

Class 5

Assimilation 2

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Lithuanian continued

Review

- ▷ Can someone remind us about our analysis of the [at-] ~ [ad-] alternation in Lithuanian?

at- eiti	‘to arrive’	at- prašiti	‘to ask’
at- imti	‘to take away’	at- kurti	‘to reestablish’
at- nešti	‘to bring’	ad- bekti	‘to run up’
at- leisti	‘to forgive’	ad- gauti	‘to get back’
at- likti	‘to complete’	ad- bukti	‘to become blunt’
at- kopti	‘to rise’	ad- gimti	‘to be born again’

Lithuanian continued

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(1) /-**voi**,+alv,-son,-cont/ → [+**voi**,+alv,-**son**,**-cont**] / __[+**voi**,-son]

- The change in [±voice] **matches** the environment, making the sounds **more similar**: this is a voicing assimilation rule.

Lithuanian continued

More data

▷ **Here's some more Lithuanian. Who can tell me what's going on?**

ap-eiti	'to circumvent'	ab-gauti	'to deceive'
ap-ieʃko:ti	'to search everywhere'	ab-ʒ ^j ureti	'to have a look at'
ap-akti	'to become blind'	ab-ʒ ^j elti	'to become overgrown'
ap-mo:ki:ti	'to train'	ab-dauʒ ^j i:ti	'to damage'
ap-temdi:ti	'to obscure'	ab-draski:ti	'to tear'
ap-ʃaukti	'to proclaim'		

Lithuanian continued

Voicing assimilation again

- Voicing assimilation again!

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ap -temdi:ti	‘to obscure’	ab -draski:ti	‘to tear’
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- Voiceless bilabial stops become voiced bilabial stops before voiced obstruents.

(2) /-**voi**,+lab,-son,-cont/ → [+**voi**,+lab,-**son**,**-cont**] / __[+**voi**,**-son**]

- And here we’re seeing fricatives conditioning the assimilation, not just stops.
- This clarifies that we do want to be talking about obstruents, not just stops.

Lithuanian continued

Our voicing assimilation rules

→ We now have two different voicing assimilation rules. Let's compare them.

- For alveolars:

$$(1) \quad /-voi,+alv,-son,-cont/ \rightarrow [+voi,+alv,-son,-cont] / _ [+voi,-son]$$

- For labials:

$$(2) \quad /-voi,+lab,-son,-cont/ \rightarrow [+voi,+lab,-son,-cont] / _ [+voi,-son]$$

▷ **Are we missing something?**

Lithuanian continued

Our voicing assimilation rule

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$$(2) \quad /-voi, \boxed{+lab}, -son, -cont/ \rightarrow [+voi, \boxed{+lab}, -son, -cont] \quad / \quad _ [+voi, -son]$$

- These two rules are the same except for their specification of **place**.

Lithuanian continued

Our voicing assimilation rule

→ We only need one rule:

- For alveolars:

$$(1) \quad /-voi, \boxed{+alv}, -son, -cont/ \rightarrow [+voi, \boxed{+alv}, -son, -cont] \quad / \quad _ [+voi, -son]$$

- For labials:

$$(2) \quad /-voi, \boxed{+lab}, -son, -cont/ \rightarrow [+voi, \boxed{+lab}, -son, -cont] \quad / \quad _ [+voi, -son]$$

- These two rules are the same except for their specification of **place**.
- If we remove the place specification, we can capture both processes with a single rule:

$$(3) \quad /-voi, -son, -cont/ \rightarrow [+voi, -son, -cont] \quad / \quad _ [+voi, -son]$$

Natural classes

A natural class in Lithuanian

- For alveolars:

(1) $/-voi, \boxed{+alv}, -son, -cont/ \rightarrow [+voi, \boxed{+alv}, -son, -cont] / _ [+voi, -son]$

- For labials:

(2) $/-voi, \boxed{+lab}, -son, -cont/ \rightarrow [+voi, \boxed{+lab}, -son, -cont] / _ [+voi, -son]$

- For any place:

(3) $/-voi, -son, -cont/ \rightarrow [+voi, -son, -cont] / _ [+voi, -son]$

- Instead of applying to only one segment, this unitary rule applies to a **natural class** of segments:
 - All the segments in the language that share the feature specification $/-voi, -son, -cont/$.

Natural classes

A natural class in Lithuanian

- Here's all of the consonants of Lithuanian again.

	Labial	Alveolar	Palatal	Velar
Stops	p b	t d		k g
Affricates		ts ɖ	tʃ ɟʃ	
Fricatives	f v	s z	ʃ ʒ	x ɣ
Nasals	m	n		
Approximants		l,r	j	

- ▷ Which consonants should this rule apply to?

(3) /-voi,-son,-cont/ → [+voi,-son,-cont] / _[+voi,-son]

Natural classes

A natural class in Lithuanian

→ All the voiceless stops and affricates.

	Labial		Alveolar		Palatal		Velar	
Stops	p	b	t	d			k	g
Affricates			ts	dʒ	tʃ	ɟʃ		
Fricatives	f	v	s	z	ʃ	ʒ	x	ɣ
Nasals		m		n				
Approximants				l,r		j		

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Natural classes

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- ▷ **What prediction does our rule make about voiceless fricatives?**

	Labial		Alveolar		Palatal		Velar	
Stops	p	b	t	d			k	g
Affricates			ts	dʒ	tʃ	ɟʃ		
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(3) /-voi,-son,-**cont**/ → [+voi,-son,-cont] / _[+voi,-son]

- This rule predicts that voiceless fricatives won't participate in voicing assimilation, because they are [+continuant].

Natural classes

A natural class in Lithuanian

▷ Do you think this prediction is correct?

	Labial		Alveolar		Palatal		Velar	
Stops	p	b	t	d			k	g
Affricates			ts	dʒ	tʃ	ɟʃ		
Fricatives	f	v	s	z	ʃ	ʒ	x	ɣ
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Natural classes

Lithuanian fricatives and voicing assimilation

- The voiceless fricatives **do** participate in voicing assimilation:

/kas-**d**avo:/ → [ka**z**davo:] ‘dug’

/ne**f**-**d**am-a/ → [ne**ʒ**dama] ‘carry’

* /f,x/ are rare sounds in Lithuanian, so I haven't found any examples, but we predict they should behave the same as /s,f/.

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▷ Should this change our rule?

(3) /-voi,-son,-cont/ → [+voi,-son,-cont] / _[+voi,-son]

Natural classes

Updating our rule

- The voiceless fricatives **do** participate in voicing assimilation:

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▷ Should this change our rule? Yes!

(3) /-voi,-son,-cont/ → [+voi,-son,-cont] / _[+voi,-son]

(4) /-voi,-son/ → [+voi,-son] / _[+voi,-son]

- This shows that the context and the change match up perfectly:
→ Both deal exclusively with voicing and sonorancy.

Natural classes

The benefits of natural classes

(4) /-voi,-son/ → [+voi,-son] / _[+voi,-son]

- Thinking about rules in terms of natural classes is important for a number of reasons:

Natural classes

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Natural classes

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 - It lets you capture rules that apply to **more than one segment**, which makes your analysis simpler (as opposed to restating the equivalent rule for each segment).
 - It lets you understand the **motivation** behind the rule, because it lets you drill down on the features that are actually important.

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 - It makes **predictions** about the way that your rules work in the language on the whole, so you can be more sure that you have the right analysis.

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 - It lets you understand the **motivation** behind the rule, because it lets you drill down on the features that are actually important.
 - It makes **predictions** about the way that your rules work in the language on the whole, so you can be more sure that you have the right analysis.
- Rules (almost) always **apply to natural classes**, rather than a collection of segments defined by a disjoint set of features.

English consonants

The consonants of English

- Here's the consonant chart for English, including **major place features**, which group specific places together based on the nature of their articulation.

	LABIAL		CORONAL			DORSAL	GLOTTAL
	Bilabial	Labiodental	Interdental	Alveolar	Palatal	Velar	Glottal
Stops	p b			t d		k g	
Affricates					tʃ ɟʃ		
Fricatives		f v	θ ð	s z	ʃ ʒ		h
Nasals	m			n		ŋ	
Liquids				l,ɹ			
Glides	w				j		

English consonants

Labials

- The feature LABIAL groups together *bilabial* (constriction with both lips) and *labiodental* (constriction between lower lip and upper teeth).

	LABIAL		CORONAL			DORSAL	GLOTTAL
	Bilabial	Labiodental	Interdental	Alveolar	Palatal	Velar	Glottal
Stops	p b			t d		k g	
Affricates					tʃ ɟʃ		
Fricatives		f v	θ ð	s z	ʃ ʒ		h
Nasals	m			n		ŋ	
Liquids				l,ɹ			
Glides	W				j		

English consonants

Coronals

- The feature CORONAL groups together *interdental* (tongue tip between/at the teeth), *alveolar* (tongue tip at the alveolar ridge), and *postalveolar/palatal* (tip/middle of tongue at/near hard palate).

	LABIAL		CORONAL			DORSAL	GLOTTAL
	Bilabial	Labiodental	Interdental	Alveolar	Palatal	Velar	Glottal
Stops	p b			t d		k g	
Affricates					tʃ ɟʃ		
Fricatives		f v	θ ð	s z	ʃ ʒ		h
Nasals	m			n		ŋ	
Liquids				l, ɹ			
Glides	w				j		

English consonants

Dorsals

- The feature DORSAL groups together *velar* (tongue body up to soft palate) and *uvular* [not used in English] (tongue body back to uvula).

	LABIAL		CORONAL			DORSAL	GLOTTAL
	Bilabial	Labiodental	Interdental	Alveolar	Palatal	Velar	Glottal
Stops	p b			t d		k g	
Affricates					tʃ dʒ		
Fricatives		f v	θ ð	s z	ʃ ʒ		h
Nasals	m			n		ŋ	
Liquids				l,ɹ			
Glides	W				j		

English consonants

Glottals

- The feature GLOTTAL refers just to *glottal* sounds (constriction at the vocal folds).

	LABIAL		CORONAL			DORSAL	GLOTTAL
	Bilabial	Labiodental	Interdental	Alveolar	Palatal	Velar	Glottal
Stops	p b			t d		k g	
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Nasals	m			n		ŋ	
Liquids				l, ɹ			
Glides	W				j		

English consonants

(Marginal) allophones

- The (voiceless) glottal stop [ʔ], voiced glottal fricative [ɦ], the (voiced) labiodental, dental, and palatal nasals [m, n̠, ɲ], and the (voiced) alveolar flap [ɾ] are all sounds that appear as **allophones** in English.

	LABIAL		CORONAL			DORSAL	GLOTTAL
	Bilabial	Labiodental	Interdental	Alveolar	Palatal	Velar	Glottal
Stops	p b			t d		k g	(ʔ)
Affricates					tʃ ɟʃ		
Fricatives		f v	θ ð	s z	ʃ ʒ		h (ɦ)
Nasals	m	(m̠)	(n̠)	n	(ɲ)	ŋ	
Liquids				l, ɭ			
Glides	W			(ɾ)	j		

English consonants

Practice with natural classes in English!

- Now that we know all the consonant sounds and consonant features, **let's work on identifying natural classes**. (Prompts on the handout.)

	LABIAL		CORONAL			DORSAL	GLOTTAL
	Bilabial	Labiodental	Interdental	Alveolar	Palatal	Velar	Glottal
Stops	p b			t d		k g	(ʔ)
Affricates					tʃ ɟʃ		
Fricatives		f v	θ ð	s z	ʃ ʒ		h (ɦ)
Nasals	m	(m̥)	(n̥)	n	(ɲ)	ŋ	
Liquids				l, ɹ			
Glides	W			(r)	j		