for the rule sequence as a whole rather than for any individual rule, and the manner of selecting a segment at each iteration would be directionally controlled, say, or perhaps random.

So applied, the rule sequence developed in this paper will account for the Kirghiz data, although the method of segment selection is partly indeterminate. A strictly left to right direction correctly derives all the forms considered in previous sections of this paper as well as \( k\ell\breve{b}\ddot{a}ym\dot{n}-k\ell\breve{b}\ddot{a}ym\dot{n}-k\ell\breve{b}\ddot{a}ym\dot{n}; \) cf. also \( jold\dot{a}t\acute{a}y+ jold\dot{a}t\dot{a}y-jold\dot{a}t\dot{a}y \) 'like a comrade'. Right to left direction can derive \( k\ell\breve{b}\ddot{a}ym\dot{n} \) from /\( k\ell\breve{b}\ddot{a}ym\dot{n}/ but must be excluded because it has the same massive undesirable effects on the individual harmony rules as simultaneous
application and the ordering of labial harmony before palatal harmony: note in particular that it would derive *joldšťy or *joldšťey depending on whether underlying A is ā or ė. Observe that the rules become valid generalizations about surface forms if applied in the correct direction, but not if they apply in the opposite direction (cf. joldšťoy and the forms discussed in section 3). It is true that the rule ay-Čy [AY] creates some exceptions to palatal harmony, but that is a consequence of the rule’s very existence.

Random selection of segments is also possible under certain conditions. For example, if the underlying suffix vowels are all back and palatal harmony is PHa, we can derive kělbaşmēn-kělbaşmēn-kělbašmēn and either joldašťay+joldašťay+joldašťay+joldašťay+joldašťay+ joldašťay. But if palatal harmony were PH-, we could derive joldašťay+joldašťay+joldašťay+joldašťay, an incorrect result.

The facts which require iteration of the entire rule sequence show too that the simultaneously applicable formulation of palatal harmony cannot possibly be correct, although it seemed perfectly valid when considered in isolation. In view of kělbaşmēn it is clear that the palatality of a suffix vowel depends solely on that of the nearest preceding vowel, not on any more distant vowel or on some prosodic root feature spread to all suffixes by a simple convention. Like labial harmony, palatal harmony is a process of partial assimilation of one vowel to the vowel of a neighboring syllable.
REFERENCES


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0. Introduction

It would generally be agreed that to talk about distinctions between grammatical and ungrammatical strings or to assign some measure of varying degrees of grammaticality to strings would be absurd in the absence of a clear conception of what a theory of grammar is a theory of. By the same token, to stipulate that some rule, string, etc., is marked or unmarked, or more or less marked with respect to some other rule, string, etc., would make little sense in the absence of a coherent conception of what a theory of markedness is a theory of. While, with increasing frequency, one encounters references to markedness in the literature, such discussions as there are typically take place in the absence of any attempt to define what the proper domain of markedness theories is or to characterize their role in general linguistic theory. Rather, what one usually finds is that there is an implied assumption that it is well-understood what theories of markedness are all about. However, consideration of the diversity of uses encountered and the tacit assumptions which they entail strongly suggests that there is little ground for assuming that the domain of markedness is in fact well-understood. In this paper the question to be addressed is then: what is a theory of markedness a theory of, and what is the role of such a theory in grammar? Having proposed an answer to that question, we will then turn to a specific example of a markedness theory, a theory of intrasegmental structure. Having outlined that case we will return again to considerations of markedness theories in general.