

0. Announcements

- Reminder: Assignment 3 due Thurs.: Exercise 2.7 (Balto-Finnic).
- Note on Apocope, exceptions.

1. From last time

-Sound change as addition/loss/reordering/generalization of rules.

2. Phonemic and non-phonemic change

A **non-phonemic** change preserves the number of phonemes in a language. E.g.:

- (1) Pipil (Uto-Aztecan, El Salvador) *o* > *u*
- (2) Guatemalan Spanish *r* > *s*
- (3) Gipuzkan Basque *j* > *x*
- (4) New Zealand **ɛ* > *ɪ*, **ɪ* > *ə*

A **phonemic** change modifies the number of phonemes in a language, through loss or addition of phonemes. E.g.:

Merger: Two phonemes merge into one, reducing the number of phonemes.

- (5) In Spanish, /b/ and /v/ **merged** to /b/: *boto* ‘dull’, *voto* ‘vote’ now both [boto].

(6) PIE * <i>e</i> , * <i>o</i> , * <i>a</i> > Sanskrit <i>a</i>	<i>Sanskrit</i>	<i>Latin</i>	
	ad-	ed-	‘to eat’
	danta	dent-	‘tooth’
	dva-	duo	‘two’
	ajra-	ager	‘field’
	apa	ab	‘away, from’

- (7) In Cockney English, /v/ and /w/ merged to /w/, e.g., *willage*, *walley*.

- (8) French and Spanish have both lost /h/. (Often considered merger with zero.)

Split (aka phonemic split, secondary split): One phoneme splits into two.

Splits follow mergers. Mergers can cause the loss of a conditioning environment, causing two sounds that were once in complementary distribution to become contrastive.

(9)		‘cat’	‘chaff’	‘chin’
	<u>Stage 1</u>	/katt/ [katt]	/keaff/ [keaff]	/kinn/ [kinn]
	<u>Stage 2</u>	/katt/ [katt]	/keaff/ [tʃeaff]	/kinn/ [tʃinn]
	<u>Stage 3</u>	/katt/ [katt]	/tʃaff/ [tʃaff]	/kinn/ [tʃinn]

(10)		Sg.	Pl.	Sg.	Pl.
	<u>Stage 1</u>	/mu:s/ [mu:s]	/mu:s-i/ [mu:s-i]	/fo:t/ [fo:t]	/fo:t-i/ [fo:t-i]
	<u>Stage 2</u>	/mu:s/ [mu:s]	/mu:s-i/ [my:s-i]	/fo:t/ [fo:t]	/fo:t-i/ [fø:t-i]
	<u>Stage 3</u>	/mu:s/ [mu:s]	/my:s/ [my:s]	/fo:t/ [fo:t]	/fø:t/ [fø:t]

(11)	<u>Stage 1:</u>	/kɪn/ [kɪn]	/kɪŋ/ [kɪŋ]
	<u>Stage 2:</u>	/kɪn/ [kɪn]	/kɪŋ/ [kɪŋ]

Also: Russian, English.

Primary split: An allophone of one phoneme merges with an allophone of another phoneme. Does not affect the number of phonemes in the language.

(12) Split of Latin /s/

Stage 1	‘dear’ (fem.) [ka:ra] /ka:ra/	‘flower’ [flo:s] /flo:s/	‘flowers’ [flo:sɛs] /flo:sɛs/
Stage 2	[ka:ra] /ka:ra/	[flo:s] /flo:s/	[flo:res] /flo:sɛs/
Stage 3	[ka:ra] /ka:ra/	[flo:s] /flo:s/	[flo:res] /flo:res/

3. Phonological space

Across languages, there appears to be a preference in phonemic systems for both **symmetry** (e.g., obstruents occurring voiced/voiceless pairs, vowels in front/back pairs), and **maximization of phonological space** (e.g., *i,u,a* preferred to *i,o,a*.) The farther apart contrasting segments are in phonological space, the easier it is to tell them apart in speech. Examples of symmetry/maximized phonological space:

(13) Sanskrit stops

p	t	tʃ	k
p ^h	t ^h	tʃ ^h	k ^h
b	d	dʒ	g
b ^h	d ^h	dʒ ^h	g ^h

(14) Old Icelandic unstressed vowels

i	u
a	

These preferences appear to trigger changes in phonological systems.

For example, certain dialects of Old Norse had an unstressed vowel system /e, o, a/, but was short-lived. Later Old Icelandic replaced it with /i, u, a/ (Hock 1991).

Languages also appear to fill gaps in phonemic systems.

(15) a. Swiss German vowels

i	ü	u
e	ö	o
ɛ		
æ		a

(Examples from Hock 1991)

b. East dialect

i	ü	u
e	ö	o
ɛ	œ	ɔ
æ		a

c. North dialect

i	ü	u
e	ö	o
ɛ	œ	ɔ
		a

d. West/center dialects

i	ü	u
e	ö	o
æ		a

(16) Reconstructed PIE stops

labial	dental	palatal	velar	labiovelar	
p	t	k'	k	k ^w	voiceless
b	d	g'	g	g ^w	voiced
b ^h	d ^h	g ^h	g ^h	g ^{wh}	voiced aspirated

What changes appear to have produced the following Proto-Celtic stop system?

(17) Proto-Celtic stops

∅	t	k	k ^w
b	d	g	∅

-Loss of *p:

- (18) PIE *peyskos > OIr. iask 'fish'
 PIE *pro > OIr. ro 'before'
 PIE *ph₂tēr > OIr. athair 'father'

-Merging of voiced aspirated stops with voiced stops:

- (19) Merging of voiced aspirates with voiced stops
 PIE *b^her-oh₂ > OIr. biru 'bear'
 PIE *d^heg^{wh}-i- > Middle Ir. daig 'fire'
 PIE *g^hel- > Middle W. gell 'yellow'

-Merging of palatal stops with velar stops;

-Voiced labiovelar *g^w > b:

- (20) PIE *g^wen- > OIr. ben 'woman'

-Further developments with *k^w:

- (21) PIE *k^wetwer > Latin quattuor, Welsh pedwar 'four', OIr cethair 'four'.

(22) Proto-Celtic stops (repeated from above)

∅	t	k	k ^w
b	d	g	∅

(23) British Celtic stops (*k^w > p)

p	t	k
b	d	g

(24) Early Old Irish (*k^w > k)

∅	t	k
b	d	g

Later Old Irish

p	t	k
b	d	g

4. From PIE to Germanic

(25) Reconstructed PIE stops (repeated from above)

labial	dental	palatal	velar	labiovelar	
p	t	k̄	k	k ^w	voiceless
b	d	ḡ	g	g ^w	voiced
b ^h	d ^h	g ^h	g ^h	g ^{wh}	voiced aspirated

(26) Grimm's Law

f	θ		h	h ^w	voiceless fricative
↑	↑		↑	↑	↑
p	t		k	k ^w	voiceless stop
↑	↑		↑	↑	↑
b	d		g	g ^w	voiced stop
↑	↑		↑	↑	↑
b ^h	d ^h		g ^h	g ^{wh}	voiced aspirated stop

- (27) PIE *ph₂tēr Latin pater English father
 *tenu Latin tenuis English thin
 *k̄ntom Latin centum English hundred
 *k^wod Latin quod English what

- (28) PIE *leb- Latin labium English lip
 *pod- Latin ped- English foot
 *gel- Latin gelidus English cold
 *g^wen- English queen

- (29) PIE *b^her- Sanskrit b^har- English bear
 *d^heh₁- Sanskrit d^hā- English do
 *mag^ho- Sanskrit mag^hám English mag [German 'am able']
 *seng^{wh}- Sanskrit English sigg^wan [Gothic 'sing']

Examples from *Indo-European Language and Culture* (2010).

4. Chain Shifts

As we've already seen, sometimes several sound changes appear to be connected. Such developments, where one change within a given phonological system gives rise to another, are called **chain shifts**.

It is generally believed that chain shifts are driven by symmetry and maximization of phonological space.

"It appears that the sounds of a sound system are so interconnected that a change in any one part of the system can have implications for other parts of the system... The general idea behind the chain shifts is that sound systems tend to be symmetrical or natural, and those that are not, those which have a 'gap' in the inventory, tend to change to make them symmetrical or natural, to fill the gap." (Campbell 2006)

Exercises 3.3, 4.5.

The **Great Vowel Shift** in English results from a chain shift (see p. 108, Figure 4.3). This chain shift is largely responsible for the discrepancy between spelling and sound in English: the vowel letters *a*, *e*, and *i* are [e], [i], and [aɪ], in contrast to most other European languages which have [a], [e], and [i].

(30)	/ge:s/	geese
	/se:n/	seen
	/go:s/	goose
	/bo:t/	boot
	/bɛ:d/	bead
	/gɔ:tə/	goat
	/na:mə/	name
	/ga:tə/	gate
	/ri:də/	ride
	/du:n/	down
	/lu:d/	loud

Drag chains: one change creates a gap in a system, which is then followed by another change to fill that gap. This may then create another gap, which then causes another change to fill that gap, and so on.

E.g., diphthongization in English may have left two gaps, setting off a chain reaction of raising to fill resulting gaps. Similarly:

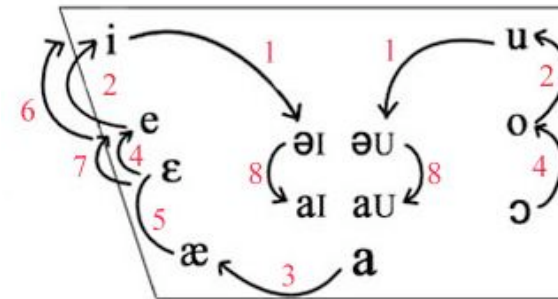
(31) French vowel system

i	y	← ₁	u
			↑ ₂
e			o
			↑ ₃
æ			a

Push chains: if a sound starts moving into the space of another sound, the sound whose space is being invaded might itself move into another sound's space (which may already be occupied, creating another **push**.)

E.g., /a:/ may have moved up into the space of /ɛ:/, threatening a merger of the two. The GVS might be a push/drag combo: /e:/ and /o:/ could have raised, pushing the high vowels out and dragging the other vowels up.

(32)



(33) Intervocalic consonants from Classical Latin to Spanish:

	∅	∅	Latin <i>regina</i> > Spanish <i>reina</i> 'queen'
	↑ ₃	↑ ₃	
b	d	g	Latin <i>amika</i> > Spanish <i>amiga</i> 'friend'
↑ ₂	↑ ₂	↑ ₂	
p	t	k	Latin [bukka] > Spanish [boka] 'mouth'
↑ ₁	↑ ₁	↑ ₁	
pp	tt	kk	