

Key Concepts in: English Phonetics & Phonology

HUFS
Summer 2024

Miran Kim (mirankim@gnu.ac.kr)



OVERVIEW: Phonetics & Phonology

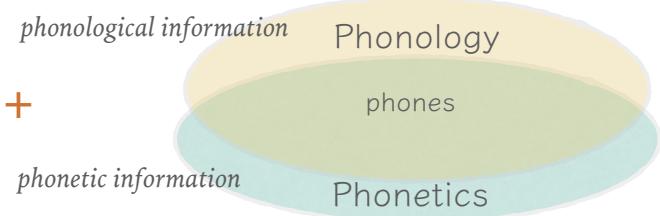
<Traditional view>



- Description of sounds
- Actual sounds produced

- Sound systems in a language
- Sounds represented in our mind

<Modern view>



2

CONTENTS:

Part 1

Basic Phonetics:

Articulation, description of English sounds, sound grouping, transcription, phonemes and allophones, syllable structure

Part 2

Phonetics & Phonology:

Phonemes to pronunciation, allophonic rules, distinctive features, phonological processes

Part 3

Phonology & Morphology

Phonological rules on morphemes (allomorphs), types of morphemes, word-formation, structure & ambiguity

Part 4

Prosody

Prosodic hierarchy (feature, segment, syllable, foot), Intonation & implicational meaning

3

“ Topic [1] Speech mechanism & articulation

How can we describe English sounds & why do we need transcription?

Part I. Basic phonetics

4

- Keep speech mechanism as background information:

When a question describes a specific sound or compares different articulation of two sounds, you shall be given **articulatory descriptions** with **linguistic terms** and **articulatory information** to share the focus of the question.

5

<Understanding speech production mechanism>

1) Airstream process

Pulmonic vs. **non-pulmonic**

2) Phonation process

voiced vs. **voiceless**

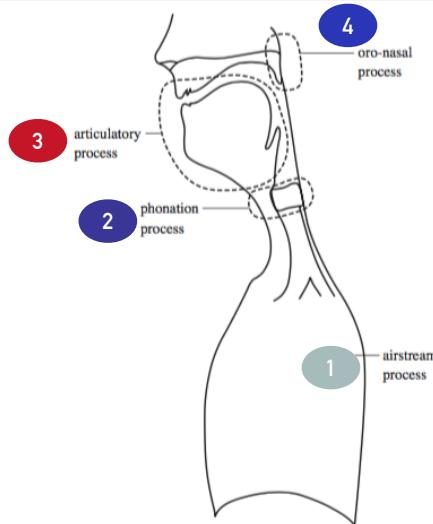
3) Articulation process

place and **manner** of articulation

4) Oro-nasal process

oral sounds vs. **nasal** sounds

Figure 1.3 The four main components of the speech mechanism.



7

Example) [2014] (cf. 2019 [3])

e.g., /l/ has two allophones: “clear /l/ [l] vs. dark /l/ [ɫ]”

“... The articulatory difference between the two is that in the former **the back of the tongue is lowered** while in the latter **it is raised toward the velum or retracted toward the uvula** (without making contact in either case)....

clear 'l'	leaf	feel	dark 'l'
<i>light</i>	<i>tile</i>		
<i>life</i>	<i>file</i>		

6

2) Phonation process

voiced vs. **voiceless**

Voiceless consonants

e.g.,

peace [s]
face [s]
leaf [f]
feel [f]

Voiced consonants in English

peas [z]
phase [z]
leave [v]
yeal [v]

* All vowels are voiced.

8

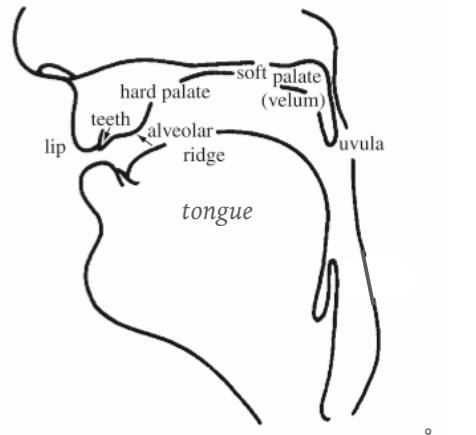
3) Articulation process

place and **manner** of articulation

Figure 1.5 The principal parts of the upper surface of the vocal tract.

e.g., **Place change**
'pie' 'tie' 'chi'
'feel', 'seal', 'heal'

e.g., **Manner change**
'tight' 'site'
'right' 'light'
'night'



"A course in phonetics" (Ladefoged & Johnson,⁹ 2006)

4) Oro-nasal process (~ velic gesture)

oral sounds vs. **nasal** sounds

e.g., **oral** vs. **nasal**

'**buy**' vs. '**my**'

'**tight**' vs. '**night**'

'**kick**' vs. '**king**'

Figure 1.8 The positions of the vocal organs in the bilabial stop in *buy*.

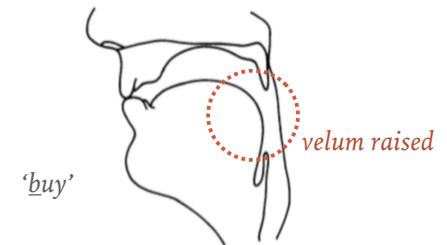
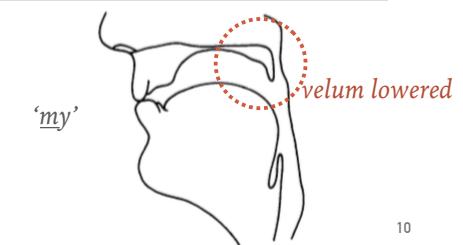


Figure 1.9 The positions of the vocal organs in the bilabial nasal (stop) in *my*.



10

“ Topic [2] Spelling & sounds

IPA & phonetic transcription

Part I. Basic phonetics

11

1. Spelling(orthography) and sounds

- One sound, multiple spellings

Unlike most languages,

English provides more than one way to spell nearly every sound.

- Most letters and letter-combinations can stand for different pronunciations depending on context and meaning.

12

: Illustration of the irregular sound-spelling correspondence

<Sound (phone)>

<Spelling (letters)>

[k]

e.g., kick, cake, christ, etc.

'k, c, ch'

[s]

e.g., beside, decide, etc.

's, c'

[s, z]

e.g., kicks, maps, bees, season, has, as, is, etc.

's'

13

Please note the followings:

- When there is no purpose of comparison between English sounds and others, some prefer a simpler version of IPA (or reduced sets of symbols):

For learners' conveniences, some introductory books use more common symbols to express English sounds.

e.g.,

(1) 'yes' [yəs] or 'may' [mey] or [me] rather than [jɛs], [mer]

(In IPA, [y] is a rounded vowel as occurring in French "oui")

(2) 'rain' [rem] rather than [.rem]

(In IPA, [r] is a trill as occurring in Spanish or Italian "perro (dog)")

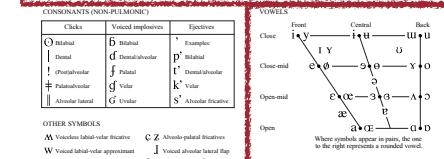
2. International Phonetic Alphabet (IPA)

- Idea: One symbol for one sound.

- Common letters for more common sounds in the world

- Purpose: IPA is to transcribe sounds of the world.

THE INTERNATIONAL PHONETIC ALPHABET (revised to 2015)											
© 2015 IPA											
CONSONANTS (PULMONIC)											
Bilabial	Vibrissal	Dental	Monlabial	Postvocalic	Retroflex	Palatal	Volar	Velar	Uvular	Pharyngeal	Glossal
Plosive	p b	t d	t̪ d̪	c̪ ɟ̪	k g	q ɢ	t̫ ɬ	?			
Nasal	m n	n̪	n̪̫	ŋ̪	ŋ̪̫	ŋ	ŋ̪	ŋ̪̫	ŋ̪̫̫		
Trill	-	r	-	-	-	-	-	-	-	r	
Tap or Flap	v̪	-	-	-	-	r̪	-	-	-	-	
Fricative	f v	θ ð	s z	f̪ z̪	s̪ z̪	ç ɟ	x y	χ ʁ	h ʕ	ħ ʕ̪	ħ̪ ʕ̪̫
Tapped fricative	-	-	-	l̪ h̪	-	-	-	-	-	-	-
Affricate	-	-	-	-	-	-	-	-	-	-	-
Approximant	-	-	-	v̫ j̫	-	ɻ̫ ɬ̫	-	-	-	-	-
Implosive	-	-	-	-	-	-	-	-	-	-	-
Symbols to the right in a cell are voiced, to the left are voiceless. Shaded areas denote articulations judged impossible.											



Where symbols appear in pairs, the one to the right represents a rounded vowel.

OTHER SYMBOLS			
M	Voiceless labio-velar fricative	C Z	Alveolo-palatal fricative
W	Voiceless labio-velar approximant	J	Voiceless alveolar lateral flap
ɥ	Voiceless labio-palatal approximant	ʃ ʒ	Similative ʃ and X
H	Voiceless epiglottal fricative	H	Voiceless epiglottal fricative
χ	Voiceless epiglottal fricative	χ	Affricate and double articulations joined by a tie bar if necessary.
ɸ	Voiceless epipharyngeal fricative	ɸ	Epipharyngeal plosive
ts	Voiceless dental click	ts	Secondary stress
ts'	Voiceless dental click	ts'	Long e: eː
ts̪	Voiceless dental click	ts̪	Half-long e'
ts̪'	Voiceless dental click	ts̪'	Major (intonational) group
ts̫	Voiceless dental click	ts̫	Syllable break ji.akt
ts̫'	Voiceless dental click	ts̫'	Linking (absence of a break)
ts̫̫	Voiceless dental click	ts̫̫	TONES AND WORD ACCENTS
ts̫̫'	Voiceless dental click	ts̫̫'	LEVEL CONTOUR
ts̫̫̫	Voiceless dental click	ts̫̫̫	ts = ˥ High ˥ High ˥ High
ts̫̫̫'	Voiceless dental click	ts̫̫̫'	ts' = ˧ Middle ˧ Middle ˧ Middle
ts̫̫̫̫	Voiceless dental click	ts̫̫̫̫	ts̫ = ˨ Low ˨ Low ˨ Low
ts̫̫̫̫'	Voiceless dental click	ts̫̫̫̫'	ts̫' = ˩ Very low ˩ Very low ˩ Very low
ts̫̫̫̫̫	Voiceless dental click	ts̫̫̫̫̫	ts̫̫ = ˥ Global ˥ Global ˥ Global
ts̫̫̫̫̫'	Voiceless dental click	ts̫̫̫̫̫'	ts̫̫' = ˧ Global ˧ Global ˧ Global

“ Topic [3] Individual sound description and sound grouping

e.g., Final sound in “leaf, cave, leap”

[f] voiceless labio-dental fricative

[v] voiced labio-dental fricative

[p] voiceless bilabial stop (=plosive)

Part I. Basic phonetics

A. Description of a sound

What is consonant? What is vowel?

Consonants differ in

1. Voicing

Status of vocal folds
(Vocal fold vibration)

<Examples>

/f/ vs. /v/

2. Place of articulation

Where the constriction occurs
(Where to block the air)

/p/ vs. /t/

3. Manner of articulation

Degree of constriction
(Space of noise channel)

/t/ vs. /s/

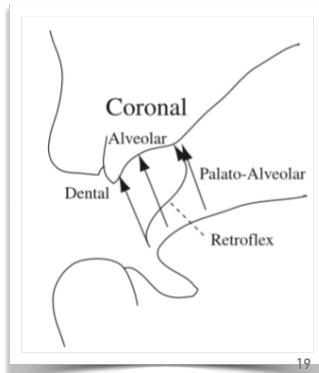
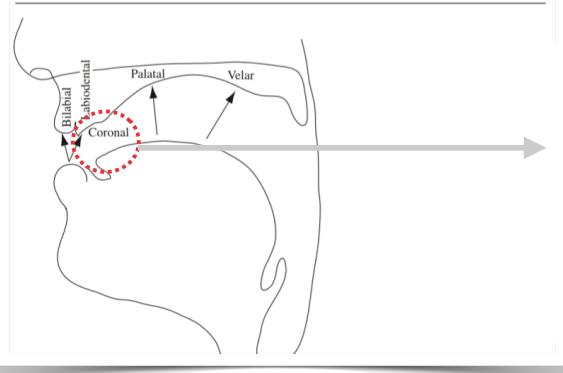
17

2. Place of articulation

Where the air from the lungs is blocked (constriction)

- Labial: lip is involved
- Coronal: tongue tip/blade is involved
- Dorsal: back of the tongue is involved

Figure 1.7 A sagittal section of the vocal tract, showing the places of articulation that occur in English. The coronal region is shown in more detail at the right.



19

1. Voicing

English consonants are either voiced or voiceless

Voiceless (9)

/p, t, k/
/f, θ, s, ʃ, h/
/tʃ/

Voiced (15)

/b, d, g/
/v, ð, z, ʒ/
/dʒ/
/m, n, ɳ/
/r, l, w, j/

All vowels are voiced.

/i, ɪ, ɛ, æ, u, ʊ, ʌ, ɔ, ɑ, (ə)/
/eɪ(e), ou(o), ai, au, ɔɪ/

C

V

18

2. Place of articulation

Where the air from the lungs is blocked (constriction)

- Labial: lip is involved

/p, b, m, f, v, (w)/

- Coronal: tongue tip/blade is involved

/t, d, n, θ, ð, s, ʃ, ʒ, tʃ, dʒ, r, l, (j)/

- Dorsal: back of the tongue is involved

/k, g, ɳ/

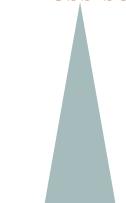
20

3. Manner of articulation

the degree of constriction

- Complete closure

Less sonorous



- Open
- More sonorous

Stops: /p, b, t, d, k, g/

Affricates: /tʃ, dʒ/

Fricatives: /f, v, θ, ð, s, z, ʃ, ʒ, h/

Nasals: /m, n, ɳ/

Approximants: /w, j, r, l/

Vowels: /i, ɪ, u, ʊ, ε, æ,/

Complete description of a consonant

Voicing	Place of articulation	(Oro-nasal)	(Laterality)	Manner of articulation
Voiced	Bilabial (Oral)		Lateral [l]	• Stop(=plosive)
Voiceless	Labio-dental Dental Alveolar Palatal Velar Glottal	Nasal [m,n,ɳ] or Non-lateral)	(Central)	• Affricate • Fricative • Tap/Flap/Trill • Approximant (liquid / glide)

→ Sonority scale (phonology): lesser degree of constriction ≈ more sonorous



+ syllable => 2013 [1] 기출문제

21

Consonant description (practice)

'peels'	Voicing	Place of articulation	(Oro-nasal)	(Laterality)	Manner of articulation
---------	---------	-----------------------	-------------	--------------	------------------------

/p/ Voiceless bilabial (oral) (central) stop

/l/ Voiced alveolar (oral) lateral approximant

/z/ Voiced alveolar (oral) (central) fricative

/m/ Voiced bilabial nasal — (stop)

/ʒ/ Voiced postalveolar (oral) (central) fricative

/r/ Voiced alveolar (oral) (central) approximant

23

24 distinct consonants in English and IPA symbols

	Bilabial	Labio-dental	Dental	Alveolar	Post-alveolar (=palato-alveolar)	Palatal	Velar	Glottal
Stops	Nasal (stop) = Nasal	m			n		ɳ	(3)
	(Oral) stop = Plosives	p b		t d		k g		(6)
Fricatives		f v	θ ð	s z	ʃ ʒ		h	(9)
Approximants	(Central) Approx.	(w)		r		j w		(3)
	Lateral Approx.			l				(1)

22

24



+ 2 Affricates

/tʃ/ /dʒ/

= 24 consonants

These sounds begin with a stop and end with a fricative.

- *Phonetically* two sounds in sequence but *phonologically* one sound in English

cf. 'kids' /kɪdz/, 'cats' /kæts/ (cf. 'cage' [dʒ], 'catch[tʃ]')
 /dz/ and /ts/ can be one sound in other languages.

25

B. Description of vowels

Vowels

1. Rounding

Lip rounding involved

2. Tongue height

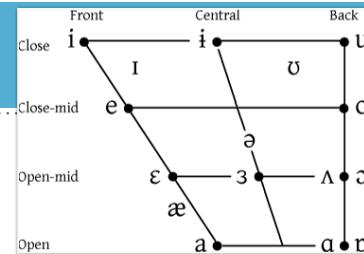
Tongue or jaw position for the vowel

3. Tongue Backness

Tongue backness for the vowel

4. Tense / lax

To describe English vowels



27

24 distinct consonants in English and IPA symbols

* When symbols appear in pairs, the one to the right represents a voiced consonant.

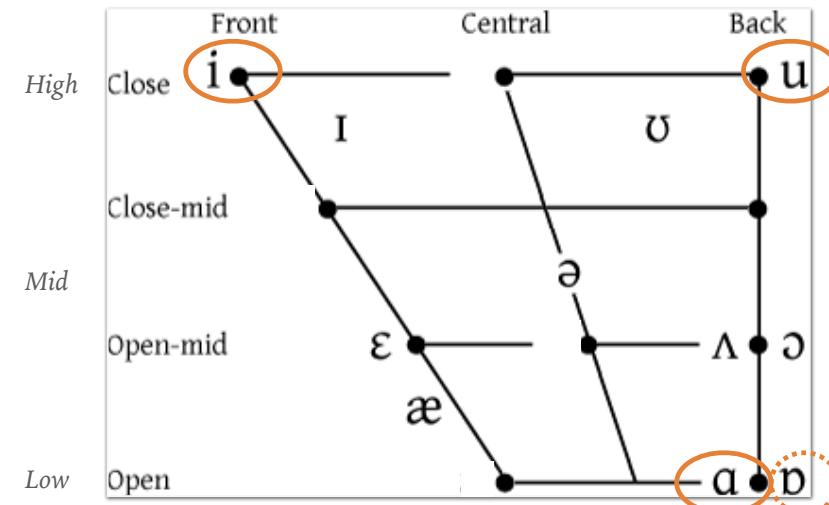
* /w/ has two places of articulation (called labio-velar)

	Bilabial	Labio-dental	Dental	Alveolar	Post-alveolar (=palato-alveolar)	Palatal	Velar	Glottal
Stops	Nasal (stop) = Nasal	m		n		ŋ		
	(Oral) stop = Plosives	p b		t d		k g		
Fricatives		f v θ ð s z		ʃ ʒ		h		
Approximants	(Central) Approx.	(w)		r	j w	Glides		
	Lateral Approx.			l				

+ /tʃ/ /dʒ/

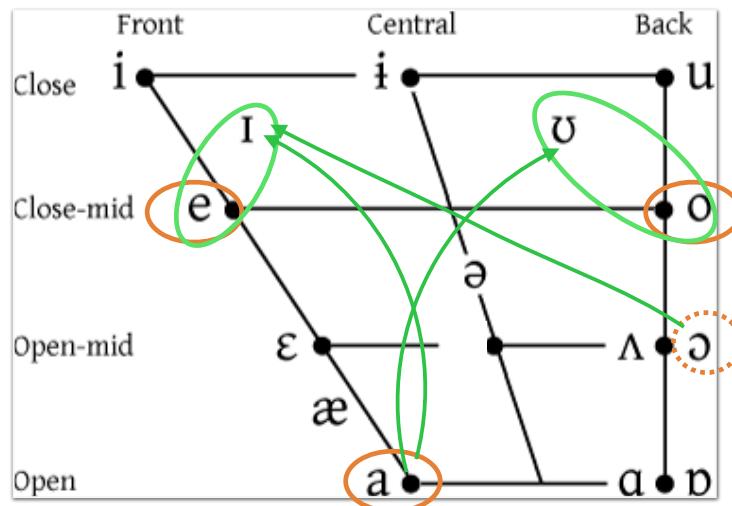
26

B. Description of vowels: monophthongs

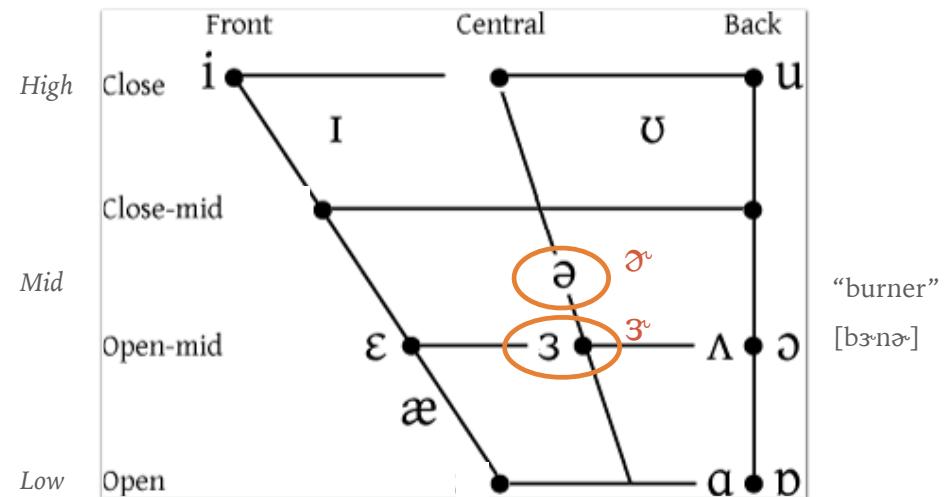


28

B. Description of vowels: diphthongs



29



30

“ Same or different sounds...

e.g., pie, spy, buy

/p/ /p/ /b/
[p^h] [p] [b̥]

Topic [4] Phonemes and allophones

Part I. Basic phonetics

A. SAME OR DIFFERENT SOUNDS?

- Phonemes: Sounds that native speakers identify (or categorize) as being “**the same**”.

Q: How many *different* consonants in the given word?



/phoneme/

아라 알라

/ㄹ/ = /ㄹ/

[c] allophones [t]

Say:



Say:

Examples of English phonemes and allophones

/p/ peak [p^h] speak [p]

/t/ team [t^h] steam [t] writer [ɾ] button [?]

Two different phonemes

Allophones that belong to the same phoneme

33

- **Phoneme:** the smallest contrastive sound unit which may bring about a change of meaning

[t]

e.g., team
[t^him]
/tim/

heat, set

[d]

deem
[dɪm]
/dim/

heed, said

Examples of English phonemes and allophones

/z/ scissors [z] amaze [z]

/ʒ/ seizures [ʒ] measure [ʒ]



One phoneme in Korean

Three different phonemes in English

34

- * **Minimal pair:** pairs of words or phrases in a particular language that differ in only one phonological element and have distinct meanings.

/r/ vs. /l/

rain vs. lane

correct vs. collect

If you find a minimal pair for 2 sounds [X] and [Y]

they are two different phonemes

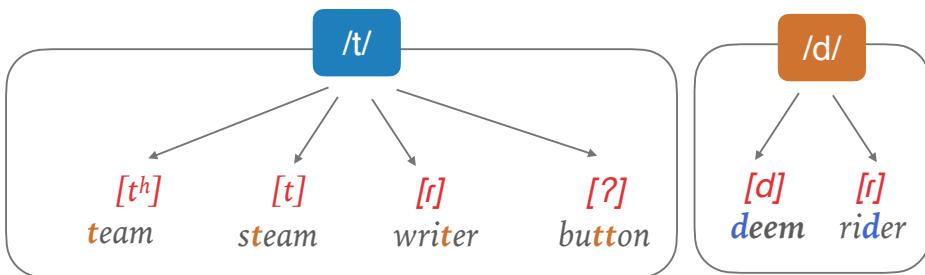


Not always

35

36

- **Allophones**: possible surface phones (=pronunciation) that belong to one phoneme



<Descriptions>

- /t, d/ are two different **sounds** = two **phonemes** as in ‘team, deem’
- [tʰ, t, r, ?] are allophones of /t/ as in ‘team, steam, writer, button’
- [r] is an allophone of /t, d/ as in ‘writer, rider’

37

Minimal pair vs. Near minimal pair?

- * (When there is no minimal pair for two sounds due to **lexical gap or phonotactic constraints**)

* **Near Minimal pair**: pairs of words or phrases that can show contrastiveness of two sounds although they may differ in the environments.

word-initial, medial, final

[dʒ] Jane, majority, cage

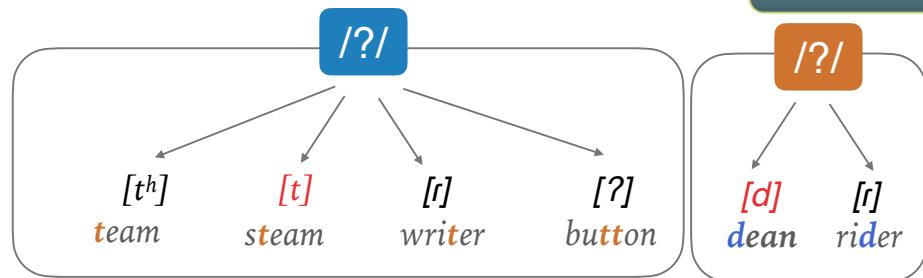
/dʒ/ vs. /ʒ/

[ʒ] (X), measure, beige

39

Which one is chosen as a phoneme among multiple allophones?

2012[1] 5번



Q: Why /t/ and not /tʰ/ or /X/

- **Phoneme** is a representative allophone among many surface forms. (We choose one that shows wider distribution and is in elsewhere condition)

38

Phonemes or allophones?

- [1] If two sounds are **found in minimal pairs**, they could be two different phonemes.

A

e.g., team /t/ /tim/
face /f/ /feɪs/
see /s/ /siː/
right /r/ /raɪt/

B

deem /d/ /dɪm/
vase /v/ /veɪs/
she /ʃ/ /ʃiː/
light /l/ /laɪt/

40

Phonemes or allophones?

[1] If two sounds are **found in minimal pairs**, they could be two different phonemes.

(Korean: “**서 계**”)

[s] or [ʃ] (dialectal)

c.f., ‘spy’ spy [pʰ] ~ spy [p] or ‘writer’ writer [t] ~ writer [ɾ]
(foreign accents) (dialectal difference)

41

Phonemes vs. allophones

[2] Look at the distributional characteristics.

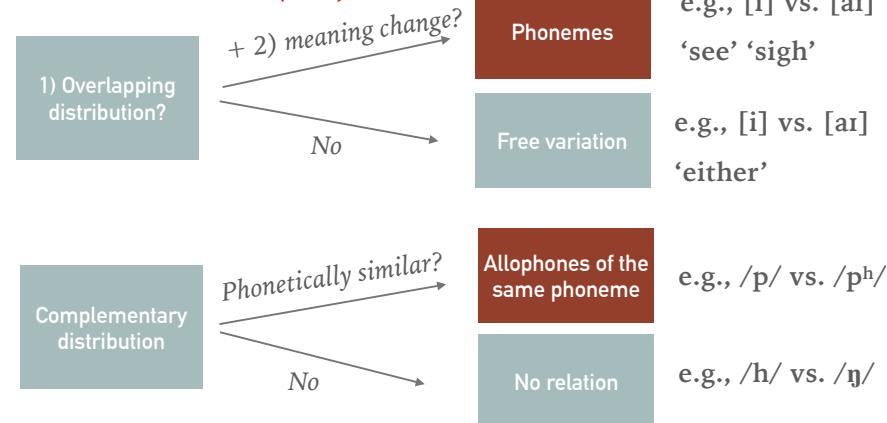
- Overlapping distribution: two sounds may appear in a same context. (*If these two sounds do not make any meaning difference*, it is called **free variation**.)
- **Contrastive distribution:** Two sounds are in contrastive distribution (= **phonemes**).
- **Complementary distribution:** Two sounds are in complementary distribution (= **allophones**)

43

Phonemes vs. allophones

[2] Look at the distributional characteristics.

Contrastive distribution (1+2)



42

Phonemes vs. allophones

2012 기출문제 [1]

Phonemic relation

Have a minimal pair
(though not always)

aɪ (p, b, t, d, s, f, ...)

— (overlapping distribution) —

Change in meaning
(**Contrastive distribution**)

pie, buy, tie, dye, sigh, etc.

Note) mint[ɪ], meant[ɛ]

Free variation

“economy” (?)

[ɪkanəmi] ([i] or [ɛ])

— (overlapping distribution) —

No meaning change —

“economy”

[ɪkanəmi] ~ [ɛkanəmi]

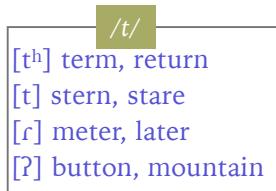
Allophonic relation

Distribution of Sound X



(non-overlapping)

Complementary distribution



44

Q: Are /ŋ/ and /h/ are allophones of the same phoneme?

- /h/ occurs only in the onset position while /ŋ/ occurs only in the coda position.
e.g., *happy, rehearsal, rehab*, etc.
- There is no minimal pair for the two sounds.
- However, these two cannot be allophones of the same phoneme. Why?
Complementary distribution?
e.g., *sing, bring, hanging*, etc.

For two sounds to belong to a same phoneme, the two sounds should phonetically similar. (*phonetic similarity*)

45

Syllable has an internal structure? (onset/rhyme)

- Speech planning: we plan what to say and how to say the idea. Sequences of sounds are planned together sometimes referring to linguistic structure. (e.g., Spoonerism)



“Three cheers for our queer old dean.”

“You have hissed all my mystery lectures.”

- Rev. W. A. Spooner (1844~1930), Professor at Oxford University.

47

“ Segmental vs. suprasegmental properties of speech

e.g., [5] syllable structure
+ *stress pattern in phonology*

Part I. Basic phonetics

46

Speech = Segmental + suprasegmental material

- **Segment** is "any discrete unit that can be identified, either physically or auditorily, in the stream of speech"
e.g., consonants (C) and vowels (V)

48

Speech = Segmental + suprasegmental material

- Suprasegmentals are properties that are carried over segmental material of speech. (e.g., Chinese tone, Vowel length contrast in Finnish)

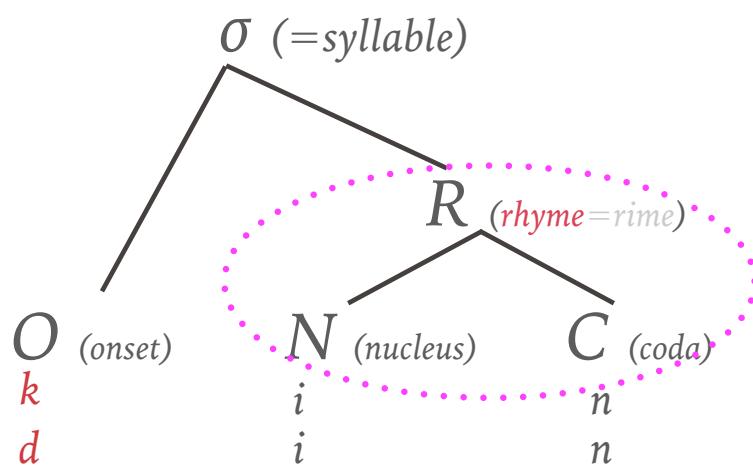
=> Prosody includes suprasegmental characteristics as well as syllable structure, stress, pitch accents, intonation and rhythm. It is often interchangeable with the term "suprasegmentals".

49

[2] Syllable structure (e.g., rhyme)

2014 기출문제 [1]

- Sounds (Cs and Vs) are hierarchically organised.



51

Syllable evidence? [1] Counting number of syllables

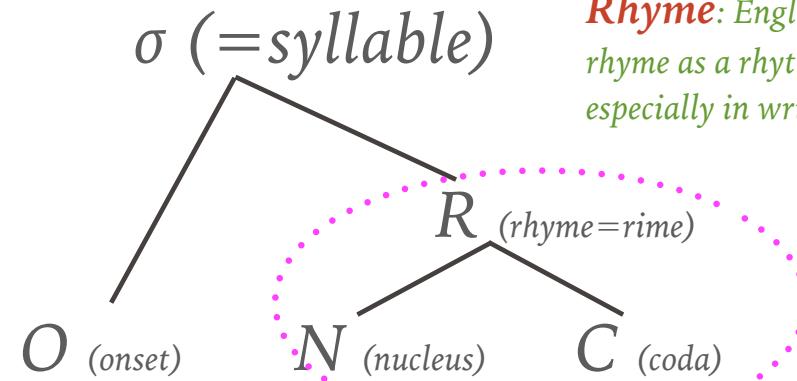
- Native speakers have the intuition on syllable counting.

Q: Find disyllabic words:

A	B	C
I	eyed	wasps
pie	tight	grasped
pine	bright	sparked
spine	sprite	seeing
scribe	screamed	playful
scribed	scripted	little

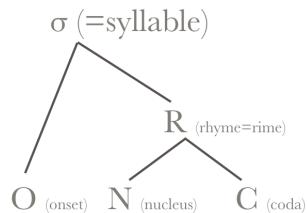
50

Rhyme: English uses rhyme as a rhythmic unit especially in writing



52

Rhyme: English uses rhyme as a rhythmic unit especially in writing



• **The Slipping String**

First fight. Then fiddle. Ply the slipping string
 With feathery sorcery; muzzle the **note**
 With hurting love; the music that they **wrote**
 Bewitch, bewilder. Qualify to **sing**
 Threadwise. Devise no salt, no hempen **thing**
 For the dear instrument to bear.
 (Gwendolyn Brooks, "The Children of the Poor")

Lose yourself
 - Eminem

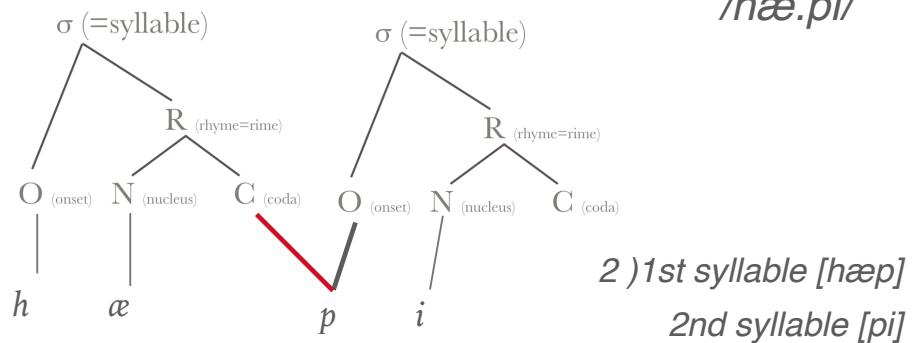
His palms are sweaty, knees weak, arms are **heavy**
 There's vomit on his sweater already, mom's **spaghetti**
 He's nervous, but on the surface he looks calm and **ready**
 To drop bombs, but he keeps on forgettin'
 What he **wrote down**, the **whole crowd** goes **so loud**
 He **opens** his **mouth**, but the words **won't** come **out**
 He's **chokin'**, **how**, everybody's **jokin' now**
 The clocks run out, times up, over, blow

53

ambi-syllabicity

In some cases, native speakers may feel that a single sound belong to two separate syllables.

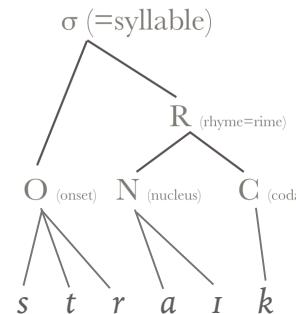
1) 'happy'
/hæ.pi/



55

[3] syllable affiliation = syllabification (example)

How many syllables in 'strike'?



54

Other influences: spelling or morphological boundary
 (these are not phonological issues)

'classic' /klæsɪk/ with 3 different intuitions (natives)

'classic' /klæ̡.sɪk/ (most common)

'classic' /klæ̡s.ɪk/ (morphological influence)

'classic' /klæ̡s.sɪk/ (spelling or prescriptive grammar)

56

“ [1] From /phoneme/
to [pronunciation]

Allophonic rules in English

We will be examining some allophonic rules in English. [+phonetic transcription]

Part II. Phonology: Sound rules in English

Examples

Voiceless stops included	Phonetic transcription
“paper”	/p, p/
	[^h p̚eɪpə]
“potato”	/p, t, t/
	[^h p̚ət̚eɪp̚əʊ]
“key”	/k/
	[^k hi]
“ski”	/k/
	[^k ski]
“happen”	/p/
	[^{hæp̚ən]}

1. Aspiration rule (for voiceless stops)

Voiceless stops are aspirated when they are located in a stressed syllable except after /s/.

p^h, t^h, k^h

team
peak
cool

p, t, k

steam
speak
school
happen
chicken

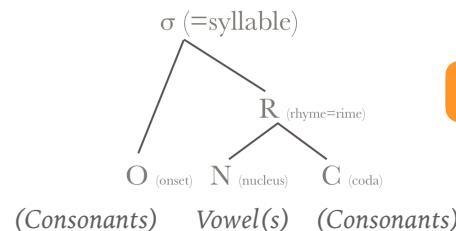
2005[1], 2013 [2]: (a)번 규칙

58

2. Syllabic consonants in English

Nasals (and liquids) are syllabic at the end of a word when immediately after an obstruent.

- Consonants in general take either **Onset** or **Coda** position within the syllable structure. The **nucleus**, on the other hand, is filled with a vowel.



2009 [2]: (1)번규칙

60

2. Syllabic consonants in English

Nasals (and liquids) are syllabic at the end of a word when immediately after an obstruent.

- Consonants in general take either **Onset** or **Coda** position within the syllable structure. The **nucleus**, on the other hand, is filled with a vowel.
- However, in English, some consonants can substitute the role of vowel (taking the nucleus position) when vowel is deleted (e.g., schwa). This means that English allow syllables without a vowel as long as there exist a syllabic consonant.

61

Examples

light vs. dark

2014, 2009

onset vs. coda

e.g., leaf vs. feel

= Velarization

2019

dark > darker > darkest

(vocalisation or deletion)

e.g., milk [mɪlk] or [mɪuk]

2019 [3], 2009 [2], 2014 [1]

63

3. Velarization of /l/: light vs. dark [ɫ]

The lateral /l/ is velarized after a vowel or before a consonant at the end of a word. (coda or rhyme position when the /l/ is syllabic.)

dark [ɫ] (=velarized)

light [l]

feel	felt	leaf	feeling
meal	milk	light	believing
seal	silk	lease	release
cool	guilt	leaf	hilarious
heel	help		

62

4. Tapping (=Flapping) of /t, d/

Alveolar stops /t,d/ become voiced taps when they occur between two vowels the second of which is unstressed.

V t/d V

[ɾ]

greater, water, butter, cutter, heater, writer
grader, powder, buddy, rider, etc.

What about 'comedy'?

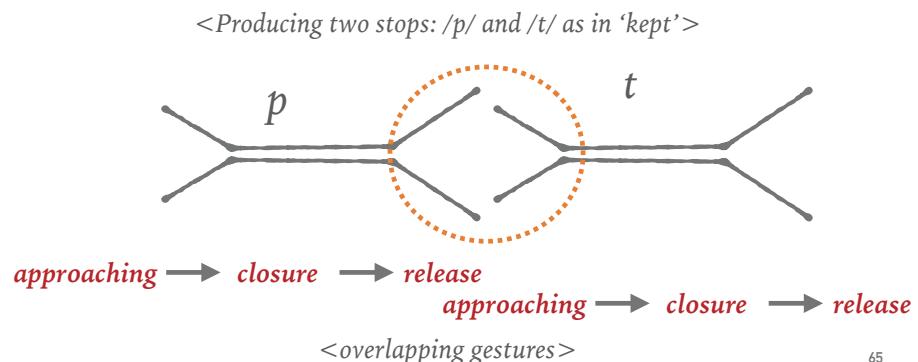
'tap' = 'flap'

2016 [3]

64

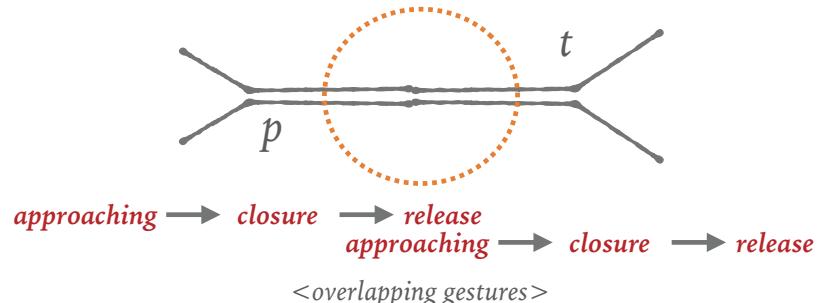
5. Unreleased stops

#4 The gestures for consecutive stops overlap, so that stops are unexploded (=unreleased) when they occur before another stop.



5. Unreleased stops

<Producing two stops: /p/ and /t/>



Examples

[p, t, k] [b, d, g] => Unreleased stops

Phonetic transcription

apt	[æpt]	kicked	[kʰɪkt]
kept		mapped	
slept		begged	
accept		stabbed	

67

6. Glottal stop I

In many accents of English, syllable final voiceless stops are accompanied by (or replaced by) an overlapping glottal stop gesture.

e.g., /p,t,k/ in 'map' 'back' 'cat' may become [?]

1. Understanding the glottal stop gesture: abrupt opening of glottis (vocal folds)

'getting' > get'n 'something' > sump'n

'hitting' > hit'n

Cockney English: glottal, little, butter

68

7. Glottal stop II

2015 [1]

#7 In many accents of English, /t/ is replaced by a glottal stop [P] when it occurs before an alveolar nasal [n] in the same syllable.

	Phonemes	Pronunciation forms (variation)
“button”	/bʌtən/	[bʌʔən]
“kitten”	/kɪtən/	[kɪʔən]
“mountain”	/maʊntən/	[maʊnʔən]

69

More cases of place assimilation (1)

‘emphasis’ /ɛmfəsis/ [ɛm̪fəsis]
/m/ bilabial nasal —> dentalised —> labio-dental [m̪]

71

8. Dentalization (place assimilation)

Alveolar consonants become dentals before a dental consonant. (phonologically: place assimilation)

‘tenth’ /tənθ/ [tʰənθ]
/n/ alveolar nasal —> dentalised [n̪]
‘wealth’ /wɛlθ/ [wɛlθ̪]
‘at this’ /æt ðɪs/ [æt̪ ðɪs]

70

More cases of place assimilation (2)

#9. Velar stops become more front before more front vowels.

‘keep’ vs. ‘cap’
[kʰip] [kʰæp]

The direction of this process is anticipatory.

2011 [1]: (a)번규칙

72

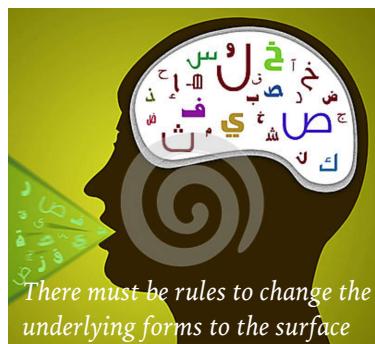
“ [2] From /phoneme/
to [pronunciation]
via **phonological rules**

Part II. Phonology: Sound rules in English

73

2. Phonological rules in English (for consonants)

- Underlying representation: **/phonemic level/**
(= abstract mental representation)
- Surface representation: **[phonetic level]** (pronunciation)



75

1. Pronunciation patterns and rules

- Every language has some sort of phonological rules, which may be different from those of other languages.*
- L2 learners' pronunciation share some traits that can be attributed to negative transfer effects from their native phonology.
- Learning the phonological rules in English help future teachers understand types of pronunciation errors from their future students.

74

3. Phoneme to pronunciation via rule derivation

lexicon

'writer'

'rider'

Underlying form

/raɪtər/

/raɪdər/

Rules to apply:

— tapping / flapping —

Surface form

[rɛɪtər]

[rɛɪdər]

76

Q: Rules to single sounds or groups of sounds?

- Phonological rules are applied to a group of sounds not to a single sound. (This is why **pattern finding** is important.)
- 24 consonants in English: **how sounds are grouped together?**

/p, t, k, b, d, g, f, v, θ, ð, s, z, ʃ, ʒ, tʃ, dʒ, r, l, w, j, h, m, n, ŋ/

Sounds share some properties.

(Distinctive or non-distinctive Features)

77

“

Important concepts to understand various phonological processes

[3] Natural classes of sounds

Part II. Sound rules in English

78

A. SOUND GROUPING

- Sounds can be grouped together by articulatory similarities.

f	θ	s	ʃ	h
v	ð		ʒ	
p		t	tʃ	k
b	w	d	dʒ	g
		r	l	

79

A. Sound grouping

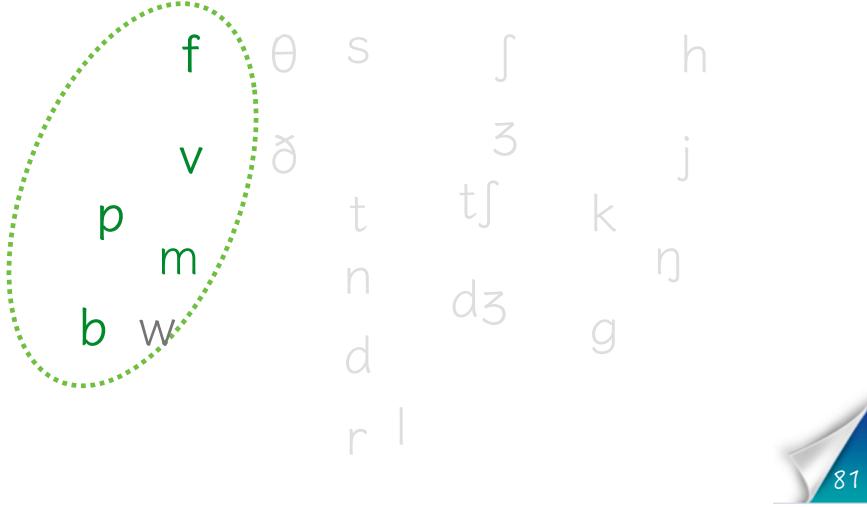
Consonants

f	θ	s	ʃ	h
v	ð		ʒ	j
p	m	t	tʃ	k
b	w	n	dʒ	g
	d	l		

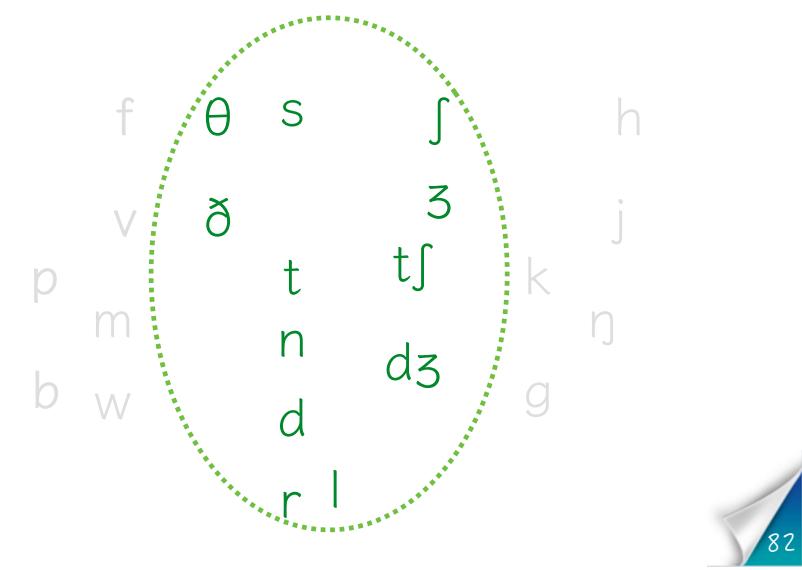
Vowels

80

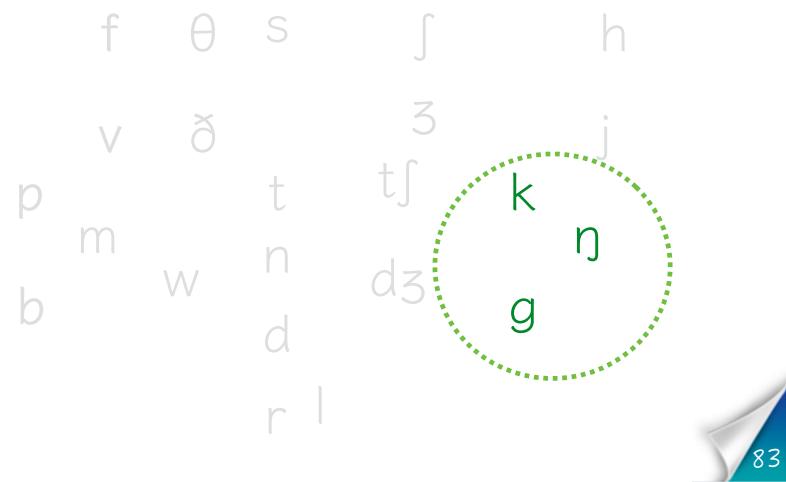
- Sounds having lip gestures: [labial] sounds



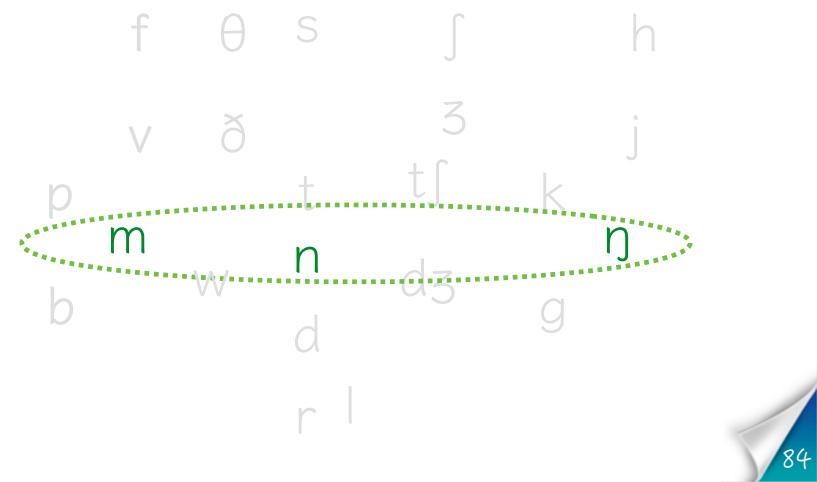
- Sounds having tongue tip/blade gestures:
[coronal] sounds



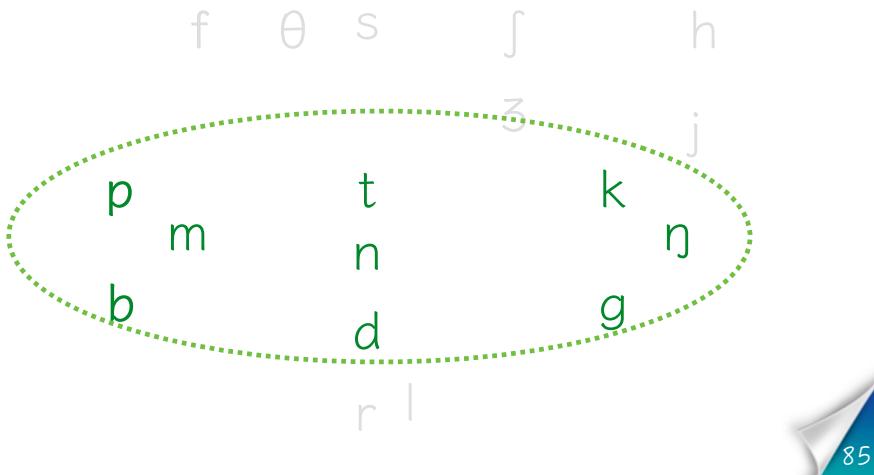
- Sounds made with the back side of the tongue:
[**dorsal**] sounds



- Sounds having velum lowering gestures:
[nasal] sounds

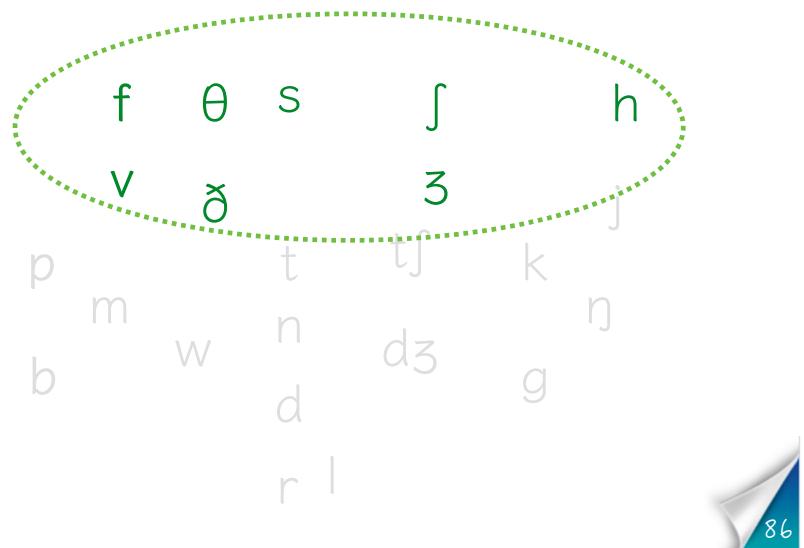


- Sounds having a complete closure:
‘stop’ sounds



85

- Sounds having continuous noise (frication):
‘fricative’ sounds



86

“ Important concepts to understand various phonological processes

[4] Distinctive and non-distinctive features

Part II. Sound rules in English

87

From sounds to features

- Sound properties ~ **features**. (Feature theory)

sty vs. ***sdy**

Sometimes they behave differently



Sometimes they behave in a similar way

sprout / loud vs. ***[sprauʃ], *[laʊv]**

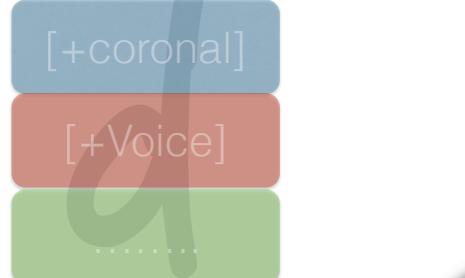
2016 [2]

88

From sounds to features

- Sound properties ~ **features**. (Feature theory)

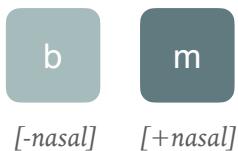
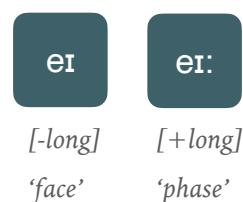
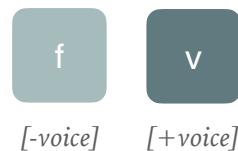
Sounds are feature bundles (a set of features)



89

BINARY SYSTEM

Features are represented in binary (+/-): present or absent



91

BINARY SYSTEM

Features are represented in binary (+/-): present or absent

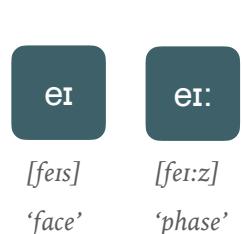
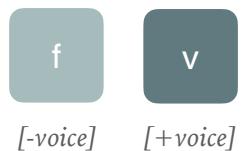
- Traditionally, features have been specified by assigning them **binary** values to signify that the segment being described by the feature either possesses that phonetic property or it does not.

Therefore, a positive value, [+], denotes the presence of a feature, while a negative value, [-], indicates its absence.

90

"DISTINCTIVE" FEATURES

By changing one feature, two sounds become **different** phonemes.



Voicing is a **distinct** feature in English.

Vowel length is a **non-distinctive** feature in English

92

Feature matrix

2020[3], 2014[2].2015[2].2016[2]

To describe English consonants (24), we need (at least) the following 11 distinctive features

	p	b	t	d	k	g	tʃ	dʒ	f	v	θ	ð	s	z	ʃ	ʒ	h	m	n	ŋ	r	l	w	j
syllabic	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
consonantal	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	
sonorant	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+	+	+	
coronal	-	-	+	+	-	-	+	+	-	+	+	+	+	+	+	-	-	+	+	+	+	+	+	
anterior	+	+	+	+	+	-	-	-	+	+	+	+	+	+	+	-	-	+	+	-	+	+	-	
continuant	-	-	-	-	-	-	-	-	+	+	+	+	+	+	+	+	-	-	-	+	+	+	+	
nasal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	-	-	-	-	
strident	-	-	-	-	-	-	-	+	+	+	-	-	+	+	+	-	-	-	-	-	-	-	-	
lateral	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
del rel	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
voice	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	+	+	+	+	+	
Stops (=Plosives)		Affricates		Fricatives		Nasals		Liquids		Glides														
obstruents												sonorants												

93

Additional features to learn

[Stress] feature

- This feature covers both consonants and vowels within the syllable (C and V).

appéar háppen

/p/ /p/
[pʰ] [p]

"aspirated" "unaspirated"

94

[stress] feature

- The [stress] feature is involved in various phonological patterns in English.
 - When consonantal features are identical, we should consider other features.

appéar háppen

[+stress] /p/ /p/ [-stress]
 [p]

95

Feature matrix and featural description of a sound

- Individual sounds are represented as feature bundle.

	p	b
syllabic	-	-
consonantal	+	+
sonorant	-	-
coronal	-	-
anterior	+	+
continuant	-	-
nasal	-	-
strident	-	-
lateral	-	-
del rel	-	-
voice	-	+
Stops		

/?/

- syllabic
+consonantal
- sonorant
- coronal
+anterior
-continuant
-nasal
-strident
-lateral
-del rel
-voice



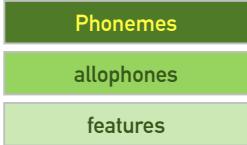
96

- In generative linguistics, a distinctive feature is the most basic unit of phonological structure that may be analyzed in phonological theory.
- Distinctive features are grouped into categories according to the **natural classes** of segments they describe: e.g., major class features, laryngeal features, manner features, and place features.

/t/

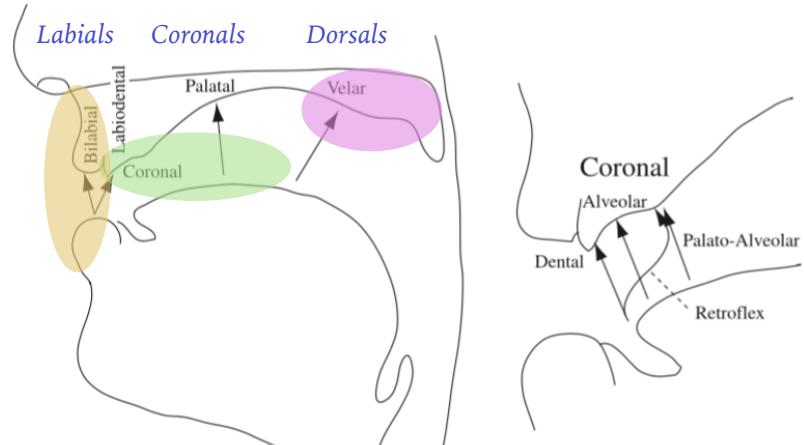
[t^h], [t],, [t̪]

[+alveolar, +coronal, -voice,]



97

- Tongue tip or blade is involved in the articulation



98

• [± sonorant]

	S, F, A (=obstruents)	Nasals	Liquids	Glides	Vowels
[syllabic]	-	-	-	-	+
[consonantal]	+	+	+	-	-
[sonorant]	-	+	+	+	+

장애음

공명음

모음

Sonorant sounds = nasals (m, n, ɳ) + glides (w, j) + liquids (r, l)

99

- Sibilants (sibilant sounds): /s, z, ʃ, ʒ, tʃ, dʒ/**

• [± lateral]

- The side(s) of the tongue is involved in the articulation.

[+ lateral] /l/

[- lateral] /r/ (+All else)

2020 [3], 2011 [1] 기출문제 예문 b

=> Dissimilation in terms of [lateral] in English

'-al' — rural, memorial, spiral,

'-ar' — similar, particular, singular, etc.

101

• [± anterior]

- [+ant] Sounds that are made in the front of the mouth: labials, dentals, and alveolars.

1) Sound groups by the place of articulation: 3 groups with 3 terms

Labials

Alveolar

?

Dorsal

?

Bilabial | labio-dental | dental | alveolar | postalveolar | palatal | velar | (glottal)

2) Using features: four groups can be identified by using 2 features

[+ant]

[-ant]

[-cor]

[+cor]

[-cor]

Group1

Group 2

Group3

Group4

102

More features: understand the definitions and follow the instruction

for vowels

- [± front], [± back]
- [± high] / [± low]
- [± long]
- [± tense]

for consonants

- [± distributed]
- [± aspirated]
- [± stop], [± velar]...
- [± labial], [± dorsal]

한국어 사전

aspiration
lip involvement

103

“ [5] **Assimilation**, dissimilation, insertion(=epenthesis), deletion, and coalescence

Part II. Phonological processes

104

Phonological processes: sound patterns

- [1] Two sounds become more similar: **assimilation**
- [2] Two sounds become more dissimilar: **dissimilation**
- [3] A sound may be deleted: **deletion**
- [4] A sound may be inserted: **epenthesis**
- [5] Two sounds merge into a third sound: **coalescence**

105

Understanding coarticulation

- **Coarticulation** refers to a situation in which speech sound is influenced by, and becomes more like, a preceding or following speech sound.
- Coarticulation is a natural process in speech production since speech is planned earlier in the stage of constructing a message.

e.g., assimilation (place assimilation: 'tenth', 'health')

106

- **Coarticulation** refers to a situation in which speech sound is influenced by, and becomes more like, a preceding or a following speech sound.

e.g., assimilation

(e.g., place assimilation: 'tenth', 'health')

Alveolar sounds /n, l/ -> dentalized before a dental sound /θ/

/tɛnθ/ [tʰɛnθ]

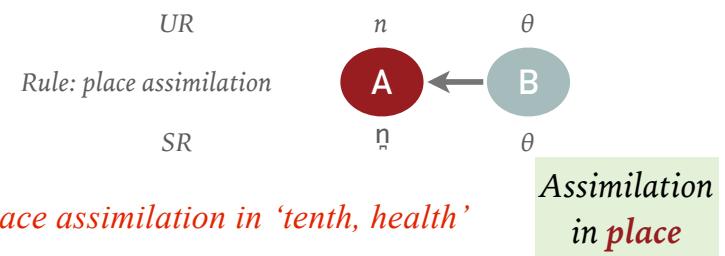
/hɛlθ/ [hɛlθ]

107

Pattern [1] Assimilation

- Two directions of assimilation:

- (1) **anticipatory (=regressive)** coarticulation, when a feature or characteristic of a speech sound is anticipated during the production of a preceding speech sound. (most commonly observed)



Pattern [1] Assimilation

(2) carryover (=progressive, perseverative) coarticulation, when the effects of a sound are seen during the production of sound(s) that follow.

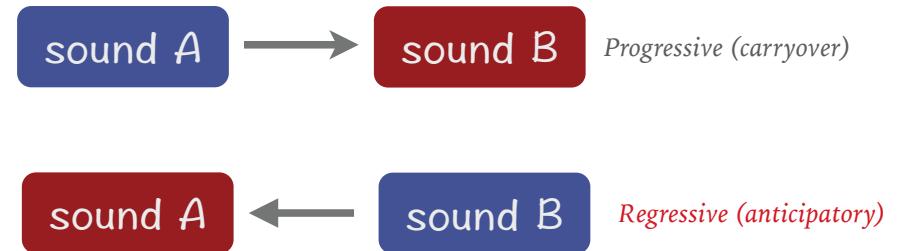
e.g., English plural morphemes /z/ -> [s,z,iz]



109

Pattern [1] Assimilation

Direction of assimilation: regressive is more common.
regressive (anticipatory) vs. progressive (carryover)



110

Assimilation in terms of...

voicing 'caps, bags'

Place of articulation 'tenth' 'met Bob'

Manner of articulation 'negative prefix'
'in-' 'il-'

Oro-nasal process 'back mirror'

111

Pattern [1] Assimilation (more cases)

Data:

"nice shirt", "his shoes", "got you", "did you"

1. Pattern finding: 어떤 소리가 어떻게 바뀌는지 관찰
2. Context finding: 이러한 변화가 어떤 환경에서 일어나는지 관찰
3. Sound grouping: 변화를 줄이는 소리, 변화된 소리를 일반화할 것.
4. Generalisation: 패턴을 일반화시켜 기술해 볼 것.

2012[2], 2009[2]-2 기출문제

112

1. Pattern finding

Data:

"nice shirt", "his shoes", "got you", "did you"

[s] # [ʃ] ---> [ʃ] # [ʃ]
[z] # [ʃ] ---> [ʒ] # [ʃ]
[t] # [j] ---> [tʃ] # [j]
[d] # [j] ---> [dʒ] # [j]

어떤소리가 어떤소리로
[s] ---> [ʃ]
[z] ---> [ʒ]
[t] ---> [tʃ]
[d] ---> [dʒ]

113

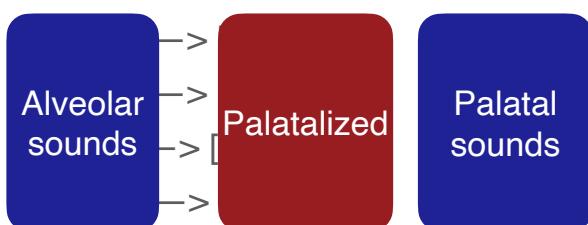
3. Sound grouping

Data:

"nice shirt", "his shoes", "got you", "did you"

어떤소리가 어떻게 변화 어떤환경에서

[s, z, t, d] ---> [ʃ, ʒ, tʃ, dʒ] before [ʃ, j]



115

2. Context finding

Sound	Voicing	Place	Manner
[ʃ]	voiceless	postalveolar (palato-alveolar)	fricative
[j]	voiced	palatal	approximant

before [ʃ], [j] (=palatal sounds)

[s] # [ʃ] ---> [ʃ] # [ʃ]
[z] # [ʃ] ---> [ʒ] # [ʃ]
[t] # [j] ---> [tʃ] # [j]
[d] # [j] ---> [dʒ] # [j]

114

4. Generalisation

Data:

"nice shirt", "his shoes", "got you", "did you"

Generalisation:

"Alveolar sounds become palatalised before a palatal sound in English."

Application:

"base shape", "rose ship", "bet you", "could you"

116

Given generalisation: (longer version)

A word-final **/t/, /d/, or /n/** may assimilate in **place of articulation** to a following word-initial bilabial or velar stop, **resulting in two identical consonants** in some cases. But some features such as voicing and nasality of the consonant remain constant. When place assimilation results in two identical consonants, it is called **total assimilation**.

117

More question:

Given generalisation: (shorter version)

Alveolar stops are assimilated in place of articulation to following bilabial or velar stops **across word boundaries**.

- (a) He has a green car.
- (b) Please send Susan a box of chocolates.
- (c) Would you care for a bit of cheese?
- (d) I met Bob yesterday.

(a, d)₁₁₉

Data:

- a. Can you pass me the one in the middle?
- b. He lost his pet **cat** yesterday. [k k]
- c. You excel as a painter.
- d. I like the blue soap dish.
- e. I will cross the channel by boat.
- f. Teachers extol the virtue of honesty.
- g. You're a very good **boy**. [b b]
- h. I heard that **ten** cooks went home. [n k]

118

*dissimilation (occurred in the history of English)
= diachronically (over time, historically)*

Data:

electrical, cultural, regional
angular, circular, singular

1. *Pattern finding:* 어떤 소리가 어떻게 바뀌는지 관찰

[r] ~ [l] alternation

2. *Context finding:* 이러한 변화가 어떤 환경에서 일어나는지 관찰

/r/ or /l/ is included in the given word.

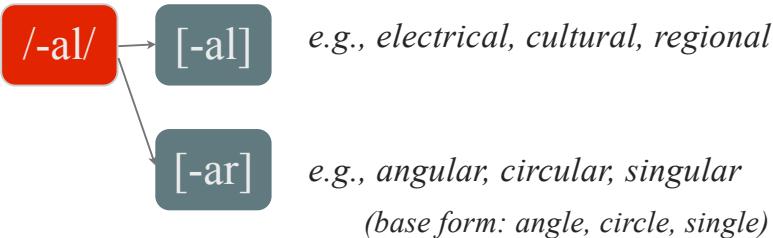
3. *Sound grouping:* 변화를 겪는 소리, 변화된 소리를 일반화할 것.

/r/ , /l/ = approximant ([-lateral], [+lateral])

120

e.g., "-al" vs. "-ar"

2020 [3], 2011 [1] -b기출문제



Rule: /l/ -> [r] / /l/

* -al 접사가 붙을 때 바로 앞에 /l/이 있으면 /l/ > /r/로 바뀜
(연속적으로 /l/이 있는 것을 피하는 패턴)

121

Pattern [3] Insertion of a sound (=epenthesis)

2011[1] -c 기출문제

Generalisation:

A homorganic voiceless stop may occur after a nasal before a voiceless fricative followed by an unstressed vowel in the same word.

Homorganic (having the same place of articulation)

<data> something /mθ/[mpθ], youngster [ŋks], etc.

prince /ns/ [nts], vacancy /ns/ [nts], etc.

123

Pattern [3]

Deletion of a sound (=elision)

2011[1] -d 기출문제

Generalisation:

(Oral) alveolar stops are deleted if they are central in a sequence of three consonants.

Oral alveolar stops in English: /t, d/

<data> hand bag, lend me, tend to,

2 consonants: winter, wanted, hand, etc.

122

Insertion, epenthesis = timing gesture

Good to know

Many people do not distinguish between prince and prints, or tense and tents. All these words may be pronounced with a short voiceless stop between the nasal and the voiceless fricative.

But the stop is not really an added gesture. It is simply the result of changing the timing of the nasal gesture with respect to the oral gesture. By raising the velum for the nasal, a moment of complete closure - a stop - occurs.

124

Epenthesis: schwa insertion case

Good to know

When two sound sequence is illegal in English, native speakers try to change something in the word before they adopt the word.

e.g., /kn/ and /mb/ are not legal sequences in English (as we witness from “know, knight, knee; numb, comb, *mbee”);

- When native speakers of English borrow a word (“knish”) or pronounce foreign names (“Mbawa”, “Ngurah Rai) that include such illegal sequences, they could drop one of the sounds, pronouncing the word as /nʃ/, but instead, they epenthesize a schwa vowel: [kənɪʃ] and [əmbawa]



125

“ More topics in phonology

- [1] Synchrony and diachrony: contemporary (regional or dialectal) and historical changes
- [2] Phonotactic constraints: sound sequences
- [3] Sonority scale and syllables
- [4] Rhotacism and /r/-related phenomena

Part II. Phonological patterns

127

Pattern [5]

Coalescence: merging into a third sound

When neighbouring sounds mutually affect each other **to merge into a third sound**, the process is called coalescent assimilation, which can be found in palatalisation in English.

<data> /t/ + /j/ > [tʃ] as in “architecture”

2012 기출문제 [2]

/s/ + /j/ > [ʃ] as in “miss you”

/d/ + /j/ > [dʒ] as in “did you”

/z/ + /j/ > [ʒ] as in “(It) saves you ...”

126

[1] Synchrony vs. diachrony

Synchrony and diachrony are two different and complementary viewpoints in linguistic analysis.

diachrony (historical viewpoint)

→ time axis

||||| synchronic 'slices' (points in time)



Butterfly Life Cycle



128

Some variations are synchronic; some are diachronic

e.g., "Merry ~ Marry ~ Mary" merger

e.g., pin~pen merger

e.g., Great Vowel Shift in English

house /hu:sə/ >> /hu:s/ >> /həʊs/

Diachronic sound changes

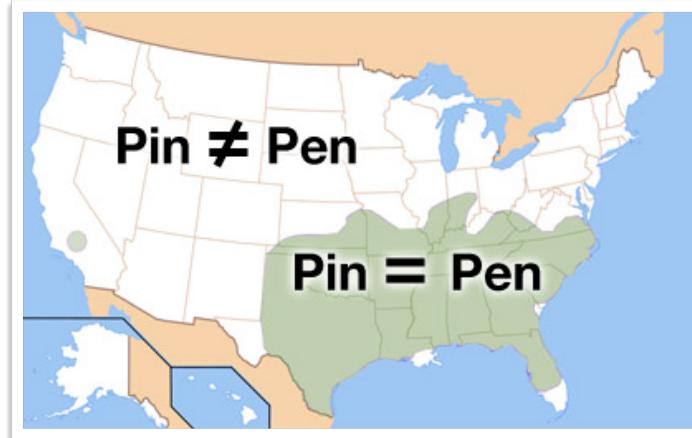
synchronic sound variation

time 129

(A) Synchronic variation example: pin / pen merger

/pin/ vs. /pɛn/ > [ɪ~ɛ]

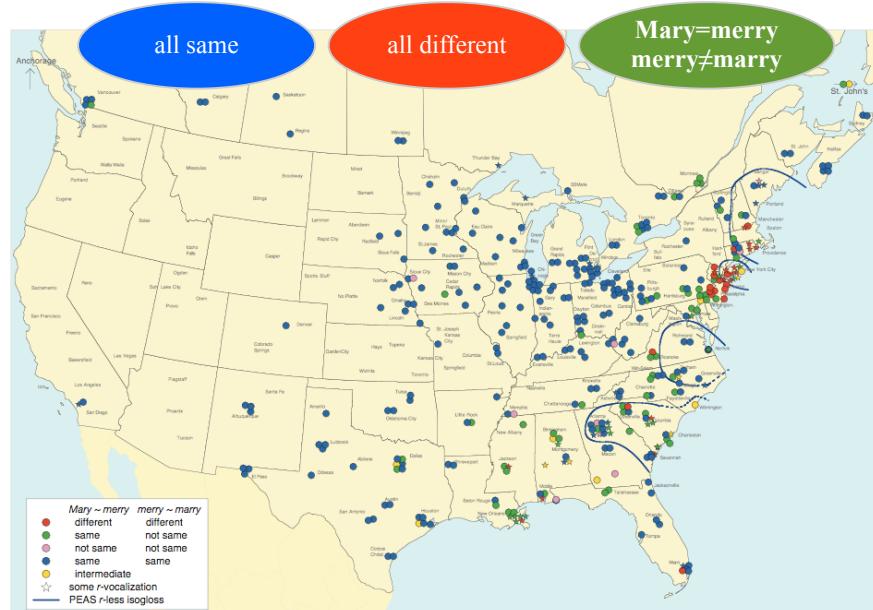
2013[2] 기출문제



See also <http://languagelog.ldc.upenn.edu/~bgzimmer/soda.jpg>

130

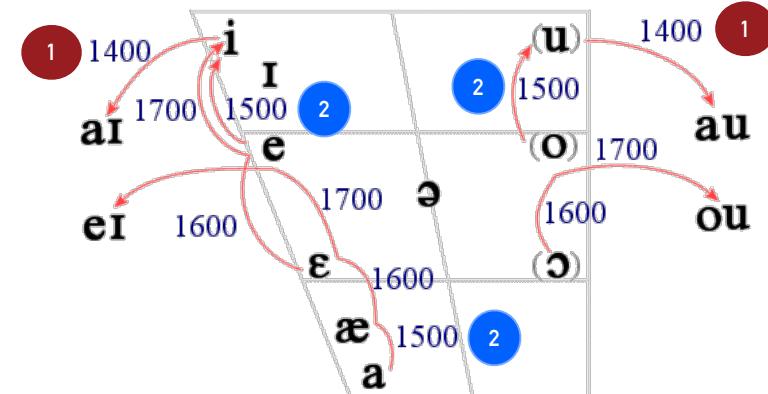
(B) Synchronic variation example: merry - Mary - marry



131

(C) Diachronic change example:

Great Vowel Shift (approx. 14th~17th century)



132

Great Vowel Shift (approx. 14th~17th century)

The Middle English spellings were retained into Modern English while the Great Vowel Shift was taking place, *resulting in some of the peculiarities of Modern English spelling in relation to vowels...*

e.g., /i:/ > /aɪ/ "I" /ik/..[ih].. /aɪ/, tyme /ti:m(ə)/ → time

e.g., /u:/ > /aʊ/ "cou" /kuu/ → cow, 'house' /hu:s/ → /haʊs/

e.g., /e:/ > /i/ "geese" /ge:s/ → /gis/

e.g., /o:/ > /u/ "goos" /go:s/ → /gus/

e.g., /o/ > /ʊ/ "book" /bok/ → /bʊk/

133

[2] Phonotactics

2009 기출문제 [1]

Phonotactics (from Ancient Greek *phōnē* "voice, sound" and *taktikós* "having to do with arranging") is a branch of phonology that deals with restrictions in a language on the permissible combinations of phonemes. Phonotactics defines permissible syllable structure, consonant clusters, and vowel sequences by means of phonotactic constraints.

Permissible (=legal, acceptable, grammatical) sound sequences in English

135

"ask word" list

e.g., /a/ > /æ/ glass, pass, ask, etc.

American English (1607 ~) keeps this change while British changed back to /a/. ("ask word" list - AE vs. BE vowel difference)

ask, bath, dance, can't, chance, laugh, last, glass, class, example, etc.

Note that British English has [æ] vowel in the system.

e.g., 'pant' is pronounced the same.

134

Phonotactic constraints in English

1. All syllables have a nucleus (either a vowel or a syllabic consonant)

"I" is a syllable and a word.

"s" is not a syllable.

['mhm] ("yes") consists of 2 syllables and it is a word.

['?m?m] ("no") - 2 syllables.

2. No geminates: only in the spelling system.

bigger [bɪgə], letter [lɛrə] (AmE) or [lɛtə] (BrE)

(The following examples are different! => Fake gemminates)
white teeth vs. why teeth

[waɪt tɪθ] [wai tɪθ]

136

Phonotactic constraints in English

3. No syllable begins with /ŋ/ or /ʒ/

/ng/ > /ŋ/ (in the history of English)

=> Since there was no word begins with /ng/, modern English lacks /ŋ/ beginning words.

Historical fact: /ʒ/ is a borrowed sound from old French

=> French has /ʒ/, and not */dʒ/ ('Jean' vs. 'John')

[French borrowing words] - genre, garage, camouflage, entourage, etc.
[word medially English has /ʒ/ sound via palatalization]- leisure, measure, pleasure, vision, etc.

137

Phonotactic constraints in English

7. Non-alveolar nasals must be **homorganic** with the next segment

Non-alveolar nasals = {m, ŋ}

dumb, dump, camp, lamb, lamp, sing, sink, finger, etc.

8. Two obstruents in the same coda must share **voicing**

obstruents = {stops, fricatives, (affricates)}

kept (*kebt, *kepd) cf. debt (/b/ is silent)

139

Phonotactic constraints in English

4. No /h/ in the syllable coda

blah, blah, blah.... /h/ is not pronounced.

5. No affricates in complex onsets (: more than one consonant)

"tree" is not pronounced as [tʃri] but as [trɪ]

6. If the second consonant in a complex coda is voiced, so is the first

"tree" is not pronounced as [tʃri] but as [trɪ]

138

Voice assimilation in English: (1) Past tense morpheme "-ed"

-ed Depening on the voicing of the final consonant
C[-voice] + [t]; C[-voice] + [d]; C /t,d/ + [ɪd]; cf. V + [d]

[t] mapped [pt], kicked [kt], laughed [ft], missed [st], crashed [ʃt], marched [tʃt]

[d] nabbed [bd], leagued [gd], caved [vd], seized [zd], camouflaged [ʒd], judged [dʒd], named [md], hanged [ŋd], revealed [ld], etc.

[d] booed [d], sued [d], cooed [d], etc.

[ɪd] needed [dɪd], avoided [dɪd], waited [tɪd], printed [tɪd], etc

140

(2) Plural morpheme “-(e)s” pronunciation

2018 [2] 기출문제

English plural morphemes (Voice assimilation)

2005기출문제

C [+voice] [z] /b, d, g, v, ð, ..., vowels		C [-voice] [s] /p, t, k, f, θ, .../		C [+alveolar, +strident] [iz] /s, z, ʃ, ʒ, tʃ, dʒ/	
Sg.	Pl.	Sg.	Pl.	Sg.	Pl.
dog	dogs	dock	docks	witch	witches
bid	bids	bit	bits	nose	noses
rib	ribs	tip	tips	marsh	marshes
love	loves	giraffe	giraffes	badge	badges
sea	seas	moth	moths	bus	buses

Note: [+alveolar, +strident] consonants are also called “**sibilants**”;

For a convenience, the exam may introduce [+strident] = [+sibilant].

141

Extended Phonotactic constraints in English (Vowel + Consonant)

2009 [1] 기출문제

9. A lax vowel must be followed by at least one consonant

1) Tense vowels in **open syllables (no coda, vowel ending syllable)**:

e.g., tea [ti], bee [bi], see [si], glue [glu], new [n(j)u]

2) No lax vowels in open syllables: *[tr], *[br], *[sr], *[glv], *[nv]

3) Lax vowel in **closed syllables (at least one coda consonant)**:

e.g., tip [tɪp], bin [bɪn], sin [sɪn], glimpse [glɪməs], nip [nɪp]

open syllables

(C)V: A, spray, clue, straw

closed syllables

(C)VC(C): aim, name, named
stayed, sing, hanged

142

[3] Sonority scale

Sound can be described as being more sonorous than others. Sonorous sounds tend to have greater energy (louder).

e.g., Vowels > consonants; /a/ > /i/

Among consonants, stops are least sonorous.

Extended Phonotactic constraints in English (Vowel + Consonant)

2009 [1] 기출문제

10. NC constraint: nasal + stop consonant sequence

1) N and C must be **homorganic** (same place):

limp, dump, mint, lint, mind, hand, mend, sink [ŋk], rank [ŋk]

2) When **N is non-alveolar** (=labial, velar), **C** must be **voiceless**

climb [b is silent], numb, tomb, sing ([g] is silent), hang ([g] is silent).

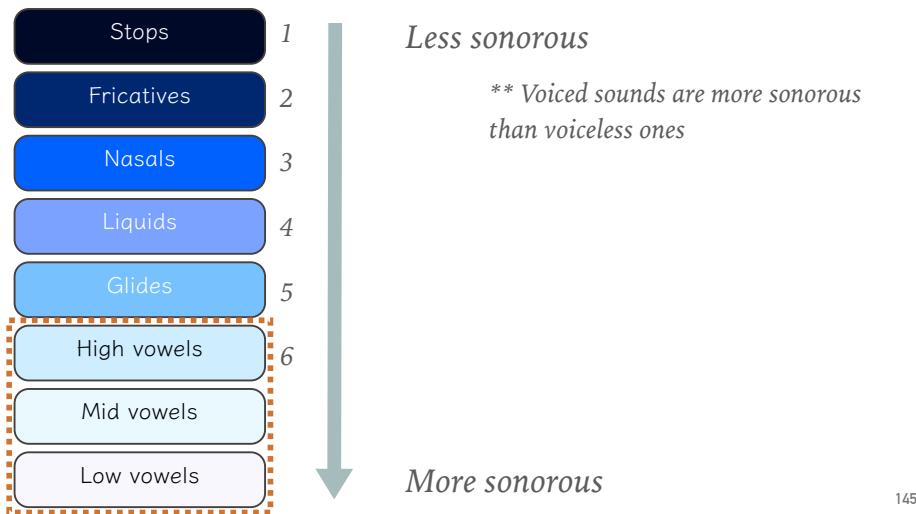
cf. lent [nt], lend [nd], mend [nd], meant [nt]

143

144

Some sounds are more sonorous than others

[a] > [e o] > [i u] > [j, w] > [r] > [l] > [m n ŋ] > [z v ð] > [s f θ] > [b d g] > [p t k]



[4] Rhotacism, r-colouring, and linking-r

1) Diachronic case: /s/ to /r/ change.

Latin /flōs/'flower' has r in all forms other than the nominative singular (*flō~~z~~is > flōris)

2) Synchronic cases: American vowels, when followed by r, become r-colored vowels. (British drops 'r' in this case)

<rhotic vs. non-rhotic accents>

e.g., turn, burn, service - [ɜ:] (r-colored vowel when stressed)

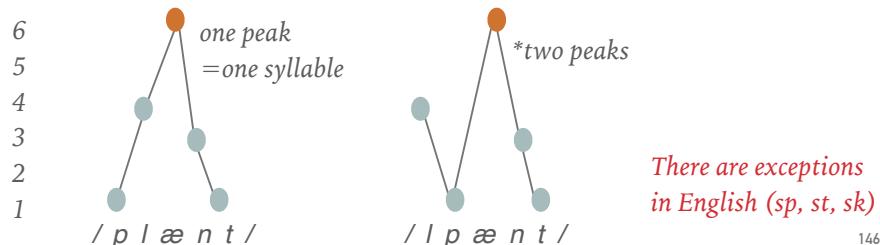
e.g., baker, doctor, persist - [ə] (r-colored vowel when unstressed)

Sonority and syllable structure

2013 기출문제 [1]

* Syllable structure tends to be highly influenced by the sonority scale, with the general rule that *more sonorous elements are internal (i.e., close to the syllable nucleus) and less sonorous elements are external*. => **Sonority sequencing principle**.

e.g., the sequence /plant/ is permissible in many languages, while /lpatn/ is much less likely.



In a non-rhotic accent English

3) linking 'r': [r] sound appears between morphemes (or words). This is found in **non-rhotic accents**.

e.g., Those who say 'I have no fea(r)' (without [r]) will pronounce 'the fearr of it' with [r].

In a non-rhotic accent English

- **Linking R** and **intrusive R** are **sandhi** or **linking** phenomena involving the appearance of the [r] between two consecutive morphemes where it would not normally be pronounced.

e.g., Those who say 'I have no fear' (without [r]) but 'the fear of it' with [r] are likely also to say "I have no idea" and " the idear of it"
=> Intrusive 'r' - In the speech of eastern New England, New York City, and British RP - [r] appears in some cases. 'law(**r**) enforcement', 'Cuba(**r**) is an island' (or some mistakes are found in "idea (**r**) of Tom"

149

Vowel + r

(2) Neutralization of the vowel before /r/

=> Loosing the contrast between two distinct sounds.

- Due to the /r/ gesture, the preceding vowel changes its quality.

Example 1) Tense vowel vs. lax vowel before /r/

'beer' and 'cheer' [i] ~ [ɪ] distinction disappears.

2013 기출문제 [2]

Example 2) Merry, marry, Mary

The three words show variable pronunciation depending on regions.

151

Vowel + r

(1) r-colouring in rhotic English

- r-colouring: coda /r/ tends to change the quality of the preceding vowel.

In AmE, “vowel + r” is pronounced as one gesture:

burn /bʌrn/ > [bən]

burner /bʌrnər/ > [bənər]



stressed



unstressed

150

“ Rhythmic characteristics of English:

[1] stress

(2016), 2010, 2008, 2007

Part II. Phonological patterns

152

Eurhythm (= Rhythmic Alteration)

The rhythmic effect of alternating patterns of a stressed syllable followed by an unstressed syllable.

e.g., "ar.ma.di.llo", "a.llи.ga.tor" (alternating rhythm)

Foot (ft) is a phonological structure, usually consisting of a stressed syllable (head) plus any associated unstressed syllables.

- (1) **Iambic** foot (weak, **strong**) = right-headed foot (n. Iamb)
- (2) **Trochaic** foot (**strong**, weak)= left-headed foot (n. Trochée)

=> Languages use one of the two types (however, English foot structure isn't so clear)

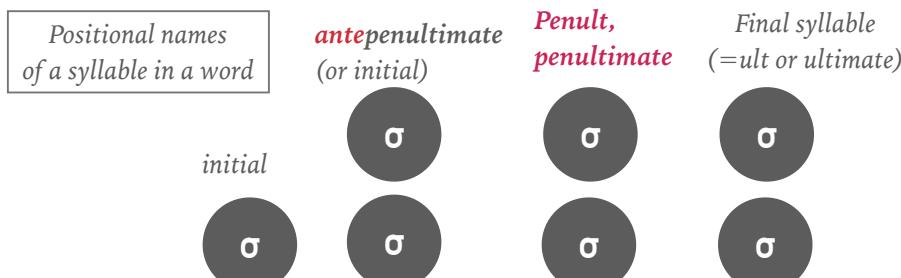
153

We find "some" predictable patterns referring to the following information

(1) Grammatical category: nouns, verbs, adjectives

(2) Number of syllables: 2 vs. 3

(3) Syllable weight: heavy vs. light syllables



155

English Stress Patterns

There is no single way to predict the stress placement of English words. (due to many borrowing words in the history of English; rich vocabulary)



<Comments>

- 1) If stress-related questions appear in the exam, follow the rules described in the given passage.
- 2) Try to be familiar with some terminology often used to describe stress pattern.
- 3) You should know where stress falls on in given examples. (be careful with the grammatical category of a word.)
- 4) You should know the pronunciation of the given words. (phonetic transcription)

154

(A) Stress patterns in 3 syllable verbs vs. nouns

2008 [1]

Data

- | | |
|-------------------------|---------------------------|
| (a) <u>bonanza</u> (n.) | (b) <u>resurrect</u> (v.) |
| (c) <u>cinema</u> (n.) | (d) <u>remember</u> (v.) |
| (f) <u>algebra</u> (n.) | (e) <u>embroider</u> (v.) |
| (h) <u>aroma</u> (n.) | (g) <u>entertain</u> (v.) |

=> You should be able to identify the vowels of the given words.

=> Schwa vowel can't be stressed.

156

Answer key: (A) Stress patterns in 3 syllable verbs vs. nouns

- (b) resurrect (v.) /rɪ.sə.rɛkt/
- (d) remember (v.) /rɪ.mɛm.bər/
- (e) embroider (v.) /ɛm.b्रɔɪ.dər/
- (g) entertain (v.) /ɛn.tɛɪn/

Verb (3 syllables): Right - to - left

A) If the **final syllable is heavy, then stress the final.**

B) If the final is light (=weak), stress moves to the left.

- (b,g) the final is heavy [rekt], [tem] (A)
(d,e) the final is light [bər] , [dər] (B)

157

(A) Stress patterns in 2 syllable verbs

2007 [2]

- | | | | | |
|----------|---------|---------|---------|--------|
| ballot | exclude | attract | annoy | divide |
| abstract | enter | delight | incline | salute |
| contain | feature | protest | portion | signal |

<Stress placement>

- | | | | | |
|----------|---------|---------|---------|--------|
| bállot | exclúde | attráct | annóy | divíde |
| abstráct | énter | delíght | inclíne | salúte |
| contáin | féature | protést | pórton | sígnal |

159

Answer key: (A) Stress patterns in 3 syllable verbs vs. nouns

- (a) bonanza (n.) /bou.næn.zə/
- (c) cinema (n.) /sɪ. nɛ. mə/
- (f) algebra (n.) /æl.dʒə.brə/
- (h) aroma (n.) /ə.rou.mə/

Noun (3 syllables): Right - to - left

A) If the **final syllable is heavy, then stress the final.**

B) If the final is light (=weak), moves to the left until you find a heavy syllable.

- (a, h) the final is light, the penultimate is heavy: [næn.zə], [rou.mə] (A)
(c,f) the final and the penultimate are both light: [sɪ.nɛ.mə] , [æl.dʒə.brə] (B)

158

Answer key: (A) Stress patterns in 2 syllable verbs

- | | | | | | |
|---------|---------|---------|---------|----------|---------|
| exclúde | attráct | annóy | divíde | abstráct | inclíne |
| /klud/ | /trækt/ | /nɔɪ/ | /vaɪd/ | /trækt/ | /klain/ |
| delíght | salúte | contáin | protést | | |
| /laɪt/ | /lut/ | /tem/ | /test/ | | |
| pórton | sígnal | bállot | énter | féeature | |
| /ʃən/ | /nəl/ | /lət/ | /tə/ | | |

/ud/, /ud/

a long vowel (+ coda) (~tense vowels)

/ækt/, /est/

multiple consonants (~complex coda)

/nɔɪ/, /aɪd/, /am/, /aɪt/, /ein/

a diphthong vowel

160

Different analysis

Syllable weight - heavy (long vowels or diphthongs; vowel with coda) and light (or weak; short vowels). Syllable weight can be involved in stress patterns. (\Rightarrow limited word sets)

Onset consonants are ignored in syllable weight.

<Some English nouns: 2nd syllable decides stress pattern>

e.g., elephant ['e.lə.fənt] (2nd syllable is light)

conviction [kən.'vik.ʃən] (2nd syllable is heavy)

potato [pə.'teɪ.təʊ] (2nd syllable is heavy)

computer [kəm.pju.ɾə] (2nd syllable is heavy)

161

Syllable weight: Heavy vs. light syllables

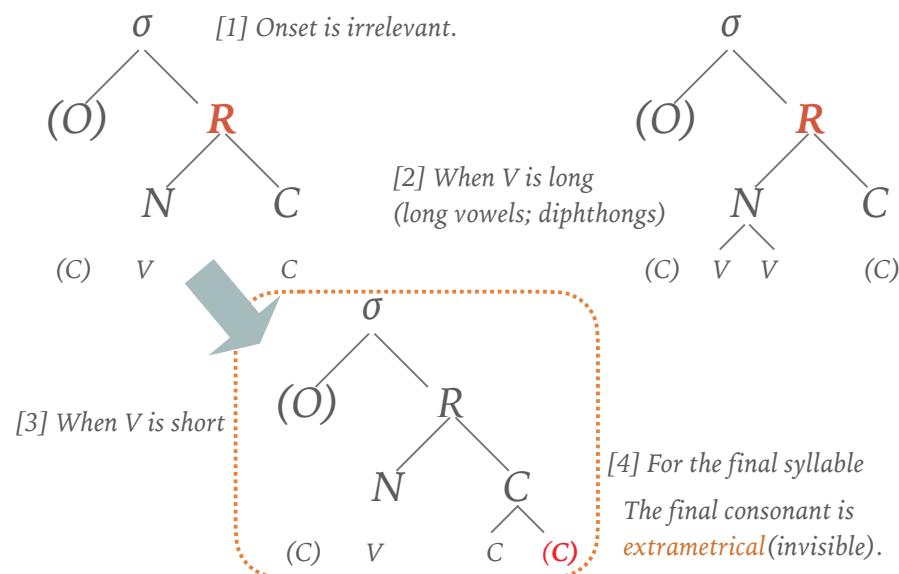
- 1) Languages differ in treating which syllables are heavy.
- 2) Syllables are heavy in English when they contain
 - 1) long vowels, (or tense vowels /i, u, ə, (ɔ)/)
 - 2) diphthongs, (/aɪəʊəɪəʊ/)
 - 3) vowel + one or more coda consonants

(Note: word-finally the final syllable should contain multiple coda consonants due to extrametricality)

- 3) Syllable weight has to do with the structure of **rhyme**.

162

WHAT IS “HEAVY” SYLLABLES? *To be heavy*



“ Interface between
phonology & morphology

Part III. Phonology & morphology

164

Pattern

Suffix (morphemes) & its phonological conditions

2023 [1], 2014 [2]; 2023 [2], 2024 [3] 기출문제

<Phonological conditions>

'-en'

<i>distinctive features</i>	'-al'
<i>syllable structure</i>	
<i>stress</i>	annual, dismissal
<i>foot</i>	natural, betrayal
<i>etc.</i>	gradual, reversal
	federal, survival
	floral, renewal
	legal, referral
	*abandonal, *fidgetal, *investigatal
	*promisal, *qualifial

165

Pattern [1]

Assimilation (more cases)

2010 [1] 기출문제

Data:

indecent, insignificant,
impossible, implausible
ingratitute, incredible

1. Pattern finding: 어떤 소리가 어떻게 바뀌는지 관찰
2. Context finding: 이러한 변화가 어떤 환경에서 일어나는지 관찰
3. Sound grouping: 변화를 줄는 소리, 변화된 소리를 일반화할 것.
4. Generalisation: 패턴을 일반화시켜 기술해 볼 것.

166

"in-" prefix (morpheme)

morpheme allomorph

/?/ → [in] e.g., indecent, insignificant

e.g., impossible, implausible, impeccable

e.g., ingratitute, incredible

Q: What could be the underlying form of this morpheme?

167

"in-" prefix (morpheme)

morpheme allomorph

/in/ → [in] e.g., indecent, insignificant

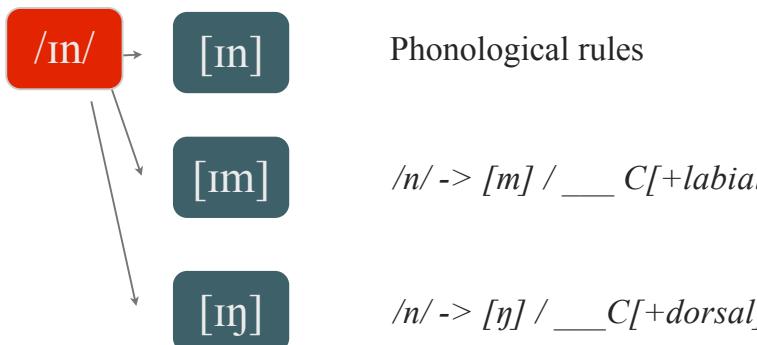
e.g., impossible, implausible, impeccable

e.g., ingratitute, incredible

* The underlying form is /in/ as we can albeit in "inappropriate"

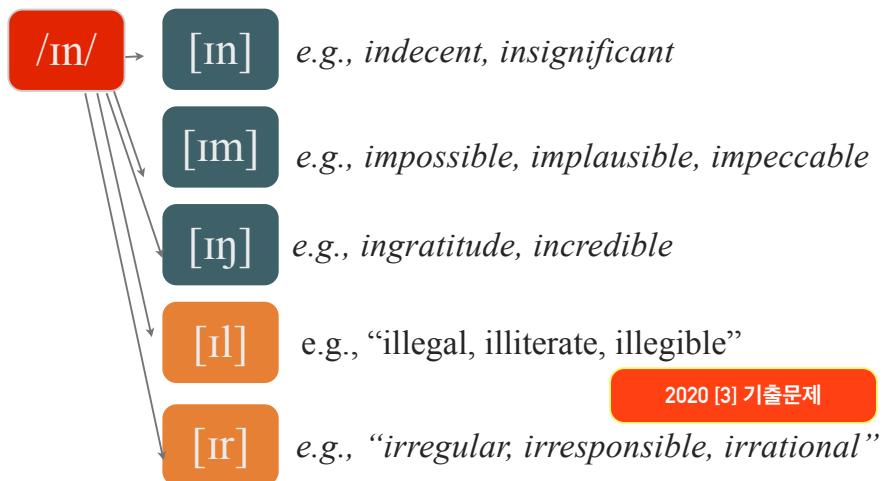
168

Place assimilation



169

Data expanded: place vs. manner assimilation



What would be the closest sound when /n/ changes in [+nasal]?

170

Pattern [2] Stress-shifting suffix (strong suffixes)

2016[2], 2010 [2] 기출

Data:	-y	-ic
diplomat	diplómacy	diplomátic
photógraph	photógraphy	photográfic
mónotone	monótony	monotónico

homonym, homonymy economy, economic
hyponym, hyponomy auto, automatic

171

Pattern [2] Stress-shifting suffix

Suffix	Base	Derived word
-al	pólitics	political
-ic	álcool	alcohólic
-ify	ácid	acídify
-ity	nómral	normálity

172

Stress-shifting suffix

Prefix	Base	Derived word
-ous	ánalogue	analógous
-ual	cóntext	contéxtual
-y (n.)	ánalogue	análogy
-y (adj.)	súmmer, vélvet	súmmery, vélvety
-ate (v.)	hýdrogen	(hydrógenate)
-ate (n./adj.)		or (hýdrogenate)
-esce	phósphor	phosphorésce

173

French suffix bears stress in itself

Prefix	example	Prefix	example
-ade	cascáde, facáde	-eur	entreprenéur
-e, ee	fiancé, employée	-ier	cavalíer
-ese	Chinése, Portuguése	-oon	buffóon
-equo	discotéque	-que	communiqué
-esque	picturésque		
-ette	dinétte		

174

'-i vowel suffix' stress to the preceding syllable

Prefix	example	Prefix	example
-ia	euphória	-iant, -ient	luxuriant, sufficient
-ian	statistícián	-iance, -ience	radiance conscience
-ial	fíñial, spatial, deficient	-iancy, -iency	deviancy sufficiency
-iary	(benefit) beneficiary	ion	cohesion
-iate	defoliate	ious	luxurious
-ien	alien	-ium, -ion, -ia	criterion, criteria, bacteria

175

Neutral suffixes (Stress neutral suffix)

-able, -age, -al (noun), -ary, -ate (noun/adj),
 -ful, -hood, -ile, -ish, -ist, -ism, -ize, -less, -ly
 -ment, -ship, -some, -wise, -y (adj)

passion > passionate (adj)

port > portal (noun)

cf. politics > political (adj)

chat > chatty (adj)

cf. analogue > analogy (n.)

176

Pattern [3] Suppletion (morphological paradigm)

This is a non-phonological alternation pattern. In a morphological paradigm, there may exist irregular forms due to, for example, a historical origin.

e.g., "mouse - mice", "go - went", "child-children", etc.

177

Suppletion (morphological paradigm)

present tense to be

Person	Conjugation
I	am
thou	art
he/she/it	is
we	ben
ye	ben
they	ben

present tense to want

Person	Conjugation
I	will
thou	wilt
he/she/it	will
we	wollen
ye	wollen
they	wollen

Verb

Pronoun I
my
me
mine

Person (gender)	Subject	Object (Accusative)	Object (Dative)	Possessive determiner	Possessive pronoun	Reflexive	Old English forms (N, A, D, G)
Singular							
First modern	ic/ich/I "I"	me/mi "me"	min/minen (pl.) "my"	min/mire/minre "mine"	min one/mi selven "myself"	ič, mec/mē, mē, mīn	
Second modern (archaic)	þou/pu/tu/þeou "you" (thou)	þe "you" (thee)	þi/ti "your" (thy)	þin/pyn "yours" (thine)	þeself/þi selven "yourself" (thyselv)	þū, þec/ bē, bē, þīn	178

Pattern [4] METATHESIS

This is a non-phonological alternation pattern. It refers to the reversal of adjacent segments in a word.

e.g., (historically in English) Tax (ks) and Task are historically developments of a single form (ks > sk).

e.g., (historically in English) 'ask' was written as 'ax' or 'acs'; Chaucer, Caxton, and the Coverdale Bible use "ax" for 'ask'; Shakespeare and the King James Bible have "ask"

e.g., In modern English, [r] frequently metathesizes with an unstressed vowel (produce - [pər]); Oprah was originally named Orpah.

179

APPENDIX

99 key words

180

FAMILIARIZE YOURSELF WITH THESE KEYWORDS (A~Z)

1. affricate
2. allophone
3. alternation
4. alveolar
5. ambisyllabicity
6. aspiration
7. assimilation (vs. dissimilation)
8. bilabial (labial, labial-velar, labio-dental)
9. clear 'l' (vs. dark 'l')
10. closed syllable (vs. open syllable)
11. coda
12. complementary distribution
13. constraints in Optimality Theory (correspondence, faithfulness, markedness, violation)
14. default rule

181

15. dental
16. derivation
17. devoiced/devoicing
18. diachronic/diachronic changes (vs. synchronic/synchrony)
19. diphthong (vs. monophthong)
20. dual articulation (or secondary articulation: e.g., lip rounding in /ʃ, ʒ, tʃ, dʒ/)
21. elision
22. elsewhere condition
23. epenthesis (insertion)
24. eurhythmy
25. extrametrical (extrametricality)
26. feature (binary feature, major class feature, unary feature)
27. feature matrix

182

28. flap, flapping (cf. tap, tapping)
29. foot
30. formants
31. free variation
32. fricative
33. fundamental frequency (pitch)
34. generative phonology
35. glide
36. glottal(glottal stop, glottalisation, glottis)
37. heavy syllable (light syllable)
38. **heterosyllabic** (vs. **tautosyllabic**)
39. homophone (homophonous)
40. **homorganic** (e.g., same place of articulation)
41. iamb/iambic (trochee / trochaic)

183

42. intonation
43. **intrusive 'r'**
44. international phonetic alphabet (IPA)
45. 'l' velarization
46. lateral
47. larynx
48. lax vowel (tense vowel)
49. lenition
50. level of representation (underlying and surface representation)
51. lexical rule
52. **linking 'r'**
53. liquid
54. manner of articulation (place of articulation)
55. metathesis

184

56. minimal pair (near minimal pair)
57. nasal (stop), nasalized vowel, nasalization
58. natural class (naturalness)
59. neutralization, neutralized
60. node
61. non-linear phonology
62. nucleus
63. obstruent
64. onset
65. opacity (opaque)
66. oral tract
67. palatal
68. palato-alveolar
70. phoneme

185

71. phonetic form
72. phonetics vs. phonology
73. phonotactics
74. plosive (~stop)
75. plural formation
76. post-lexical rule
77. rhotic (rhoticisation, rhoticised vowels)
78. rhyme
79. rounding (lip rounding)
80. rule ordering (extrinsic vs. intrinsic order)
81. schwa
82. semi-vowel
83. sibilant
84. sonorant (sonority, sonority hierarchy)
85. spoonerism

186

86. spreading (feature spreading)
87. palatalization (palatalized)
88. stress (function, primary, secondary, placement)
89. superscript (subscript, diacritic)
90. suppletion
91. syllabic (syllabicity)
92. synchrony vs. diachrony
93. unreleased (stop); unexploded
94. velar (velum, velarization)
95. vocal tract
96. voiced (voiceless, voicing, vocal cords = vocal folds)
97. voice onset time (VOT)
98. vowel (height, backness, reduction)
99. vowel change (Great Vowel Shift)

187

“ *It is not enough that we do our best; sometimes we must do what is required.*

— Winston S. Churchill

If you are going through hell, keep going. — Winston S. Churchill

188