Phonology Practice

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Ling 201 Discussion Section 3/9/2024

Plan for today

1. Work through an allophone problem together
2. Go over Question 2 on Assignment 3
3. More allophone problems

Language 1: t vs d

[uvdi] [uθt]

[intos]

[pit]

[tinb]

[θuðd]

[tʃuzd]

[ekt]

[aft]

Step 1: List the environments

What do we mean by environment?: The neighboring phone (or silence) that comes immediately before, and the one that comes immediately after

For example:

- in the word [uvdi], d is in the environment “v comes before, i comes after”
- in the word [uzd], d is in the environment “z comes before, nothing comes after”.
- We write “nothing” with # for shorthand, i.e. “z comes before, # comes after”

Step 1: List the environments

[t]		[d]	
Before	After	Before	After
θ	#	v	i
n	o	ð	#
i	#	z	#
#	i		
k	#		
f	#		

Step 2: Check for complementary distribution

“Complementary distribution” is just a fancy way of describing the case where:

-there’s some **type of environmen**t where [t] **always** occurs

-[d] **never** occurs in that environment

OR vice-versa:

-there’s some type of environment where [d] **always** occurs

-[t] **never** occurs in that environment

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“Complementary distribution” is just a fancy way of describing the case where:

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OR vice-versa:

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-[t] **never** occurs in that environment

Why do we care about this? Well, if [t] and [d] are in complementary distribution, it means that for this language, where you get [t]s depends on where you get [d]s (and vice versa!)

Step 2: Check for complementary distribution

Is there anything that [t]'s environments have in common, that never is true for [d]'s environments? Or vice versa?

[t]		[d]	
Before	After	Before	After
θ	#	v	i
n	o	ð	#
i	#	z	#
#	i		
k	#		
f	#		

Step 2: Check for complementary distribution

[t]		[d]	
Before	After	Before	After
θ	#	**v**	i
n	o	**ð**	#
i	#	**z**	#
#	i		
k	#		
f	#		

Step 2: Check for complementary distribution

Notice that all of the sounds before [d] are fricatives, and they're all voiced.

[t]		[d]	
Before	After	Before	After
θ	#	**v**	i
n	o	**ð**	#
i	#	**z**	#
#	i		
k	#		
f	#		

Step 2: Check for complementary distribution

There's always a voiced fricative before [d]!
There's never a voiced fricative before [t]!

[t]		[d]	
Before	After	Before	After
θ	#	**v**	i
n	o	**ð**	#
i	#	**z**	#
#	i		
k	#		
f	#		

Step 2: Check for complementary distribution

So, we can conclude that [t] and [d] are in complementary distribution: [d] always occurs after a voiced fricative, and [d] never does

Step 3: Describe the rule

WHY does [d] always show up after a voiced fricative, and [t] never does???

Because [d] is an allophone of the phoneme /t/!

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Because [d] is an allophone of the phoneme /t/!

How do we know [t] isn't an allophone of [d]? Good question! We'll get to that in a little bit

Step 3: Describe the rule

Because we never see [t] after a voiced fricative, and we see [d] there, a first pass at describing the rule is:

/t/ changes into [d] after a voiced fricative.

Step 4: Describe the rule in features

But our rules don't work on whole phones; they work on properties of those phones called features.

Make sure to get the feature chart handout from Canvas!

Consonants	p	b	t	d	k	g	f	v	s	z	θ	ð	ʃ	ʒ	ʧ	ʤ
consonant	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
vowel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
sonorant	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
voice	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+
labial	+	+	-	-	-	-	+	+	-	-	-	-	-	-	-	-
coronal	-	-	+	+	-	-	-	-	+	+	+	+	+	+	+	+
anterior	+	+	+	+	-	-	+	+	+	+	+	+	-	-	-	-
strident	-	-	-	-	-	-	-	-	+	+	-	-	+	+	+	+
nasal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
continuant	-	-	-	-	-	-	+	+	+	+	+	+	+	+	-	-
back	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-
lateral	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Step 4: Describe the rule in features

So all we need to do now is translate this rule into features:

/t/ changes into [d] after a voiced fricative.

Step 4: Describe the rule in features

/t/ changes into [d] after a voiced fricative.

First, let’s find the feature values that describe /t/ and nothing else.

Step 4: Describe the rule in features

First, let's find the feature values that describe /t/ and nothing else.

/t/ is [-voice], so let's start there.

However, a ton of other sounds are [-voice] too, but they aren't involved in our rule. So let's see what other feature values will help eliminate those:

Step 4: Describe the rule in features

- /t/ is [-voice] and also [+coronal], unlike many other [-voice] phonemes.
- However, [-voice, +coronal] still describes /s/, /θ/, / tʃ/ as well as /t/.

- What other features of [t] can we use that are different from /s/, /θ/, / tʃ/?

Step 4: Describe the rule in features

What other features of [t] can we use that are different from /s/, /θ/, / tʃ/?

/s/ and /θ/ are both [+continuant], but /t/ is [-continuant].

Step 4: Describe the rule in features

So we can describe /t/ as [-voice, +coronal, -continuant] to eliminate /s/ and /θ/.

[-voice, +coronal, -continuant] still describes /tʃ/, though, and we don’t want to include it in our rule, so we need to find a feature different for /t/ and /tʃ/.

Step 4: Describe the rule in features

/tʃ/ is [-anterior], but /t/ is [+anterior]. So we can describe /t/ and not /tʃ/ with the feature description:

[-voice, +coronal, -continuant, +anterior].

Step 4: Describe the rule in features

Reminder: our rule is **/t/** changes into **[d]** after a **voiced fricative.**

We've just described /t/ in terms of features. Now let's describe the "voiced fricative" environment.

Step 4: Describe the rule in features

Goal: what combo of feature values do v, ð, z have in common that are different from other phones in the chart?

They’re all [+voice], so let’s start there.

Step 4: Describe the rule in features

Goal: what combo of feature values do v, ð, z have in common that are different from other phones in the chart?

They're all [+voice], so let's start there.

There are a ton of other [+voice] sounds though, like [n] and [b], that we don't want to include in our rule. We need to find the feature values that are different between v, ð, z and other [+voice] sounds to eliminate those.

Step 4: Describe the rule in features

What features are different for v, ð, z and other voiced sounds?

v, ð, z are all [+continuant], and a lot of other voiced sounds aren’t, so let’s include that.

So far we have [+voice, +continuant].

Step 4: Describe the rule in features

What features are different for v, ð, z and other voiced sounds?

v, ð, z are all [+continuant], and a lot of other voiced sounds aren’t, so let’s include that.

So far we have [+voice, +continuant].

What other sounds does this still include? ʒ, r, l, j

Step 4: Describe the rule in features

What features are different for v, ð, z and other voiced sounds?

v, ð, z are all [+continuant], and a lot of other voiced sounds aren't, so let's include that.

So far we have, to describe v, ð, z , [+voice, +continuant].

What other sounds does this still include? ʒ, r, l, j

These sounds aren't in the language we're looking at [look back at our word data to check this], so we don't have to worry about eliminating those.

Step 4: Describe the rule in features

What features are different for v, ð, z and other voiced sounds?

v, ð, z are all [+continuant], and a lot of other voiced sounds aren't, so let's include that.

So far we have, to describe v, ð, z , [+voice, +continuant].

What other sounds does this still include? ʒ, r, l, j

These sounds aren't in the language we're looking at [look back at our word data to check this], so we don't have to worry about eliminating those.

So our description for "voiced fricative" here can just be [+voice, +continuant].

Sidetrack

Now let’s get back to that question: why is the rule that /t/ changes to [d] and not /d/ changes to [t]? It’s because of the distributions!

Sidetrack

If the rule is /d/ -> [t] after θ, n, i, #, k, f, then there's:

- no set of feature values that describes only the phones in the environment (θ, n, i, #, k, f) and nothing else. (check this on your chart!)

- We have no way to express this in our feature system!

- And on a deeper level, there's nothing about the properties of the phones that predicts whether they'll make the change happen

Sidetrack

If the rule is /d/ -> [t] after i, o, # then there's:

- no set of feature values that describes only the phones in the environment (i, o, #) and nothing else.

- We have no way to express this in our feature system!
  - What about "before a vowel **or** silence"?
  - That won't work; our feature system doesn't do "**or**"'s, since then we could put together any random set of stuff that has nothing to do with properties they share

Step 4: Describe the rule in features

Reminder: our rule is /t/ changes into [d] after a voiced fricative.

So far we have /t/ in features: [-voice, +coronal, -continuant, +anterior]

And we have “voiced fricatives” in features: [+voice, +continuant]

All that’s left is to specify the change from /t/ to [d].

Step 4: Describe the rule in features

Reminder: our rule is /t/ changes into [d] after a voiced fricative.

So far we have /t/ in features: [-voice, +coronal, -continuant, +anterior]

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All that’s left is to specify the change from /t/ to [d].

t and d are exactly the same, except that [d] is voiced.

Step 4: Describe the rule in features

Reminder: our rule is /t/ changes into [d] after a voiced fricative.

So far we have /t/ in features: [-voice, +coronal, -continuant, +anterior]

And we have “voiced fricatives” in features: [+voice, +continuant]

All that’s left is to specify the change from /t/ to [d].

t and d are exactly the same, except that [d] is voiced. So we can write our rule as:

Step 6: Describe the rule in features

Reminder: our rule is **/t/** changes into [d] after a **voiced fricative**.

So far we have /t/ in features: **[-voice, +coronal, -continuant, +anterior]**

And we have “voiced fricatives” in features: **[+voice, +continuant]**

All that’s left is to specify the change from /t/ to [d].

t and d are exactly the same, except that [d] is voiced. So we can write our rule as:

/-voice, +coronal, -continuant, +anterior/ → [+voice] / **[+voice, +continuant]** ___

And we're done!

Our analysis of this dataset is that there's this rule:

/-voice, +coronal, -continuant, +anterior/ → [+voice] / **[+voice, +continuant]** ___

Assignment 3 Question 2

More language dataset practice

Language 2: m vs n

[bamp]

[noli]

[enk]

[andin]

[imfan]

[pambu]

[imva]

Language 3: s vs z

[iza]

[zang]

[θin] [ekza]

[lits]

[akθ] [mis]

[aði]

[aði]