Trade-offs in the contrastive hierarchy: Voicing *versus* continuancy in Slavic

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Saint Mary's University

Outline

- Our approach to phonological representations:
  The Successive Division Algorithm (SDA)
- Contrast and phonological activity:
  What does the SDA actually predict?
- Applying the SDA to Russian
  - Revising Halle's hierarchy
  - Consequences of the change
- Evidence elsewhere in Slavic

Our approach to phonological representations

Two components of a theory of phonemic contrast:

Dresher (2009, 2015); Hall (2007, forthcoming)

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Our approach to phonological representations

Two components of a theory of phonemic contrast:

1. **The Contrastivist Hypothesis:** Only contrastive features are phonologically active.
2. **The Successive Division Algorithm:** Contrastive features are assigned by recursively dividing the underlying inventory.

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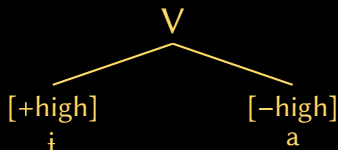
V
ə

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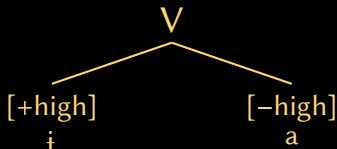
```
                    V
             ╱              ╲
        [+high]          [−high]
           ɨ                a
```

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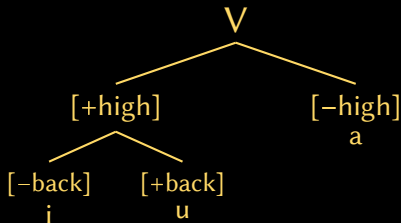
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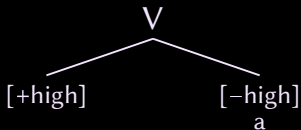   V   V

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```
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           /     \
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```
              V
           /     \
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         i
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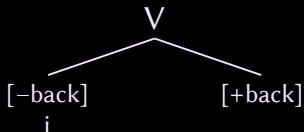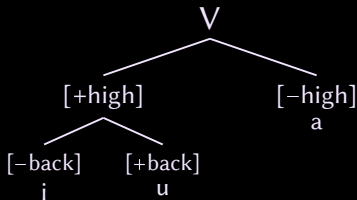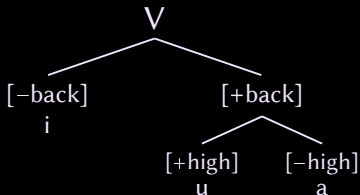
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```
              V
           /     \
     [+high]      [−high]
     /    \           a
[−back]  [+back]
   i        u
```

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```
              V
           /     \
     [−back]      [+back]
        i        /     \
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	i	u	a
high	+	+	−
back	−	+	
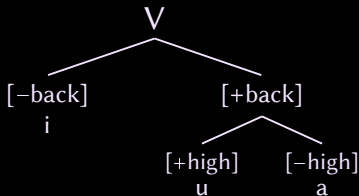
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high		+	−
back	−	+	+

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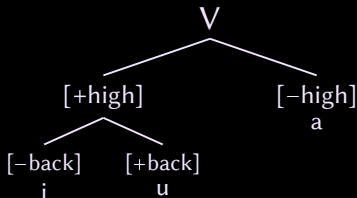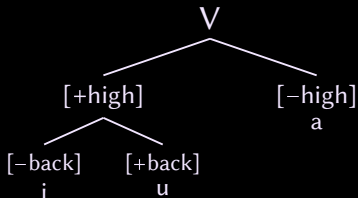[±high] and [±back]:

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```
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       ┌──────┴──────┐
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   ┌───┴───┐          a
[−back] [+back]
   i       u
```

back ≫ high

```
              V
       ┌──────┴──────┐
  [−back]        [+back]
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```

	i	u	a
high	+	+	−
back	−	+	∅
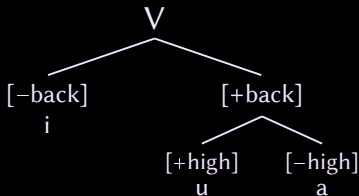
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Contrast and phonological activity

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Hall (2007: 20)

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see also Blaho (2008), de Lacy (2010)

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The SDA and the Contrastivist Hypothesis make testable predictions.

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- We can make predictions about trade-offs between potentially contrastive features.

Contrast and phonological activity

Back to our three-vowel example:

Contrast and phonological activity
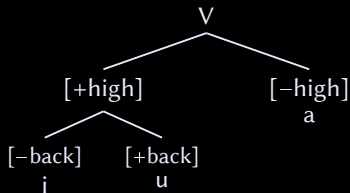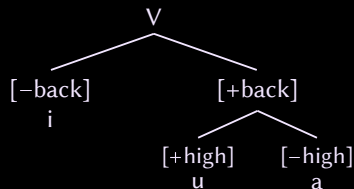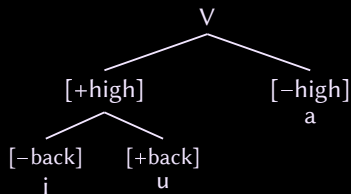
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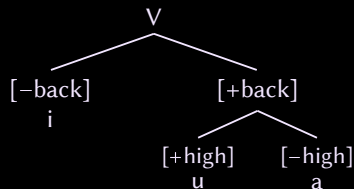## Contrast and phonological activity

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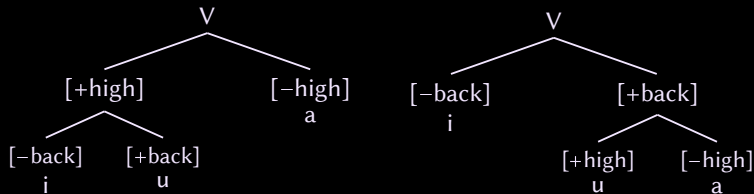
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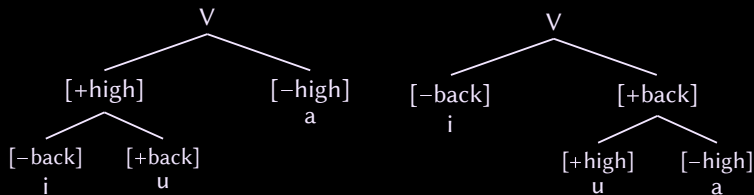
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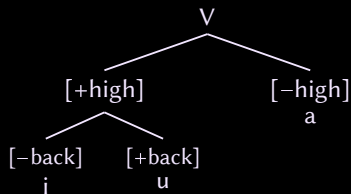# Contrast and phonological activity
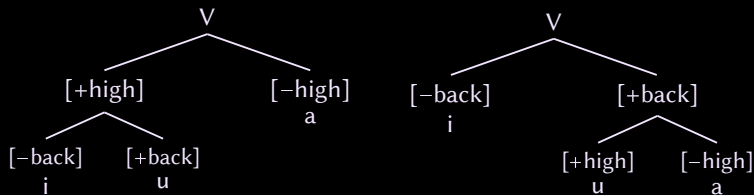
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> HALLE (1959: 34)
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> "The hierarchy of features seems to provide an explanation for the intuition that not all features are equally central to a given phonological system."

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- Redundant features are filled in during the derivation, allowing them to be phonologically active.

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/__ VD.:   z-d^jelat^j   'do'

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- (And it's not active on sonorants.)

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- Schematically:
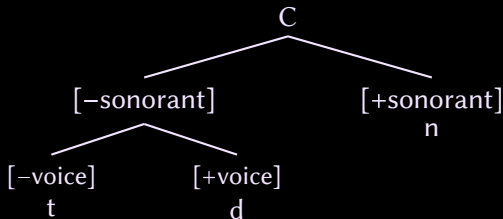
```
                        C
              ┌─────────┴──────────┐
         [−sonorant]           [+sonorant]
          ┌────┴────┐               n
      [−voice]   [+voice]
         t          d
```

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STOP	p	pʲ	t	tʲ		k	kʲ
	b	bʲ	d	dʲ		g	
AFFRICATE			ts		tʃ		
FRICATIVE	f	fʲ	s	sʲ	ʃ	x	
	v	vʲ	z	zʲ	ʒ		

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- These unpaired obstruents were key to Halle's (1957; 1959) argument against the structuralist separation of morphophonemic and allophonic patterns.

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(Thus Halle's argument: If processes that produce alternations between phonemes are strictly separate from allophony, then there is no unified account of voicing assimilation.)

examples from Halle (1959), Timberlake (2002)

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- They also trigger regressive assimilatory devoicing:

bʲez ozʲera	'without a lake'
bʲes xlʲeba	'without bread'
bʲes tseni	'without price'
bʲes tʃestʲi	'without honour'

examples from Halle (1959), Timberlake (2002), Calabrese (1995)

Specifying the unpaired obstruents

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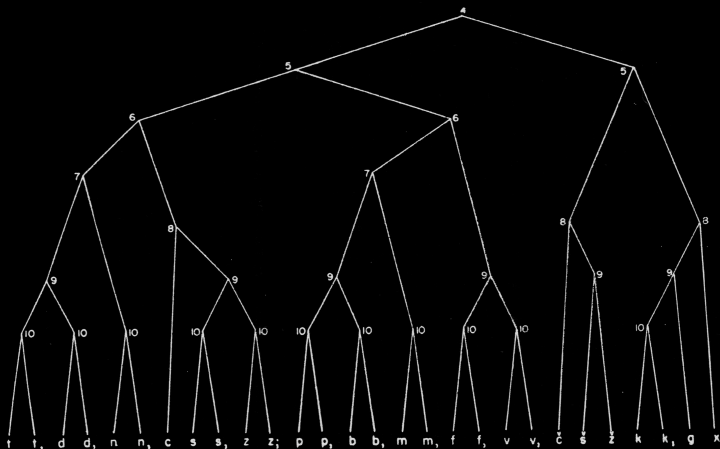contrastive hierarchy for [+consonantal] phonemes fron Halle (1959: 46)
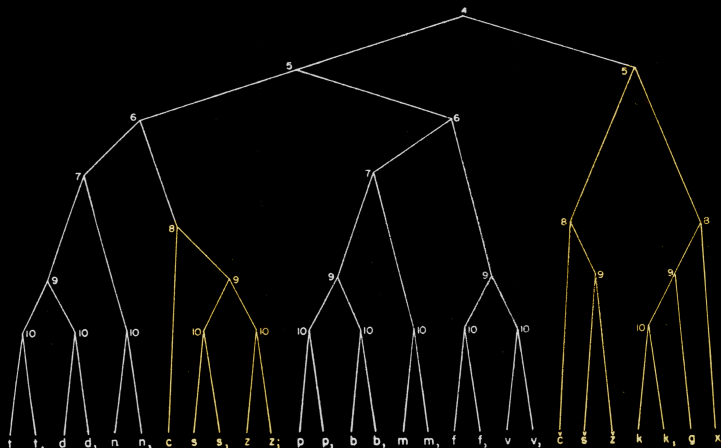
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In Halle's hierarchy:

[±low tonality] ≫ [±continuant] ≫ [±voiced] ≫ [±sharped]

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In Halle's hierarchy:

$$[\pm\text{low tonality}] \gg [\pm\text{continuant}] \gg [\pm\text{voiced}] \gg [\pm\text{sharped}]$$

Strident dentals:

```
                    /ts s sʲ z zʲ/
                   ╱           ╲
          [−cont]              [+cont]
            ts              ╱         ╲
                     [−voice]          [+voice]
                    ╱      ╲           ╱      ╲
            [−sharp]  [+sharp]  [−sharp]  [+sharp]
               s        sʲ         z        zʲ
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In Halle's hierarchy:

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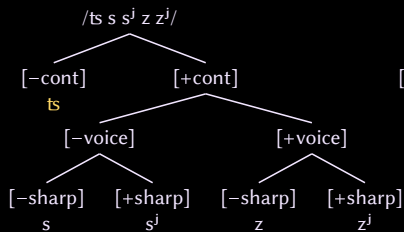Palatals and velars:

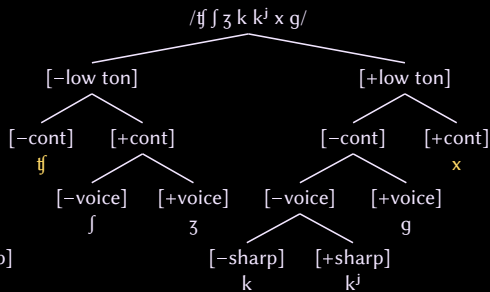# Specifying the unpaired obstruents

In Halle's hierarchy:

$$[\pm\text{low tonality}] \gg [\pm\text{continuant}] \gg [\pm\text{voiced}] \gg [\pm\text{sharped}]$$

Strident dentals:

Palatals and velars:

Specifying the unpaired obstruents

In Halle's hierarchy:

[±low tonality] ≫ [±continuant] ≫ [±voiced] ≫ [±sharped]

Strident dentals:

Palatals and velars:

/ts s sʲ z zʲ/

[−cont]
ts

[+cont]

[−voice]

[+voice]

[−sharp]
s

[+sharp]
sʲ

[−sharp]
z

[+sharp]
zʲ

/tʃ ʃ ʒ k kʲ x g/
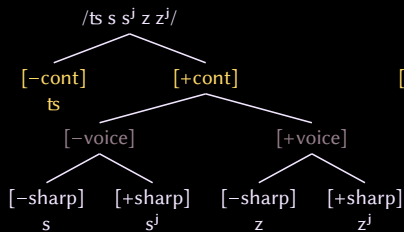
[−low ton]

[+low ton]

[−cont]
tʃ

[+cont]

[−cont]

[+cont]
x

[−voice]
ʃ

[+voice]
ʒ

[−voice]

[+voice]
g

[−sharp]
k

[+sharp]
kʲ

[±continuant] cuts off /ts/, /tʃ/, and /x/ before [−voiced] can be assigned to them.

Specifying the unpaired obstruents

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Rule P 1b Unless followed by an obstruent, /ts/, /tʃ/, and /x/ are voiceless.

rules: Halle (1959: 63–64)

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Rule P 1b Unless followed by an obstruent, /ts/, /tʃ/, and /x/ are voiceless.

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	UNDERLYING	
	bʲe z	x lʲeba
[±voiced] :	+ ∅	

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	UNDERLYING		RULE P 1B	
	bʲez xlʲeba	→	bʲez xlʲeba	
[±voiced] :	+ ∅		+ −	

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	bʲez xlʲeba	→	bʲez xlʲeba	→	bʲes xlʲeba
[±voiced] :	+ ∅		+ −		− −

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- We predict a trade-off.

Specifying the unpaired obstruents

Revising Halle's hierarchy...

$[\pm\text{low tonality}] \gg [\pm\text{continuant}] \gg [\pm\text{voiced}] \gg [\pm\text{sharped}]$

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Palatals and velars:

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[±low tonality] ≫ [±voiced] ≫ [±continuant] ≫ [±sharped]

Strident dentals:

/ts s sʲ z zʲ/
- [−voice]
  - [−cont] ts
  - [+cont]
    - [−sharp] s
    - [+sharp] sʲ
- [+voice]
  - [−sharp] z
  - [+sharp] zʲ

Palatals and velars:

/tʃ ʃ ʒ k kʲ x g/
- [−low ton]
  - [−voice]
    - [−cont] tʃ
    - [+cont] ʃ
  - [+voice] ʒ
- [+low ton]
  - [−voice]
    - [−cont]
      - [−sharp] k
      - [+sharp] kʲ
    - [+cont] x
  - [+voice] g
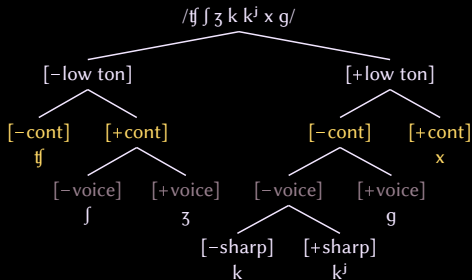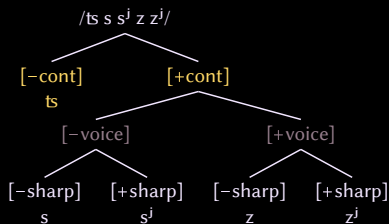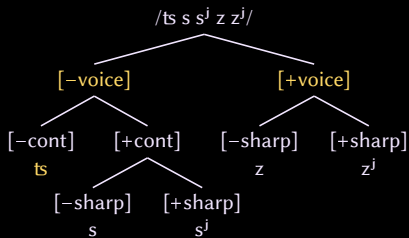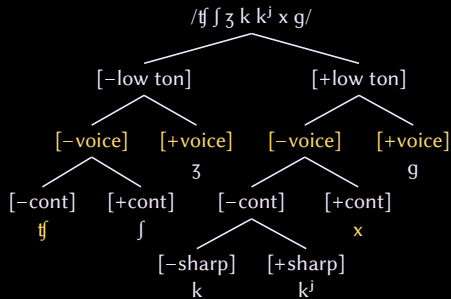
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Revising Halle's hierarchy...

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- [−voice]
  - [−cont] ts
  - [+cont]
    - [−sharp] s
    - [+sharp] sʲ
- [+voice]
  - [−sharp] z
  - [+sharp] zʲ

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  - [−voice]
    - [−cont] tʃ
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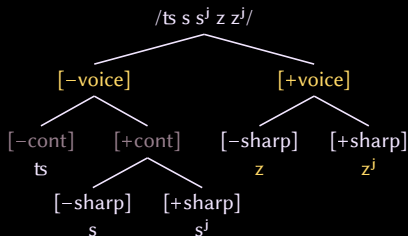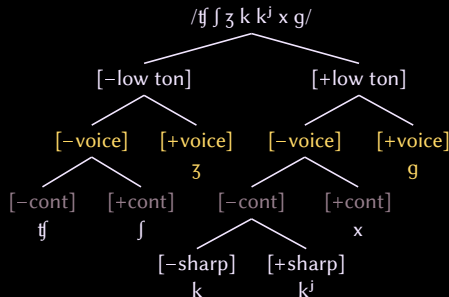
- ...gives us [−voiced] on /ts tʃ x/...
- ...but removes [±continuant] from /z zʲ ʒ g/.

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- Minimally, we predict that omitting [±continuant] from these segments will not lead to what Nevins (2015) calls an 'Oops, I Need That' problem.

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- Minimally, we predict that omitting [±continuant] from these segments will not lead to what Nevins (2015) calls an 'Oops, I Need That' problem.
- More than this, though, there seems to be positive evidence for underspecification of [±continuant].

The other unpaired obstruents: Variation

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- However, to the extent that different dialects of Russian show similar phonological patterns, we expect their inventories to have the same specifications.
- If this segment variously shows up as [g] and [ɣ]/[ɦ], this is consistent with—but does not entail—the idea that it is unspecified for continuancy.

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Some (morpho)phonological evidence:
Alternations resulting from the First Velar Palatalization

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		[+low tonality] → [−low tonality]		
[−voiced]	[+continuant]	x	→	ʃ

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[−voiced]	[−continuant]	k	→	ʧ

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[+voiced]	∅	g	→	ʒ

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[+voiced]	∅	g	→	ʒ

Adjectives:

POSITIVE	COMPARATIVE	GLOSS
tʲixij	tʲiʃe	'quiet(er)'
ʒarkij	ʒarʧe	'hot(ter)'
dorogoj	doroʒe	'dear(er)'

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[+voiced]	∅	g	→	ʒ

Verbs:

3RD PLURAL	3RD SINGULAR	GLOSS
maxut	maʃet	'wave(s), wag(s)'
pekut	peʧet	'bake(s)'
strigut	striʒet	'shear(s)'

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[+voiced]	∅	g	→	ʒ

Denominal adjectives:

NOUN	ADJECTIVE	GLOSS
ʧerepaxa	ʧerepaʃij	'turtle' / 'testudinian'
volk	volʧij	'wolf' / 'lupine'
vraǵ	vraʒij	'enemy' / 'hostile'

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		[+low tonality]	$\rightarrow$	[−low tonality]
[−voiced]	[+continuant]	x	$\rightarrow$	ʃ
[−voiced]	[−continuant]	k	$\rightarrow$	tʃ
[+voiced]	∅	g	$\rightarrow$	ʒ

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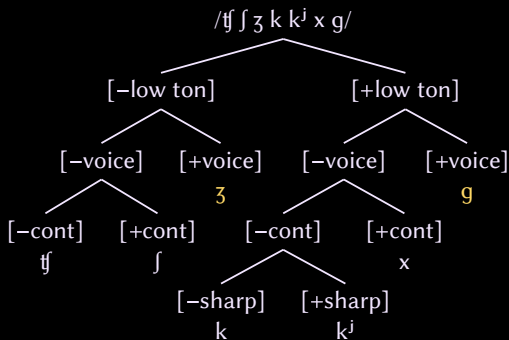
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$$\begin{bmatrix} \text{+compact} \\ \text{+low tonality} \end{bmatrix} \sim \begin{bmatrix} \text{−compact} \\ \text{−low tonality} \end{bmatrix}$$

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		$\begin{bmatrix} +\text{compact} \\ +\text{low tonality} \end{bmatrix}$	~	$\begin{bmatrix} -\text{compact} \\ -\text{low tonality} \end{bmatrix}$
[−voiced]	[−continuant]	k	~	ts

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[−voiced]	[−continuant]	k	~	t͡s
[+voiced]	∅	g, gʲ	~	z, zʲ

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| brjakatʲ | 'to let fall w/ a clang' | brjatsatʲ | 'to clang' |
| voskliknutʲ | 'to exclaim' (pf.) | vosklitsatʲ | 'to exclaim' (impf.) |

examples from Lightner (1965)

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These alternations are not productive in Modern Russian, but they
are consistent with the prediction that /z zʲ/ are also unspecified for
continuancy.

Elsewhere in Slavic

Other Slavic languages show similarly asymmetrical inventories, and similar phonological patterns:

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Serbian: /g/ has no continuant counterpart, and alternates with /ʒ/ and with /z/. Radišić (2009) argues for a contrastive hierarchy that leaves /g/ unspecified for continuancy.

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Lower Sorbian: /g/ has no continuant counterpart.

sources: Radišić (2009) on Serbian; Schaarschmidt (1998) on Sorbian

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Other Slavic languages show similarly asymmetrical inventories, and similar phonological patterns:

Lower Sorbian: /g/ has no continuant counterpart. Where /k/ alternates with /ts/ and /x/ with /ʃ/...

NOMINATIVE	DATIVE	GLOSS
ruk-a	ruts-e	'hand'
mux-a	muʃ-e	'fly'

sources: Radišić (2009) on Serbian; Schaarschmidt (1998) on Sorbian

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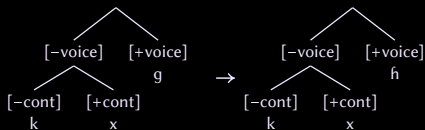**Lower Sorbian:** /g/ has no continuant counterpart. Where /k/ alternates with /ts/ and /x/ with /ʃ/...

NOMINATIVE	DATIVE	GLOSS
ru**k**-a	ru**ts**-e	'hand'
mu**x**-a	mu**ʃ**-e	'fly'
no**g**-a	no**z**-e	'leg'
roz**g**-a	roz**dz**-e	'twig'

.../g/ becomes either /z/ or /dz/, whichever is phonotactically less marked (/dz/ after /z/; /z/ elsewhere).

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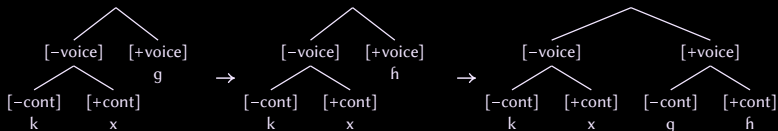
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- As regards voicing and continuancy in Slavic, though, it appears that they are not actually false.

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