

BBN-ANG-141 Foundations of phonology 11

Phonotactic constraints

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outline

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element combinations

given a set of words some combinations are possible, others are not:
e.g., of {*eats*, *nuts*, *Tom*}, we get

- * Tom nuts eats
- ✓ Tom eats nuts
- ✓ nuts Tom eats
- * nuts eats Tom
- * eats Tom nuts
- * eats nuts Tom

a similar sensitivity to order is observable in phonology:
e.g., of {e, n, t}, we get

- * tne
- ✓ ten
- * nte
- ✓ net
- * etn
- ✓ ent



possible/impossible words, existing/nonexistent words

	EXISTING	NONEXISTENT	
POSSIBLE	brick	blick	← accidental gap
IMPOSSIBLE	schwa	bnick	← systematic gap

← impossible, but existing word

- ▶ PHONOTACTIC CONSTRAINTS are meant to filter out impossible words
- ▶ many words not filtered out by phonotactic constraints still do not exist (ACCIDENTAL GAPS)
- ▶ some words are filtered out (because they contain a rare string), still they do exist
- ▶ actually, *blick* is an existing, but rare word

phonotactic constraints

- ▶ avail **within morphemes**, across morphemes sound combinations occur much more freely: /**kb**/ or /**vz**/ do not occur within a morpheme, but they do in *blackboard* or *loves*, where a morpheme boundary separates the cluster
- ▶ are normally formulated with reference to NATURAL CLASSES (sound organization is systematic)
- ▶ phonotactic constraints hold
 - ▶ at the edges of words, **# \leftrightarrow C**, **C \leftrightarrow #**, **V \leftrightarrow #**
 - ▶ between two consonants, **C \leftrightarrow C**
 - ▶ sometimes between a vowel and the following consonant, **V \leftrightarrow C**
 - ▶ rarely between a consonant and the following vowel, **C \leftrightarrow V**
- ▶ usually only adjacent (=neighbouring) segments are affected

the beginning of the word

vowels

/ɥ/ and /ɥw/ are rare (*umlaut*; *oodles*, *ooze*) but this does not seem to be systematic

consonants

/ŋ/ does not occur

#CC type 1: sC

sp spot	(ʃp spiel)
st stop	
stʃ stew	(ʃtʃ stew)
sk Scot	
(sf sphere)	
sm smock	(ʃm schmooze)
sn snot	(ʃn schnapps)
sl slot	(ʃl schlep)
(sr Srinagar)	ʃr shred
sw swat	(ʃw schwa)
(sj suit)	

#CC type 2: TR

T=obstruents, except s/f; R=nonnasal sonorants

pl plan	pr prank	(pw pueblo)
bl black	br brass	(bw bwana)
fl flag	fr frank	
	tr trap	tw tweak
	dr drank	dw dwell
	θr thrash	θw thwack
kl clap	kr crack	kw quick
gl glad	gr grab	(gw guacamole)

#CC type 3: Cj

OLD	NEW
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LABIAL

pure	pjo:
beauty	bj#wtj
few	fj#w
view	vj#w
mute	mj#wt

DENTAL

Thule	θj#wl	θ#wl
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ALVEOLAR

suit	sj#wt	s#wt
Zeus	zj#ws	z#ws
Luke	lj#wk	l#wk
new	nj#w	n#w

OLD	NEW
-----	-----

ALVEOLAR

tube	tj#wb	tj#wb
dune	dj#wn	dʒ#wn

PALATAL

rule	r#wl
chew	tj#w
juice	dʒ#ws
chute	ʃ#wt
jupe	ʒ#wp

VELAR

cute	kj#wt
gue	gj#w
huge	hj#wdʒ

#CCC: sTR & sCj

spl split	spr spring		spj spew
	str strap	* stw	stj/stʃ stew
(skl sclerosis)	skr scratch	skw squad	skj skew
* sfl	(sfr sphragistic)		* sfj
			(smj smew)
			* snj
			(slj sluice)

the end of the word

vowels

checked vowels (/ɪ ɛ ʌ ɔ ʊ/ and stressed /ə/) not occur (only unstressed /ə/, which is an R vowel!)

consonants

- ▶ /r h/: do not occur
- ▶ /j w/: do not occur, unless diphthongs are analysed as vowel+consonant

CC# type 1: NT

LABIAL	DENTAL	ALVEOLAR	PALATAL	VELAR
mp hemp		nt bent	ntʃ bench	ŋk bank
*mb		nd bend	ndʒ sponge	(ŋg langue)
mf nymph	nθ month	ns pence	(nʃ avalanche)	
*mv	*nð	nz bronze	(nʒ mélange)	

CC# type 2: IC

LABIAL	DENTAL	ALVEOLAR	PALATAL	VELAR
lp help		lt belt	ltʃ belch	lk bulk
lb bulb		ld held	ldʒ sponge	(lg Glenelg)
lf shelf	lθ filth	ls else	(lj Welsh)	
lv twelve	*lð	lz Charles	*lʒ	
lm film		ln kiln		*lj

CC# type 3: TT

fricative+plosive

sp lisp	st list	sk risk
	ft lift	

plosive+fricative

ps lapse	ts quartz	ks fix
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plosive+plosive

pt script		kt fact
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CCC#

mpt prompt	m ps glimpse	(l pt sculpt)
ŋkt instinct	ŋks lynx	(l kt mulct)

sonorants

/r w j/

only occur before a vowel or syllabic consonant: *rack*, *car engine*, *carol* /-r|/, *ca*ɹ/, *ca*ɹd, *yet*, *wet*, *narwhal* /-w|/, *royal* /-j|/ (if *owl*, *Lloyd*, *boy* contain diphthongs: /aw| lojd boj/)

/h/

only occurs before a stressed vowel or at the beginning of a word: *horizon*, *álcohôl*, *vehícular*, *véhicle*, *anníhilate*

/ŋ/

only occurs before {k g} and word-finally: *ink* /ɪŋk/, *finger* /fɪŋgə/, *fang* /faŋ/

some vowel+consonant restrictions

- ▶ most vowels occur before most consonants, some combinations are impossible: eg ***ʌ**ʒ, ***ʌ**θ, ***ʌ**ð; word finally only **i**ð (no **a**ð, **ɛ**ð, etc)
- ▶ diphthongs do not occur before consonant clusters if either of the consonants is **noncoronal**: ***j**mp, ***w**mp, ***j**ft, ***w**ft, ***j**lk, ***w**lk, etc, but they do before clusters where both consonants are coronal: *paste* /**p**ɛ**j**st/, *fiend* /**f**i**j**nd/, *wild* /**w**a**j**ld/, *bolt* /**b**ə**w**lt/, *wound* /**w**ʌ**w**nd/, *round* /**r**a**w**nd/, *point* /**p**o**j**nt/ (but *chamber* /tʃɛ**j**mbə/)
- ▶ some long vowels (the broad ones: /**ɑ**: **o**: **ɜ**:/) may occur before two consonants (e.g., *task*, *auction*, *excerpt*), others (the smooth ones: /**i**: **ɛ**:/) may not
- ▶ only short monophthongs occur before /ŋ/ (the velar nasal behaves like a noncoronal cluster)
- ▶ only **coronal** consonant after /**aw**/: *flout*, *loud*, *couch*, *gouge*, *house*, *arouse*, *south*, *Louth*, *brown*, *owl*, but ***aw**m, ***aw**p, ***aw**k, etc.
- ▶ only **alveolar** consonant after /**oj**/: *exploit*, *void*, *voice*, *noise*, *coin*, *coil*, but ***oj**θ, ***oj**f, ***oj**tʃ, ***oj**p (exc. *coif*)

CCV restrictions

while consonant + vowel restrictions are rare, the following occur in English

- ▶ Cj can only be followed by /ɰw ɰ: o: ə/: cf. *pubic*, *cure*, *pure*, *million* (a rare exception: *piano* /pjɑ:nəw/)
- ▶ Cw cannot be followed by /ɰw ɰ:/: cf. *two* /tɰw/ (the /w/ drops, but it is present in *twelve*, *twenty*, *twice*, *between*, etc.)

note, however, the absence of CV restrictions

language change

one aspect of language change is the modification of phonotactic constraints, e.g.,

- ▶ Old English (OE) had /h/ word finally and before consonants, Modern English (ModE) does not
 - ▶ it disappeared in *night, bought, sigh*
 - ▶ became /f/ in *tough, enough*
- ▶ OE had /hr hl hw/ in *ring, loaf, whale*
- ▶ OE had /kn/, ModE does not: /kniht/ became /najt/
- ▶ OE did not have #{v, z} and {v, z}#, ModE does
- ▶ as original compounds become monomorphemic, phonotactic constraints apply to them, eg *cupboard* *pb /kʌbəd/, *Christmas* *stm /krɪsməs/ (cf. *chipboard* and *postman* which are not (yet?) monomorphemic)

loanwords

- ▶ loanwords are usually altered to fit the phonotactic constraints of the host language
 - ▶ F *café* (with e# in F) is /kəfɛj/
 - ▶ F *garage* is /gəra:ʒ/ or /garɪʒ/ (cf. *manage* /manɪʒ/)
 - ▶ G *Bach* (with x in G) is /bɑ:k/ (or /bɑ:x/: some constraints are weaker than others)
- ▶ but loans may modify phonotactic constraints
 - ▶ E ʒ# developed as an effect of French loans
 - ▶ Hu #CC developed as an effect of Indo-European loans
 - ▶ E *#kn, but *knesset* may be /kn-, kən-/; E *#ʃm, but *schmalz* is /ʃm-/ (yielding “impossible” but existing words)

sample exam questions

which of the following words is possible in English?

1. /ko:w/
2. /writ/
3. /tapa/
4. /kwojn/

which word is phonotactically ill-formed?

1. *shrink* /ʃrɪŋk/
2. *schwa* /ʃwa:/
3. *schedule* /ʃɛdʒɪwl/
4. *schedule* /skɛdʒɪwl/