

Phonetics, shading into Phonology

- ajm ən ajs skʌlptər. læst najt aj med ə kjuːb.
- aj wʊd ɪmædʒən ɪf ju kʊd ʌndərstænd mors kod,
ə tæp dænsər wʊd draɪv ju kreɪzi.
- ajm əɡenst pɪkətɪŋ, bət aj dont no haw tə ʃoʊ ɪt.
- maj fek plænts daɪd bəkɔːz aj dɪd nɑt prətend tə wɔtər ðəm.
- wʌn tajm ə ɡaj hændəd mi ə pɪktsər, hi sɛd “hɪrz ə pɪktsər əv mi wɛn aj wəz ʃʌŋgər.” evri pɪktsər əv ju ɪz wɛn ju wɛr ʃʌŋgər.
- aj laɪk rajs. rajs ɪz ɡret ɪf ju wʌnə ɪt tu θawzænd əv sʌmθɪŋ.
- aj ɡat ə kɪŋ saɪz bɛd. aj dont no ɛni kɪŋz,
bʌt ɪf wʌn kem ovər, aj ɡɛs hi wʊd bi kʌmftərbəl.

--mits hɛdbɜːrg

let's think more carefully about voicing....

Voice Onset Time: vocal cords start vibrating some time after the stop closure is released....

VOT 0-25 ms-->voiced

VOT 25 ms +-->voiceless

categorical perception: we have an arbitrary dividing line in the continuum of VOT

...categorical perception detected in 1-month-old infants.



chinchillas also have categorical perception...
(Kuhl and Miller 1975)

English VOT actually varies with position...

...so in a sense, English has three bilabial oral stops: b, p, and p^h.

So does Hindi?

pal	'take care of'
p^hal	'knife blade'
bal	'hair'

...so in a sense, English has three bilabial oral stops: b, p, and p^h.

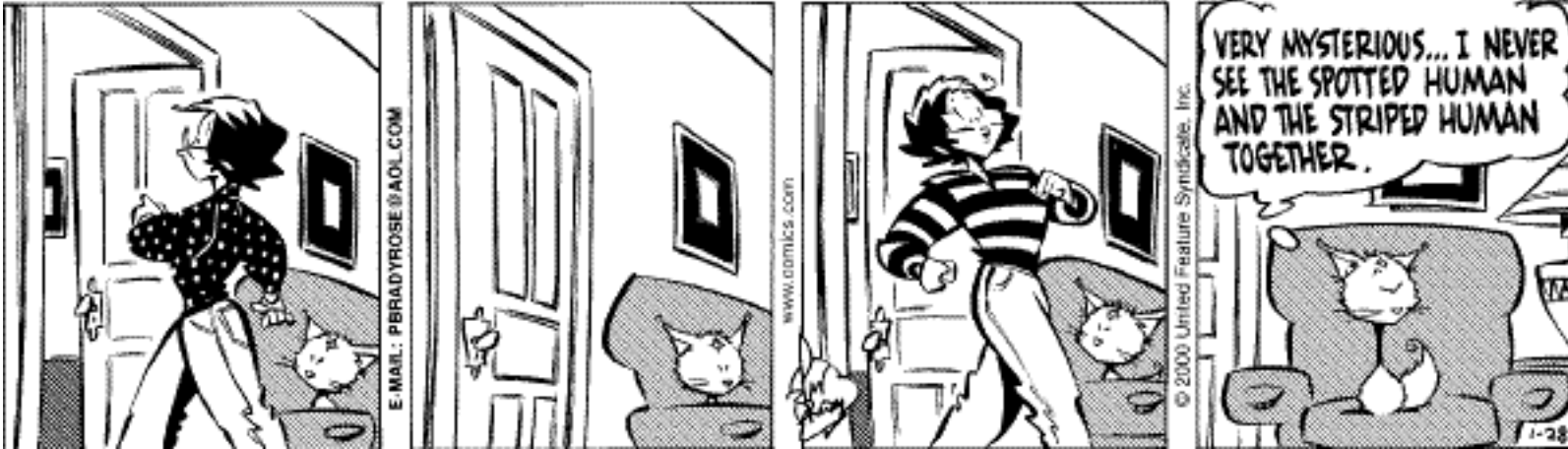
So does Hindi?

pal	'take care of'
p^hal	'knife blade'
bal	'hair'

....seems like we're missing something...

allophones

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....English "p" and "p^h" are in complementary distribution: there's no environment where you can get either one (unlike Hindi: *pal* 'take care of', *p^hal* 'knife blade').

remember **allomorphs**?

morpheme

"electric"

allomorphs

electri[k] + "-al" = "electrical"

electri[s] + "-ity" = "electricity"

in English, [p] and [p^h] are **allophones** of /p/.

phoneme

/p/

allophones

[p] between [s] and a vowel

[p^h] elsewhere

phoneme

/p/ [p] / s __ V

becomes

/p/ [p] / s ___ V

allophone

/p/ [p] / s __ V

when it is...

/p/ [p] / s ___ V

here.

/p/ [p] / s __ V

more generally:

A B / C _ D

(and C and/or D can be absent...)

English

/p/

[p] between [s] and a vowel
[p^h] elsewhere

Hindi

/p/

[p]

/p^h/

[p^h]

How do you know whether two sounds are allophones or distinct phonemes?

- look for **minimal pairs** (like Hindi *pal* and *p^hal*)
- if you can't find any, see if you can find a rule determining when you find which version of the sound.

Korean:

saram 'person'

rupi 'ruby'

irum 'name'

ratio 'radio'

mul 'water'

pal 'arm'

səul 'Seoul'

ilkop 'seven'

ipalsa 'barber'

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/l/ [r] / __ V

Korean:

sar**am** 'person'

ru**pi** 'ruby'

iru**m** 'name'

ra**ti**o 'radio'

mu**l** 'water'

pa**l** 'arm'

seu**l** 'Seoul'

il**ko**p 'seven'

ipa**l**sa 'barber'

/l/ [r] / ___ V
[l]

Careful! Not all sound changes create allophones of a single phoneme.

Polish Plurals

jezy <u>k</u> 'language'	jezy <u>ki</u> 'languages'	jezy <u>k</u>
garne <u>k</u> 'pot'	garn <u>ki</u> 'pots'	garne <u>k</u>
sok <u>k</u> 'juice'	sok <u>ki</u> 'juices'	sok <u>k</u>
wu <u>k</u> 'bow'	wu <u>ki</u> 'bows'	wu <u>k</u>
brze <u>k</u> 'bank of a river'	brze <u>gi</u> 'banks of a river'	brze <u>g</u>
dwu <u>k</u> 'debt'	dwu <u>gi</u> 'debts'	dwu <u>g</u>
wu <u>k</u> 'lye'	wu <u>gi</u> '(kinds of) lye'	wu <u>g</u>

plus a rule: /g/--> [k] / __ #

"word boundary"

further exercise: English /t/

sit

sitter

heat

heater

at

attic

/t/ becomes [ɾ] (in American English)

sit [sɪt]

sitter [sɪɾəɪ]

heat [hit]

heater [hiɾəɪ]

at [æt]

attic [æɾɪk]

/t/-->[ɾ] / V__V ?

but what about...

atone [ə^ton]

attack [ə^tæk]

detect [dɪ^tekt]

sit	[sɪt]
sitter	[sɪtʃəɪ]
heat	[hi:t]
heater	[hi:tʃəɪ]
at	[æt]
attic	[ætɪk]
atone	[ətʰon]
attack	[ətʰæk]
detect	[dɪtʰekt]

sit	[sít]
sitter	[síɾəɪ]
heat	[hít]
heater	[híɾəɪ]
at	[æt]
attic	[éɾɪk]
atone	[ə ^h ón]
attack	[ə ^h æk]
detect	[dɪ ^h ékt]

t-->ɾ / V__ V

What we're seeing is that the distribution of aspirated, flapped, and unaspirated [t] is *predictable*. It would be a mistake to posit this distinction in the lexicon...

Rules like the Flapping Rule (and the other rules we've looked at) capture generalizations about the distributions of certain sounds.

If we just listed:

heat	[hit]
heater	[híɾəɪ]

...in the lexicon, we would miss these generalizations (i.e., we wouldn't succeed in predicting that there are no English words like [hir] or (in American English) [hitəɪ]).

And these generalizations are part of our competence:

"gat"	[gæt]	+ -er
--> "gatter"	[gæɾəɪ]	

Phonological rules also allow us to simplify our statements about allomorphy:

"heat" --> [hit]
--> [hir] + -er

We don't need to state anywhere that 'heat' has these two allomorphs; it's covered by our phonological rule.

Compare:

"electric" --> [əlektrik]
--> [əlektris] + -ity

...which does have to be stated in the lexicon.

English plurals

dɔg

t^hʌb

hɛd

bɛl

p^hɪn

fɪlm

fliː

k^hɛjv

k^hɑː

k^hæt

dʒəˌjæf

t^hʌp

t^hɪæk

bɪˌɪf

bɪˌɪdʒ

mɛs

lætʃ

mɛjz

English plurals

dɒgz

tʰʌbz

hedz

belz

pʰɪnz

filmz

flijz

kʰejvz

kʰaɪz

kʰæts

dʒəɪəfs

tʰaps

tʰɪæks

bɪʌfəz

bɪdʒəz

mɛsəz

lætsəz

meɪzəz

English plurals

dɒgz	k ^h ætʃs
t ^h ʌbz	dʒəʔæfʃs
hedz	t ^h ʌps
bɛlz	t ^h ɪækʃs
p ^h ɪnz	bɪʃəz
filmz	bɪdʒəz
fliːz	mɛsəz
k ^h ɛjvz	lætʃəz
k ^h ɑːz	meɪzəz

əz after *stridents*

s after voiceless non-stridents

z after voiced non-stridents

English plurals

dɒgz

tʰʌbz

filmz

hedz

belz

pʰɪnz

flijz

kʰejvz

kʰɑɪz

kʰæts

dʒəɪəfs

bɪdʒəz

tʰʌps

tʰɪæks

bɪʌʃəz

mɛsəz

lætsəz

mejzəz

Concentrate on **s** and **z** first.

two imaginable stories:

1. plural is underlying **s**,
and it voices after voiced sound.
2. plural is underlying **z**,
and it devoices after voiceless C.

əz after stridents

s after voiceless non-stridents

z after voiced non-stridents

1. Plural is underlying **s**, and it voices after voiced sound.

2. Plural is underlying **z**, and it devoices after voiceless C.

...are either of these general facts about English? any counterexamples?

1. Plural is underlying **s**, and it voices after voiced sound.

p^hlejs, læns, p^hərs...

2. Plural is underlying **z**, and it devoices after voiceless C.

...*ʃɪpz...

...are either of these general facts about English? any counterexamples?

1. Plural is underlying **s**, and it voices after voiced sound.

p^hlejs, læns, p^hərs...

2. Plural is underlying **z**, and it devoices after voiceless C.

...*ʃɪpz...

...are either of these general facts about English? any counterexamples?

**→ hypothesis 2 can be part of a general English fact:
*[voiceless] [voiced] #**

similarly:

bɪʌfəz

mɛsəz

lætʃəz

meɪzəz

əz after stridents...

similarly:

bɪʌfəz

mɛsəz

lætʃəz

meɪzəz

əz after stridents...

more generally, *[strident] [strident] #

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24.900 Introduction to Linguistics Spring 2022

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