Underlying Contrasts and East Slavic Post-Velar Fronting
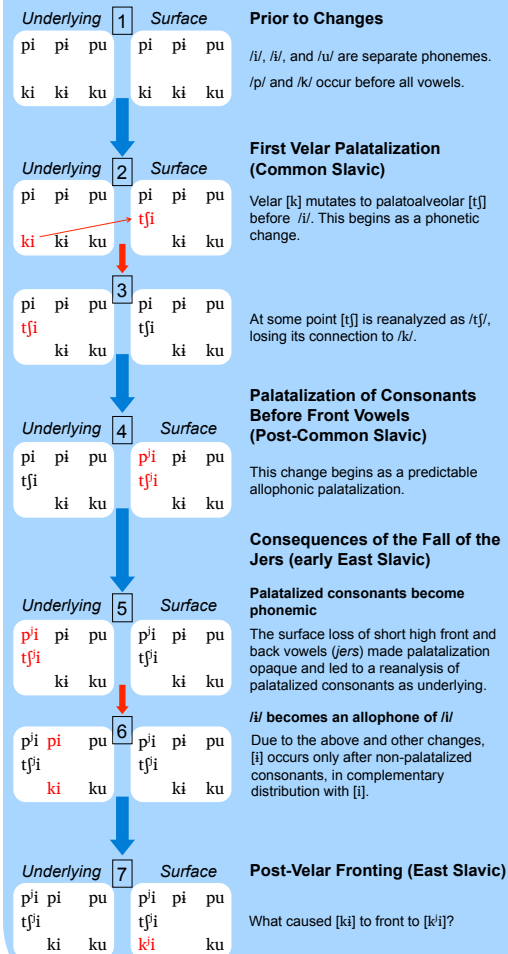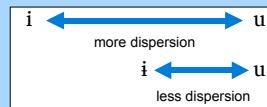
Introduction

What caused the fronting of ki to kʲi between the 12th and 14th centuries in East Slavic? Everyone agrees that the lack of contrast between k and kʲ is crucial. Padgett (2003) argues it was motivated also by the surface distance between i and u. I argue, following Jakobson (1929), that the trigger was the reanalysis of underlying vowel contrasts, whereby the phoneme /ɨ/ became a positional allophone of /i/. At issue is the proper way to incorporate contrast into phonology.

Slavic Sound Changes

	Underlying	①	Surface		Prior to Changes

pi pɨ pu   pi pɨ pu
ki kɨ ku   ki kɨ ku

/i/, /ɨ/, and /u/ are separate phonemes.

/p/ and /k/ occur before all vowels.

First Velar Palatalization (Common Slavic)

② Underlying / Surface

pi pɨ pu   pi pɨ pu
ki kɨ ku   tʃi kɨ ku

Velar [k] mutates to palatoalveolar [tʃ] before /i/. This begins as a phonetic change.

③

pi pɨ pu   pi pɨ pu
tʃi   tʃi
ki ku   ki ku

At some point [tʃ] is reanalyzed as /tʃ/, losing its connection to /k/.

Palatalization of Consonants Before Front Vowels (Post-Common Slavic)

④ Underlying / Surface

pi pɨ pu   pʲi pɨ pu
tʃi   tʃʲi
ki ku   ki ku

This change begins as a predictable allophonic palatalization.

Consequences of the Fall of the Jers (early East Slavic)

Palatalized consonants become phonemic

The surface loss of short high front and back vowels (jers) made palatalization opaque and led to a reanalysis of palatalized consonants as underlying.

⑤ Underlying / Surface

pʲi pɨ pu   pʲi pɨ pu
tʃʲi   tʃʲi
ki ku   ki ku

/ɨ/ becomes an allophone of /i/

Due to the above and other changes, [ɨ] occurs only after non-palatalized consonants, in complementary distribution with [i].

⑥

pʲi pi pu   pʲi pɨ pu
tʃʲi   tʃʲi
ki   ki ku

Post-Velar Fronting (East Slavic)

⑦ Underlying / Surface

pʲi pi pu   pʲi pɨ pu
tʃʲi   tʃʲi
ki ku   kʲi ku

What caused [ki] to front to [kʲi]?

Dispersion Theory Analysis

Padgett (2003) looks at surface phonetic contrasts and proposes that the key to the change of ki to kʲi is that kʲi makes a better perceptual contrast with ku than does ki.

i ←——————→ u
more dispersion

i ←———→ u
less dispersion

SPACE constraint for East Slavic (Padgett 2003):

SPACE_Colour ≥ 1/2: Potential minimal pairs differing in vowel color differ by at least 1/2 of the full vowel color range.

Before Post-Velar Fronting

At Stage 6 on the left it is more important to preserve the underlying vowel colour than to maximize dispersion:

		*MERGE	IDENT (COLOUR)	SPACE-COLOUR
	pʲi₁ pi₂ pu₃ ki₅ ku₆ tʃʲi₄			
☞	pʲi₁ pi₂ pu₃ ki₅ ku₆ tʃʲi₄			*
	pʲi₁ pi₂ pu₃ kɨ₅ ku₆ tʃʲi₄		*!	

Post-Velar Fronting

is due to a reordering of the IDENT and SPACE constraints. *MERGE prevents pi from fronting, so it will not neutralize with pʲi.

		*MERGE	SPACE-COLOUR	IDENT (COLOUR)
	pi₁ pi₂ pu₃ ki₅ ku₆ tʃʲi₄			
	pi₁ pi₂ pu₃ ki₅ ku₆ tʃʲi₄		*!	
☞	pi₁ pi₂ pu₃ kʲi₅ ku₆ tʃʲi₄			*

Problems with the Analysis

- To implement this idea formally, Padgett must limit the analysis in non-principled ways ('extreme idealizations'):
  - only a specifically chosen set of 'words' can be considered
  - only one space dimension (Colour) can be considered

- Minimal pairs are determined on the surface. According to Padgett's definition:

  ki - ku   differ only in the vowel and are a minimal pair. But…

  kʲi - ku   differ in the vowel and the consonant and are not a minimal pair. Therefore, the SPACE constraint should not apply.

- No principled reason for treating the velars (represented by k) differently from the labials and coronals (represented by p, except for tʃ).

- The analysis disregards the phonemic status of the vowels, unlike Jakobson's analysis.

Modified Contrastive Specification

In MCS (Dresher, Piggott and Rice 1994, Dresher and Rice 2007, Dresher 2009), the appropriate level at which minimal contrast holds is at the underlying phonemic level. Contrastive features must be assigned in an order, following language-particular contrastive hierarchies.

Stage 4: Contrastively [–back] vowels palatalize consonants

		p i [–back]	p ɨ [+back]	tʃ i [–back]	k ɨ [+back]
④	Underlying				
	Palatalization	pʲ i [–back]	pɨ	tʃʲ i [–back]	kɨ
	Surface	pʲi	pɨ	tʃʲi	kɨ

Stage 5: Vowels and paired consonants contrastively [±back]

		pʲ i [–bk][–bk]	p ɨ [+bk][+bk]	tʃʲ i [–bk][–bk]	k ɨ [+bk]
⑤	Underlying				
	Palatalization				
	Surface	pʲi	pɨ	tʃʲi	kɨ

Note that tʃʲ but not k is considered 'paired', i.e. contrastive for [back]? This cannot be explained by minimal pairs. However, it follows from the East Slavic contrastive hierarchy given below

Stage 6: /ɨ/ becomes an allophone of /i/

		pʲ i [–bk][–bk]	p i [+bk][–bk]	tʃʲ i [–bk][–bk]	k ɨ [–bk]
⑥	Underlying				
	i-Backing		p ɨ [+bk][–bk]		N/A
	Palatalization				kʲ i [–bk]
	Surface	pʲi	pɨ	tʃʲi	kʲi

The reanalysis of ɨ requires the introduction of i-Backing. No surface forms from Stage 5 are affected except the velars: lacking a contrastive [+back] specification, k cannot back i, which palatalizes it instead. Post-Velar Fronting is a consequence of this reanalysis.

Contrastive feature hierarchy for East Slavic

[sonorant] > Major Place > [voiced] > [continuant] > [back] > coronal features

Contrastive specifications of some consonants

p	t	tʃʲ	k
[–sonorant]	[–sonorant]	[–sonorant]	[–sonorant]
[labial]	[coronal]	[coronal]	[velar]
[–voiced]	[–voiced]	[–voiced]	[–voiced]
[–continuant]	[–continuant]	[–continuant]	[–continuant]
[+back]	[+back]	[–back]	
	[–del rel]	[+del rel]	

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