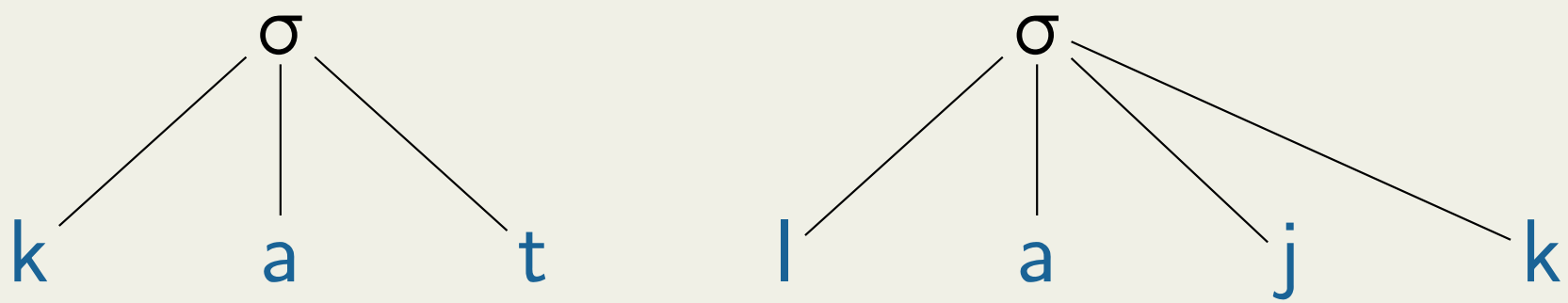
BBN–ANG–243 Phonological analysis
5–6. Syllable structure

Zoltán Kiss, Péter Szigetvári, Miklós Törkenczy

Dept of English Linguistics, Eötvös Loránd University

the structure of the syllable: flat

flat syllables



phonotactic constraints

C+C

{t, s, k} wɪj- t {r, w} ɪj-

phonotactic constraints

C+C

$\{t, s, k\}$wɪj- t$\{r, w\}$ɪj-

V+C

-$\{ɪ, ɛ, a, o\}$j- *-ʉ$\{j, θ, ð, v\}$-

phonotactic constraints

C+C

{t, s, k}wɪj-

t{r, w}ɪj-

V+C

-{ɪ, ɛ, a, o}j-

*-ʉ{j, θ, ð, v}-

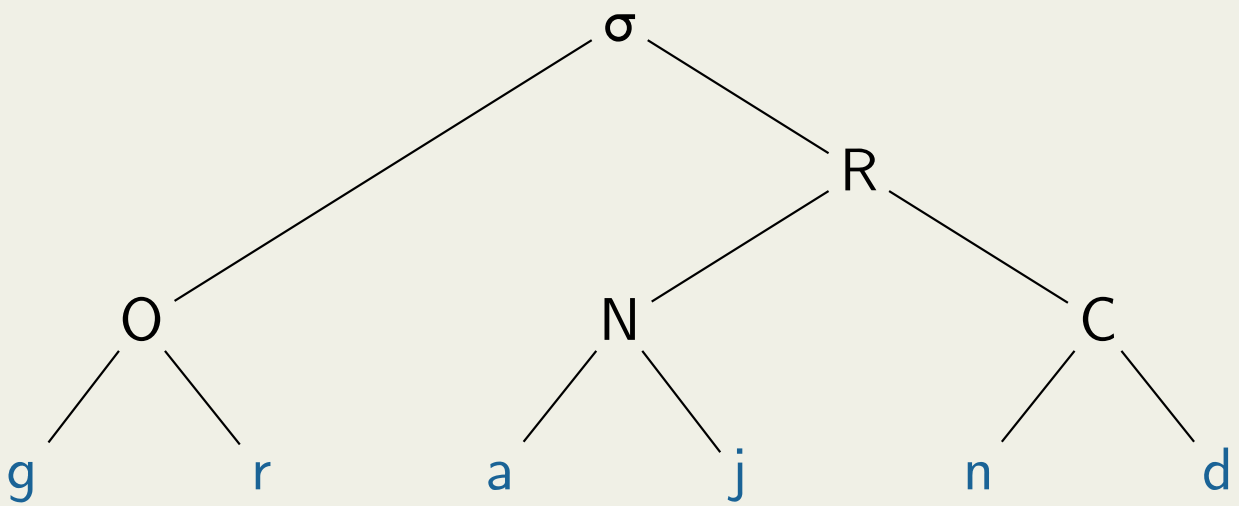
C(C)+V

tr{ɪ, ɛ, a, ə, ɔ, ʉ}-

{pl, kl, pr, br, tr, dr, sw, tʃ, m, l, r, h, ⋮}ɛ-

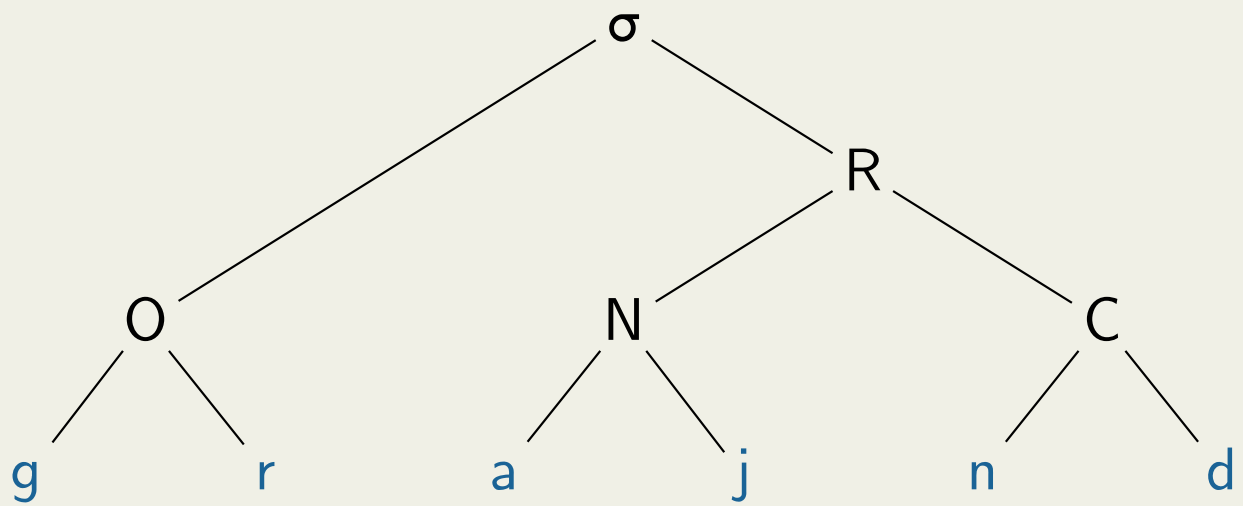
the structure of the syllable: hierarchical

syllabic constituents: onset, rhyme, nucleus, coda



the structure of the syllable: hierarchical

syllabic constituents: onset, rhyme, nucleus, coda



alternatively

[syllable [onset g r] [rhyme [nucleus a j] [coda n d]]]

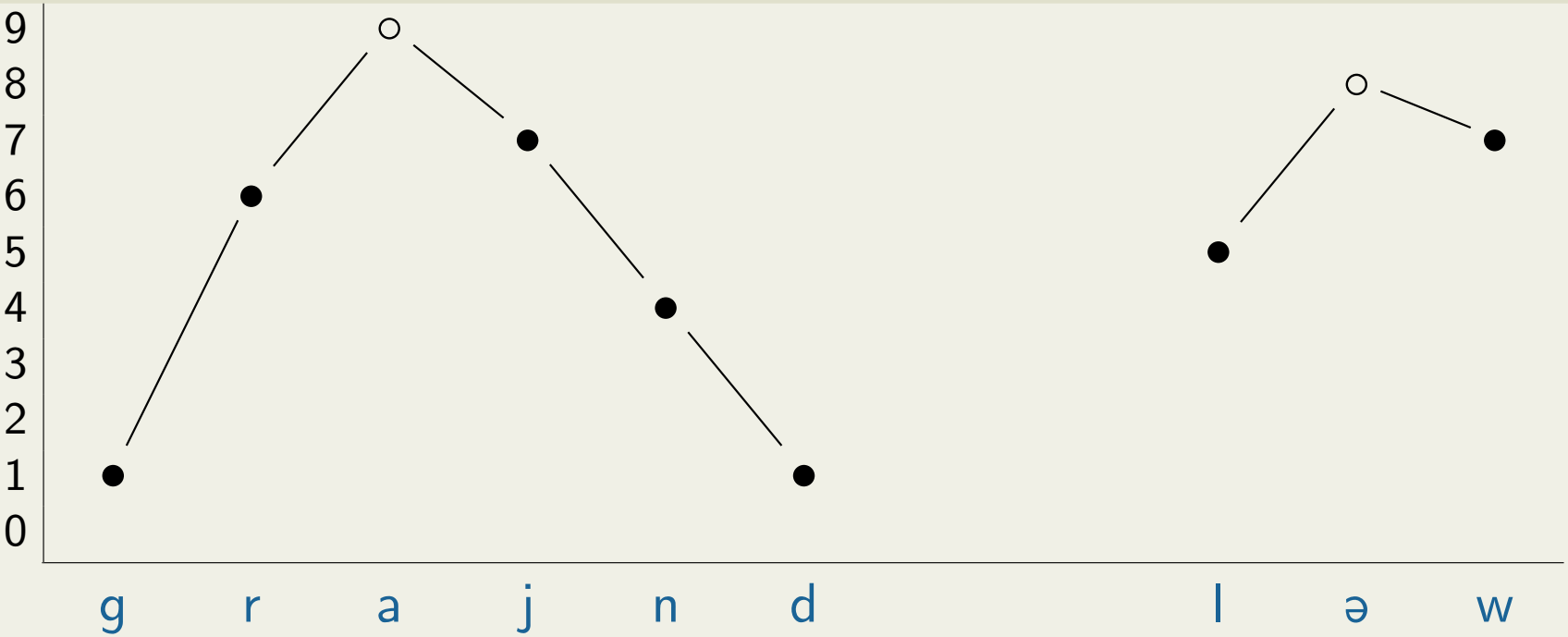
sonority

a sonority hierarchy

index	sounds
9	low vowels (e.g., a ɐ ɑ ɒ)
8	mid vowels (e.g., e ɛ ø ə ɔ o)
7	high vowels (e.g., j i y ɨ ʉ u w)
6	rhotics (e.g., r ɾ)
5	laterals (e.g., l)
4	nasals (e.g., m n ɲ ŋ)
3	voiced fricatives (e.g., v ð z ʒ ɣ)
2	voiceless fricatives (e.g., f θ s ʃ x)
1	voiced plosives (e.g., b d ɟ g)
0	voiceless plosives (e.g., p t c k)

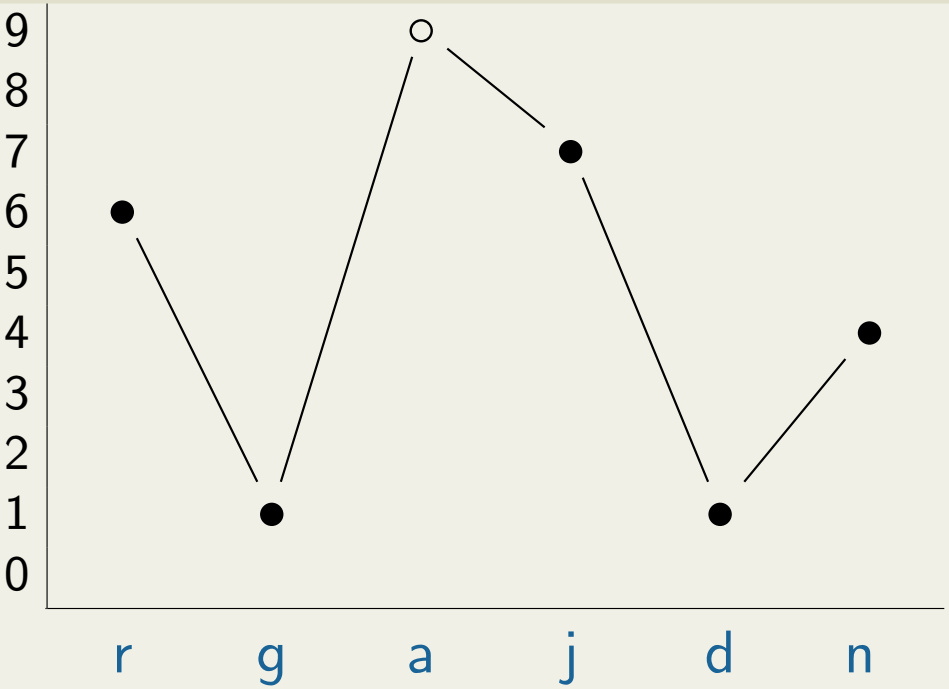
sonority sequencing

the sonority profiles of *grind* and *low*



sonority violations

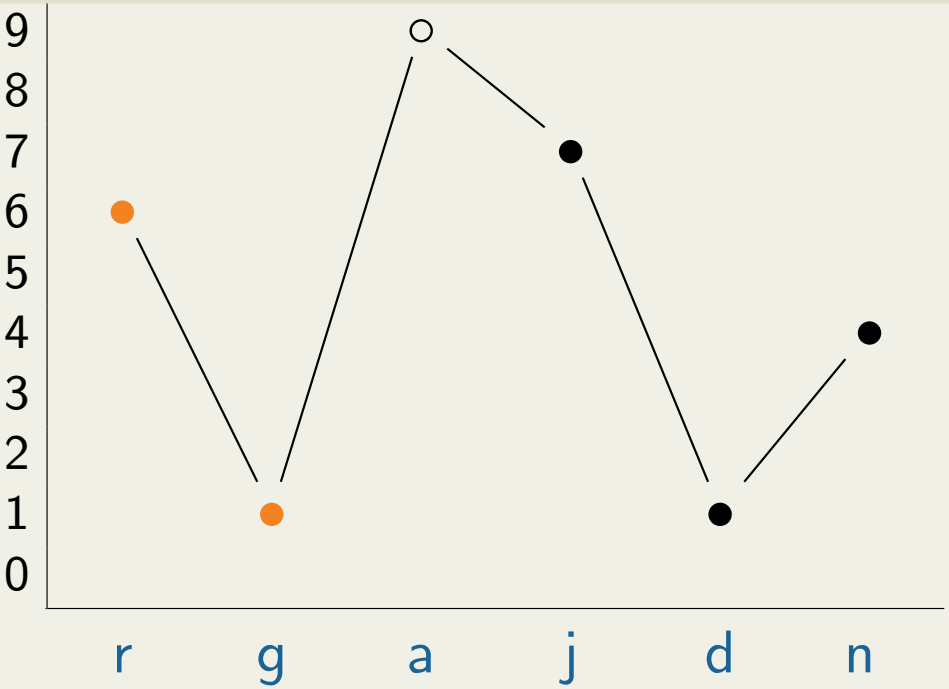
an impossible sonority profile: *rgidn*



the string above is impossible *as a monosyllable*

sonority violations

an impossible sonority profile: *rgidn*

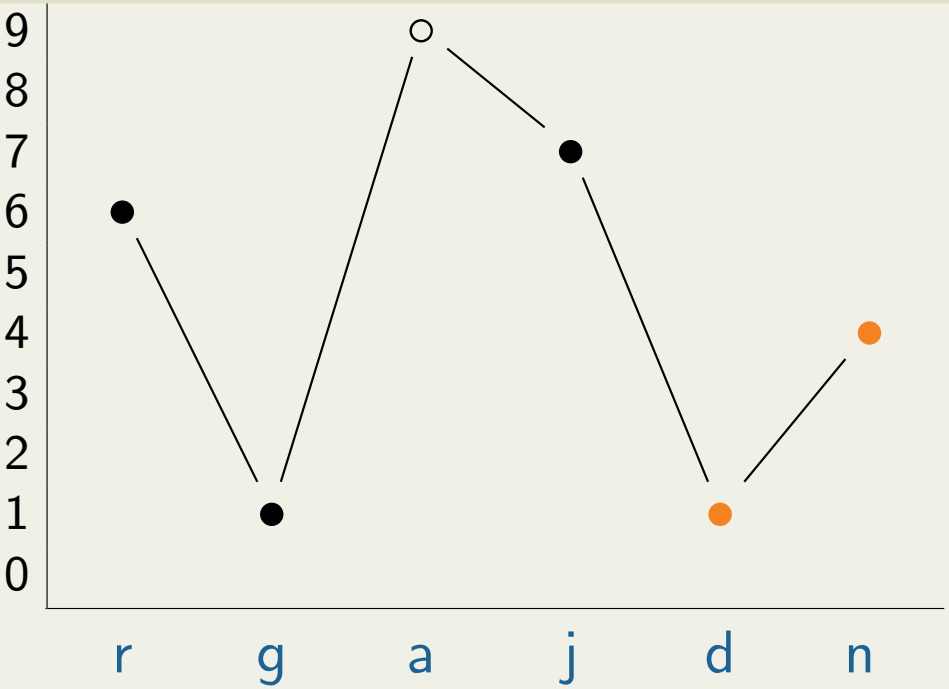


the string above is impossible *as a monosyllable*

- sonority fall before the peak

sonority violations

an impossible sonority profile: *rgidn*

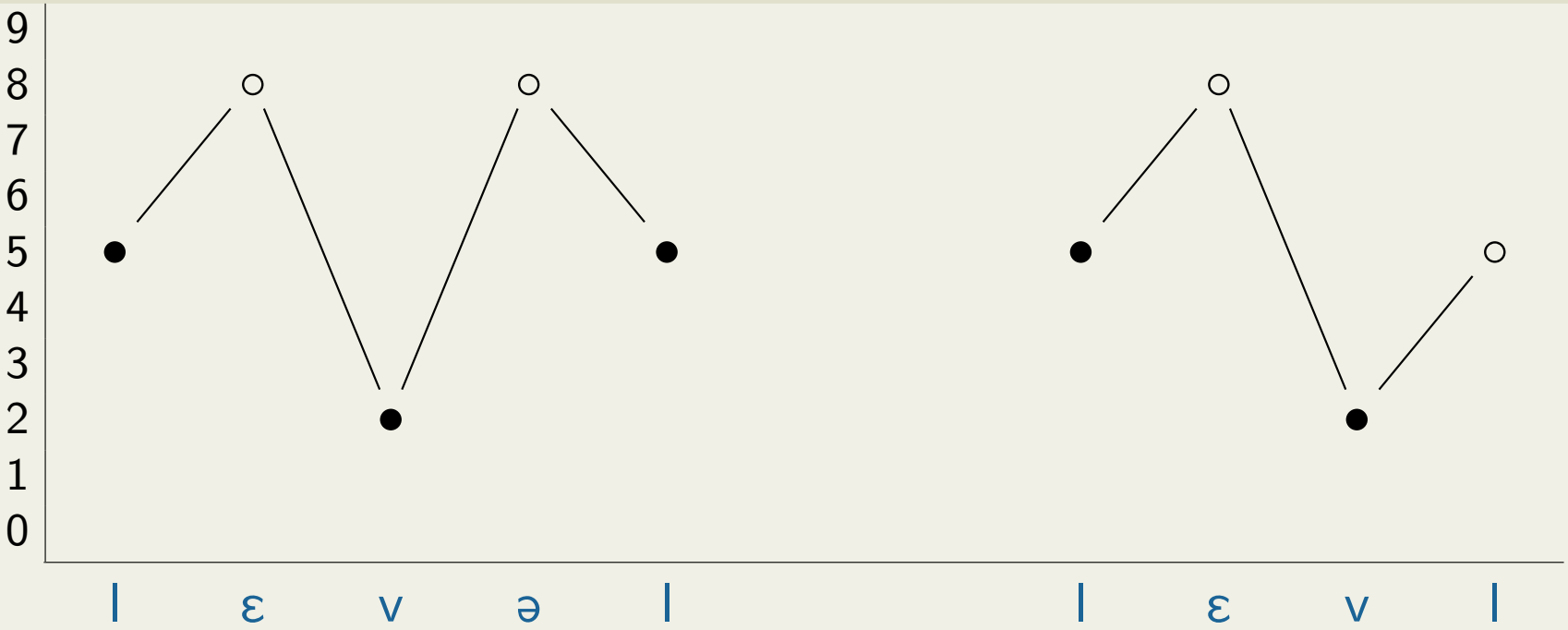


the string above is impossible *as a monosyllable*

- sonority fall before the peak
- sonority rise after the peak

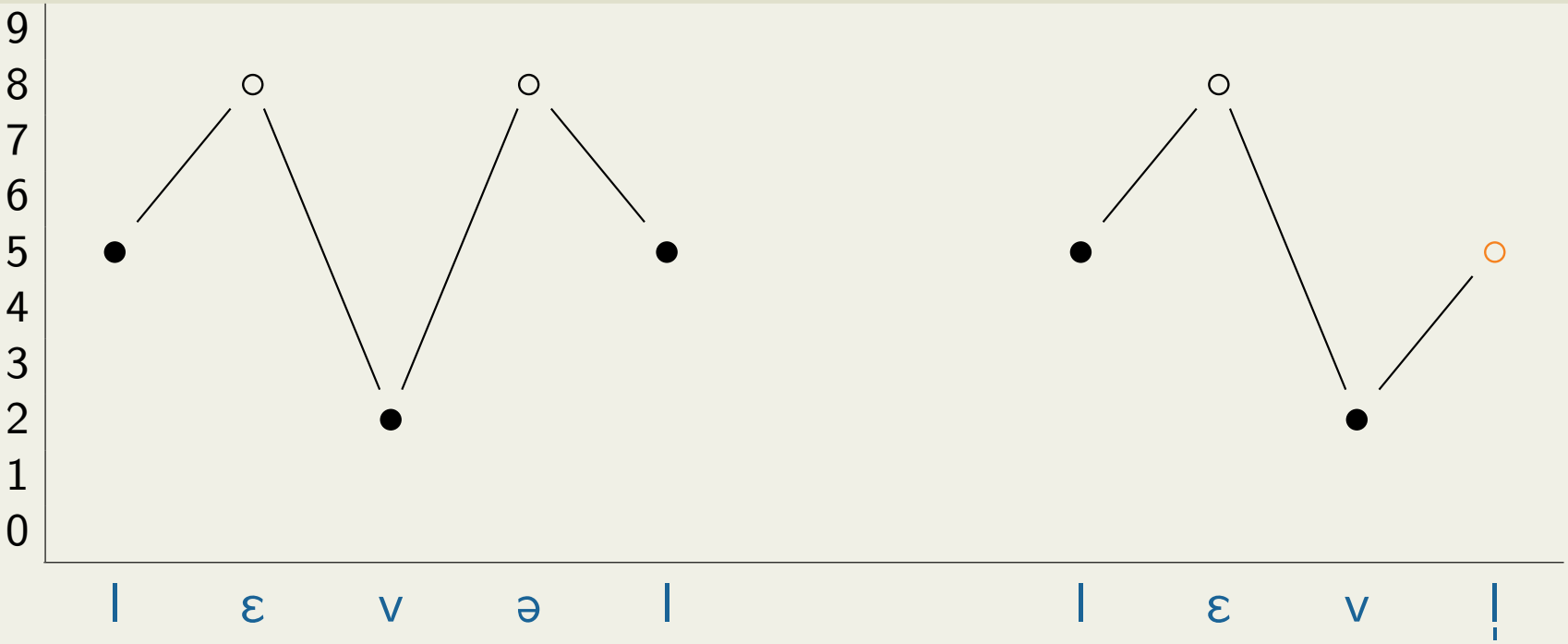
syllabic consonants

the sonority profiles of *level* [lɛvəl] and [lɛv̩l]



syllabic consonants

the sonority profiles of *level* [lɛvəl] and [lɛvl̩]



onset maximization

onset maximization principle

onset maximization

onset maximization principle

- VCV $\rightarrow$ V.CV (e.g., *le.vel*, *le.tter*, *la.ter*)

onset maximization

onset maximization principle

- VCV $\rightarrow$ V.CV (e.g., *le.vel*, *le.tter*, *la.ter*)
- VCCV

onset maximization

onset maximization principle

- VCV $\rightarrow$ V.CV (e.g., *le.vel*, *le.tter*, *la.ter*)
- VCCV
  - rising-sonority CC: V.CCV (e.g., *a.pply*, *ze.bra*, *Geo.ffrey*)

onset maximization

onset maximization principle

- VCV $\rightarrow$ V.CV (e.g., *le.vel*, *le.tter*, *la.ter*)
- VCCV
  - rising-sonority CC: V.CCV (e.g., *a.pply*, *ze.bra*, *Geo.ffrey*)
  - falling-sonority CC: VC.CV (e.g., *Al.pine*, *pan.da*, *as.pire*)

onset maximization

onset maximization principle

- VCV $\rightarrow$ V.CV (e.g., *le.vel*, *le.tter*, *la.ter*)
- VCCV
  - rising-sonority CC: V.CCV (e.g., *a.pply*, *ze.bra*, *Geo.ffrey*)
  - falling-sonority CC: VC.CV (e.g., *Al.pine*, *pan.da*, *as.pire*)
  - level-sonority CC: VC.CV (e.g., *chim.ney*, *as.phalt*, *fac.tor*)

a further principle is needed

heterosyllabic rising-sonority clusters

at.las
ath.lete
at.mosphere
ad.mire
eth.nic
hyp.nosis
ack.nowledge
ac.me
ig.nore
on.ly
Ham.let
Hen.ry
wal.rus

word edges

how relevant are word edges to determining possible syllable edges?

word edges

how relevant are word edges to determining possible syllable edges?

1. $X → #X? maybe

word edges

how relevant are word edges to determining possible syllable edges?

1. $X → #X? maybe
2. #X → $X? no

word edges

how relevant are word edges to determining possible syllable edges?

1. $X → #X? maybe
2. #X → $X? no
3. X$ → X#? no

word edges

how relevant are word edges to determining possible syllable edges?

1. $X → #X? maybe
2. #X → $X? no
3. X$ → X#? no
4. X# → X$? no

word edges

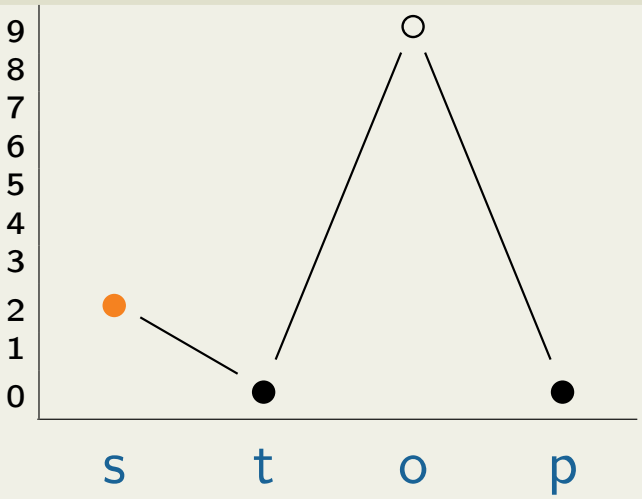
how relevant are word edges to determining possible syllable edges?

1. $X → #X? maybe
2. #X → $X? no
3. X$ → X#? no
4. X# → X$? no

that is: not really

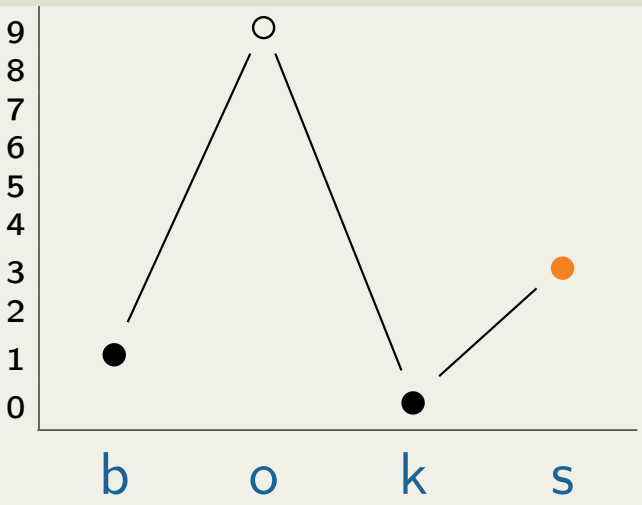
word-initial strings

s+stop violates sonority sequencing



word-final strings

stop+s violates sonority sequencing



syllable-final strings

syllable-final short vowels

syllable-final strings

syllable-final short vowels

- *V̆# → *V̆$

syllable-final strings

syllable-final short vowels

- *V̆# → *V̆$
  - *dē.mon* vs. *lĕm.on*?

syllable-final strings

syllable-final short vowels

- *V̆# → *V̆$
  - *dē.mon* vs. *lĕm.on*?
  - *ferry*: *ɛ#, *ɛr#

“degenerate” syllables

#sC: s a degenerate syllable?

“degenerate” syllables

#sC: s a degenerate syllable?

- A|manda # should # ig|nore # the |# children

“degenerate” syllables

#sC: s a degenerate syllable?

- A|manda # should # ig|nore # the |# children
- s.top, s.pot, s.cope

L-darkening

data

clear [l]	dark [ɫ]
look	cool
lick	kill
play	belt
pillow	seldom

L-darkening

data

clear [l]	dark [ɬ]
look	cool
lick	kill
play	belt
pillow	seldom

rule/distribution

1. $l \rightarrow l \; / \; \_\_ \; V$
2. $l \rightarrow ɬ \; / \; \_\_ \; \left\{ \begin{matrix} C \\ \# \end{matrix} \right\}$

L-darkening

data

clear [l]	dark [ɬ]
look	cool
lick	kill
play	belt
pillow	seldom

rule/distribution

1. l → l / __ V
2. l → ɬ / __ { C, # }

- except: clear [l] before a consonant (yod): *value* valjɬw

L-darkening

data

clear [l]	dark [ɬ]
look	cool
lick	kill
play	belt
pillow	seldom

rule/distribution

1. l → l / __ V
2. l → ɬ / __ $\left\{ \begin{matrix} C \\ \# \end{matrix} \right\}$

- except: clear [l] before a consonant (yod): *value* valjɯw
- except: dark [ɬ] before a vowel: *travelling* travɬɪŋ (syllabic [l]!)

L-darkening

data

clear [l]	dark [ɫ]
look	cool
lick	kill
play	belt
pillow	seldom

rule/distribution

1. l → l / __ V
2. l → ɫ / __ {C, #}

- except: clear [l] before a consonant (yod): *value* valjɯw
- except: dark [ɫ] before a vowel: *travelling* travɫɪŋ (syllabic [l]!)

syllabic formulation

- clear [l] in onset
- dark [ɫ] in rhyme

L-darkening

data

clear [l]	dark [ɬ]
look	cool
lick	kill
play	belt
pillow	seldom

rule/distribution

1. l → l / __ V
2. l → ɬ / __ $\left\{ \begin{matrix} C \\ \# \end{matrix} \right\}$

- except: clear [l] before a consonant (yod): *value* valjʉw
- except: dark [ɬ] before a vowel: *travelling* travɬɪŋ (syllabic [l]!)

syllabic formulation

- clear [l] in onset [j] is the only C before which [l] is in the onset
- dark [ɬ] in rhyme

L-darkening

data

clear [l]	dark [ɫ]
look	cool
lick	kill
play	belt
pillow	seldom

rule/distribution

1. $\text{l} \rightarrow \text{l} \;/\; \_\_ \;\text{V}$
2. $\text{l} \rightarrow \text{ɫ} \;/\; \_\_ \begin{Bmatrix} \text{C} \\ \# \end{Bmatrix}$

- except: clear [l] before a consonant (yod): *value* valjɯw
- except: dark [ɫ] before a vowel: *travelling* travɫɪŋ (syllabic [l]!)

syllabic formulation

- clear [l] in onset [j] is the only C before which [l] is in the onset
- dark [ɫ] in rhyme [ɫ̩] in nucleus, $\_\_ \begin{Bmatrix} \text{C} \\ \# \end{Bmatrix} = \_\_(\text{C})\$ =$ in coda

R-dropping

data

[r]	no [r]
right	tar
carry	metre
pray	card
zebra	martyr

R-dropping

data

[r]	no [r]
right	tar
carry	metre
pray	card
zebra	martyr

rule/distribution

1. $r \;/\; \_\_\; V$
2. $r \rightarrow \emptyset \;/\; \_\_ \begin{Bmatrix} C \\ \# \end{Bmatrix}$

R-dropping

data

[r]	no [r]
right	tar
carry	metre
pray	card
zebra	martyr

rule/distribution

1. $r \;/\; \_\_\; V$
2. $r \rightarrow \emptyset \;/\; \_\_\; \left\{ \begin{matrix} C \\ \# \end{matrix} \right\}$

[r] in onset only

R-dropping

data

[r]	no [r]
right	tar
carry	metre
pray	card
zebra	martyr

rule/distribution

1. $r / \_\ V$
2. $r \rightarrow \emptyset / \_ \begin{Bmatrix} C \\ \# \end{Bmatrix}$

[r] in onset only

- $\Rightarrow$ *[r̩] (in nucleus!)

R-dropping

data

[r]	no [r]
right	tar
carry	metre
pray	card
zebra	martyr

rule/distribution

1. $r \;/\; \_\_\; V$
2. $r \rightarrow \emptyset \;/\; \_\_\; \left\{ \begin{matrix} C \\ \# \end{matrix} \right\}$

[r] in onset only

- $\Rightarrow$ *[r̩] (in nucleus!)
- *camera* [kámr̩ə], *cigarette* [sɪgr̩ét]

R-dropping

data

[r]	no [r]
right	tar
carry	metre
pray	card
zebra	martyr

rule/distribution

1. $r \;/\; \_\_\; V$
2. $r \rightarrow \emptyset \;/\; \_\_\; \left\{ \begin{matrix} C \\ \# \end{matrix} \right\}$

[r] in onset only

- $\Rightarrow$ *[r̩] (in nucleus!)
- *camera* [kámr̩ə], *cigarette* [sɪgr̩ét]
- *barrel* [bárl̩], *literal* [lítr̩l̩]

R-dropping

data

[r]	no [r]
right	tar
carry	metre
pray	card
zebra	martyr

rule/distribution

1. r / __ V
2. r → ∅ / __ $\begin{Bmatrix} C \\ \# \end{Bmatrix}$

[r] in onset only

- ⇒ *[r̩] (in nucleus!)
- *camera* [kámr̩ə], *cigarette* [sɪgr̩ét]
- *barrel* [bárl̩], *literal* [lítr̩l̩]
- [r] occurs before anything syllabic

aspiration

data

aspirated		unaspirated	
pain	pʰéjn	Spain	spɛ́jn
plain	pʰlɛ́jn	splay	splɛ́j
apace	əpʰéjs	leper	lɛ́pə
complain	kʰəmpʰlɛ́jn	explain	ɪksplɛ́jn
pagoda	pʰəgə́wdə	specific	spəsífɪk
placenta	pʰləsɛ́ntə	lap	láp

aspiration

data

aspirated		unaspirated	
pain	pʰéjn	Spain	spéjn
plain	pʰléjn	splay	spléj
apace	əpʰéjs	leper	lépə
complain	kʰəmpʰléjn	explain	ɪkspléjn
pagoda	pʰəgə́wdə	specific	spəsífɪk
placenta	pʰləsɛ́ntə	lap	láp

rule/distribution

aspiration

data

aspirated		unaspirated	
pain	pʰéjn	Spain	spéjn
plain	pʰléjn	splay	spléj
apace	əpʰéjs	leper	lépə
complain	kʰəmpʰléjn	explain	ɪkspléjn
pagoda	pʰəgə́wdə	specific	spəsífɪk
placenta	pʰləsɛ́ntə	lap	láp

rule/distribution

- $C \rightarrow C^h \;/\; \$ \_\_$

aspiration

data

aspirated		unaspirated	
pain	pʰéjn	Spain	spéjn
plain	pʰléjn	splay	spléj
apace	əpʰéjs	leper	lépə
complain	kʰəmpʰléjn	explain	ıkspléjn
pagoda	pʰəgə́wdə	specific	spəsífık
placenta	pʰləsɛ́ntə	lap	láp

rule/distribution

- $C \rightarrow C^h \;/\; \$ \_\_$
- this is the only point in indicating stress at the "syllable boundary": kəm'plɛjn vs ık'splɛjn

aspiration

data

aspirated		unaspirated	
pain	pʰéjn	Spain	spɛ́jn
plain	pʰlɛ́jn	splay	splɛ́j
apace	əpʰéjs	leper	lɛ́pə
complain	kʰəmpʰlɛ́jn	explain	ɪksplɛ́jn
pagoda	pʰəgə́wdə	specific	spəsífɪk
placenta	pʰləsɛ́ntə	lap	láp

rule/distribution

- $C \rightarrow C^h \;/\; \$\_\_$
- this is the only point in indicating stress at the "syllable boundary": kəm'plɛjn vs ɪk'splɛjn
- *kaftan* *[-tʰ-] ⇒ *ka.ftan*?

an alternative analysis

fortis plosives are not aspirated after s (and f)

an alternative analysis

fortis plosives are not aspirated after s (and f)

- because fortis plosives do not occur after s (and f)

an alternative analysis

fortis plosives are not aspirated after s (and f)

- because fortis plosives do not occur after s (and f)
- note: the contrast of p t k and b d g is neutralized after s (and f)

an alternative analysis

fortis plosives are not aspirated after s (and f)

- because fortis plosives do not occur after s (and f)
- note: the contrast of p t k and b d g is neutralized after s (and f)
- *pain* pɛ́jn vs *Spain* sbɛ́jn (cf Welsh *Sbaen*)

an alternative analysis

fortis plosives are not aspirated after s (and f)

- because fortis plosives do not occur after s (and f)
- note: the contrast of p t k and b d g is neutralized after s (and f)
- *pain* pɛ́jn vs *Spain* sbɛ́jn (cf Welsh *Sbaen*)
- the "p" of *Spain* is phonetically identical to the "b" of *bane*

an alternative analysis

fortis plosives are not aspirated after s (and f)

- because fortis plosives do not occur after s (and f)
- note: the contrast of p t k and b d g is neutralized after s (and f)
- *pain* pɛ́jn vs *Spain* sbɛ́jn (cf Welsh *Sbaen*)
- the "p" of *Spain* is phonetically identical to the "b" of *bane*
- the homophones *discussed* and *disgust* are currently transcribed as if they were a minimal pair: dıskə́st vs dısgə́st, they both are "pronounced" as dısgə́sd

an alternative analysis

fortis plosives are not aspirated after s (and f)

- because fortis plosives do not occur after s (and f)
- note: the contrast of p t k and b d g is neutralized after s (and f)
- *pain* pɛ́jn vs *Spain* sbɛ́jn (cf Welsh *Sbaen*)
- the "p" of *Spain* is phonetically identical to the "b" of *bane*
- the homophones *discussed* and *disgust* are currently transcribed as if they were a minimal pair: dıskə́st vs dısgə́st, they both are "pronounced" as dısgə́sd
- sp is only possible across a word boundary: *tax#payer* tákspɛjə

an alternative analysis

fortis plosives are not aspirated after s (and f)

- because fortis plosives do not occur after s (and f)
- note: the contrast of p t k and b d g is neutralized after s (and f)
- *pain* pɛ́jn vs *Spain* sbɛ́jn (cf Welsh *Sbaen*)
- the "p" of *Spain* is phonetically identical to the "b" of *bane*
- the homophones *discussed* and *disgust* are currently transcribed as if they were a minimal pair: dıskə́st vs dısgə́st, they both are "pronounced" as dısgə́sd
- sp is only possible across a word boundary: *tax#payer* tákspɛjə
- therefore aspiration has nothing to do with syllable boundaries

constraints on fricative+plosive clusters

sb, sd, sg are common

Spain sbɛ́jn, explain ɪksblɛ́jn, stop sdop, pester pɛ́sdə, school sgʉwl, asking á꞉sgɪŋ

constraints on fricative+plosive clusters

sb, sd, sg are common

Spain sbɛ́jn, explain ɪksblɛ́jn, stop sdop, pester pɛ́sdə, school sgʉwl, asking á꞉sgɪŋ

sp, st, sk only across a word boundary

icepack ájspak, misprint mísprínt, foxtrot fókstrot, mistime místájm, discount dɪskáwnt, miscarry mɪskárɪj

constraints on fricative+plosive clusters

sb, sd, sg are common

Spain sbɛ́jn, explain ɪksblɛ́jn, stop sdop, pester pɛ́sdə, school sgʉwl, asking á꞉sgɪŋ

sp, st, sk only across a word boundary

icepack ájspak, misprint mísprínt, foxtrot fókstrot, mistime místájm, discount dɪskáwnt, miscarry mɪskárɪj

zb, zp, zd, zt, zg, zk are rare

husband házbənd, gazpacho gazpátʃəw, Mazda mázdə, Aztec áztɛk, Glasgow glázgəw, Azkaban ázkəban

yod-dropping

data

compute	kəmpjʉ́wt	enthuse	ɪnθ(j)ʉ́wz
rebuke	rɪbjʉ́wk	consume	kəns(j)ʉ́wm
confuse	kənfjʉ́wz	exude	ɪgz(j)ʉ́wd
revue	rɪvjʉ́w	minute	majn(j)ʉ́wt
amuse	əmjʉ́wz	volute	vəl(j)ʉ́wt
		obtuse	əbt(j)ʉ́ws
agglutinate	əglʉ́wtɪneɪt	deduce	dɪd(j)ʉ́ws
peruse	pərʉ́wz		
assure	əʃóː	acute	əkjʉ́wt
eschew	ɪstʃʉ́w	ambiguity	ámbɪgjʉ́wətɪj
adjudicate	ədʒʉ́wdɪkɛjt	exhume	ɛkshjʉ́wm

yod-dropping

data

compute	kəmpj̟ʉ̟wt	enthuse	ɪnθ(j)ʉ̟wz
rebuke	rɪbj̟ʉ̟wk	consume	kəns(j)ʉ̟wm
confuse	kənfj̟ʉ̟wz	exude	ɪgz(j)ʉ̟wd
revue	rɪvj̟ʉ̟w	minute	majn(j)ʉ̟wt
amuse	əmj̟ʉ̟wz	volute	vəl(j)ʉ̟wt
		obtuse	əbt(j)ʉ̟ws
agglutinate	əglʉ̟wtɪneɪt	deduce	dɪd(j)ʉ̟ws
peruse	pərʉ̟wz		
assure	əʃóː	acute	əkj̟ʉ̟wt
eschew	ɪstʃʉ̟w	ambiguity	ámbɪgj̟ʉ̟wətɪj
adjudicate	ədʒʉ̟wdɪkɛjt	exhume	ɛkshj̟ʉ̟wm

distribution

[j] does not appear

yod-dropping

data

compute	kəmpjʉ́wt	enthuse	ɪnθ(j)ʉ́wz
rebuke	rɪbjʉ́wk	consume	kəns(j)ʉ́wm
confuse	kənfjʉ́wz	exude	ɪgz(j)ʉ́wd
revue	rɪvjʉ́w	minute	majn(j)ʉ́wt
amuse	əmjʉ́wz	volute	vəl(j)ʉ́wt
		obtuse	əbt(j)ʉ́ws
agglutinate	əglʉ́wtɪneɪt	deduce	dɪd(j)ʉ́ws
peruse	pərʉ́wz		
assure	əʃóː	acute	əkjʉ́wt
eschew	ɪstʃʉ́w	ambiguity	ámbɪgjʉ́wətɪj
adjudicate	ədʒʉ́wdɪkɛjt	exhume	ɛkshjʉ́wm

distribution

[j] does not appear

- after postalveolar consonants

yod-dropping

data

compute	kəmpjʉ́wt	enthuse	ɪnθ(j)ʉ́wz
rebuke	rɪbjʉ́wk	consume	kəns(j)ʉ́wm
confuse	kənfjʉ́wz	exude	ɪgz(j)ʉ́wd
revue	rɪvjʉ́w	minute	majn(j)ʉ́wt
amuse	əmjʉ́wz	volute	vəl(j)ʉ́wt
		obtuse	əbt(j)ʉ́ws
agglutinate	əglʉ́wtɪneɪt	deduce	dɪd(j)ʉ́ws
peruse	pərʉ́wz		
assure	əʃóː	acute	əkjʉ́wt
eschew	ɪstʃʉ́w	ambiguity	ámbɪgjʉ́wətɪj
adjudicate	ədʒʉ́wdɪkɛjt	exhume	ɛkshjʉ́wm

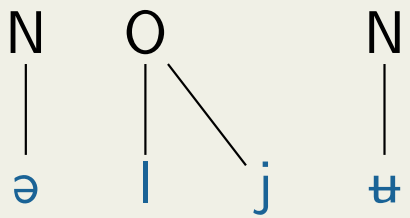
distribution

[j] does not appear

- after postalveolar consonants
- after C+l clusters

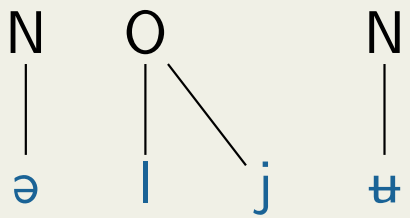
yod-dropping

yod after a single onset

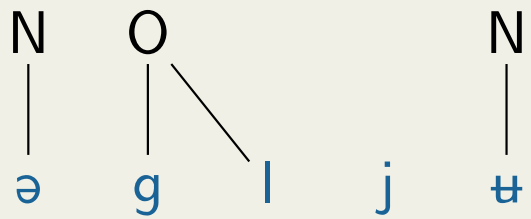


yod-dropping

yod after a single onset

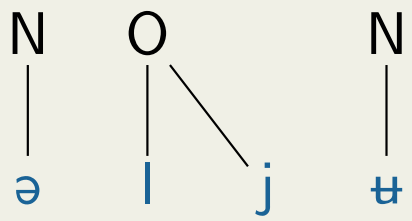


yod after a branching onset

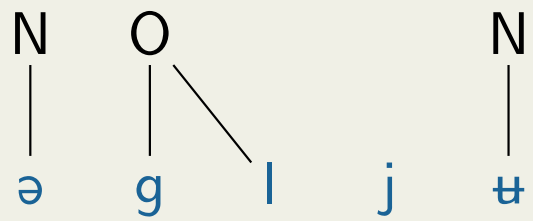


yod-dropping

yod after a single onset



yod after a branching onset



j after sC clusters

C_xj		sC_xj	
beauty	bj-	sputum	sbj-
mew	mj-	smew	smj-
duty	dj-	student	sdj-
new	nj-	—	
lewd	lj-	slew	slj-
argue	gj-	rescue	sgj-

open vs closed syllables

- pa.dək (*paddock*)

open vs closed syllables

- pa.dək (*paddock*)
- pan.də (*panda*)

open vs closed syllables

- pa.dək (*paddock*)
- pan.də (*panda*)

- cinema ⇔ paddock

open vs closed syllables

- pa.dək (*paddock*)
- pan.də (*panda*)

- cinema ⇔ paddock
- make ⇔ map

light vs. heavy syllables

- sɪ.nə.mə (*cinema*), ə.lɪ.vɪ.jə or .vjə (*Olivia*)

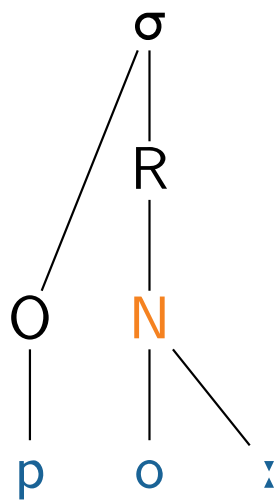
light vs. heavy syllables

- sɪ.nə.mə (*cinema*), ə.lɪ.vɪ.jə or .vjə (*Olivia*)
- tambɔː (*tambour*), aŋ.gə (*anger*)

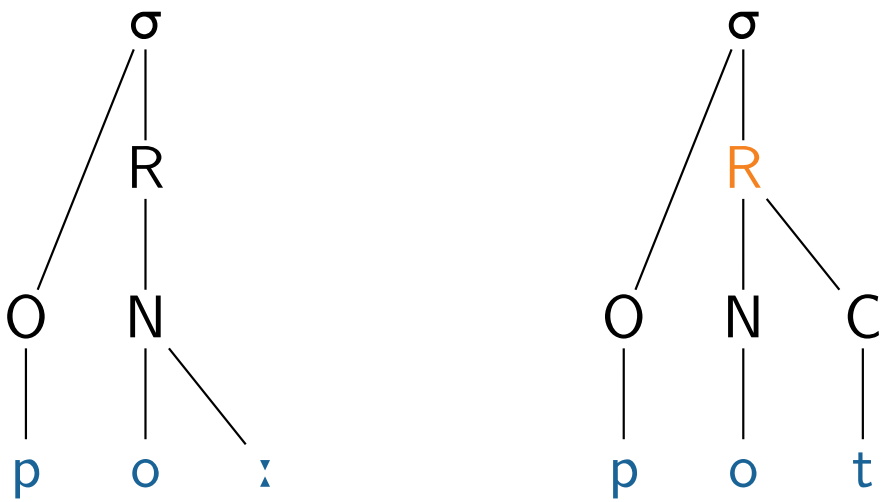
light vs. heavy syllables

- sɪ.nə.mə (*cinema*), ə.lɪ.vɪ.jə or .vjə (*Olivia*)
- tambo꞉ (*tambour*), aŋ.gə (*anger*)
- mɛjn.tɛjn (*maintain*), wo꞉so꞉ (*Warsaw*)

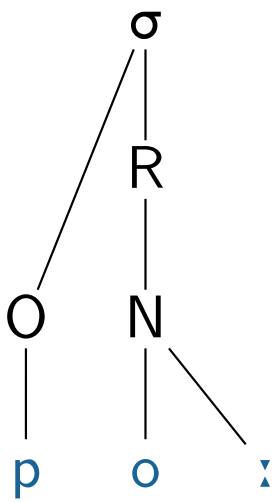
heavy syllables

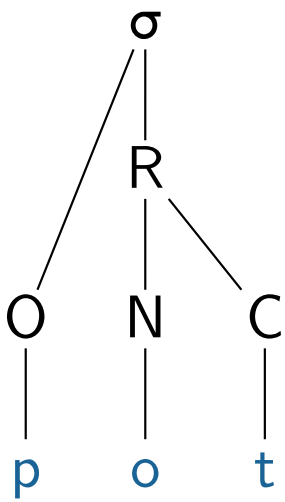


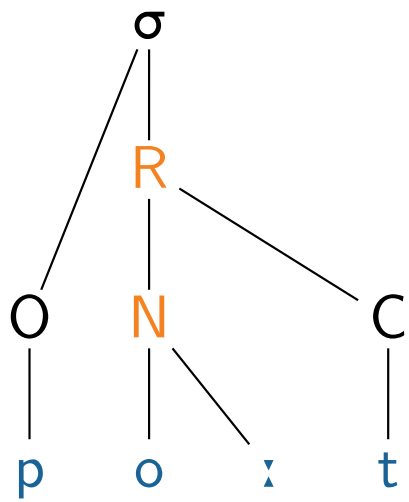
heavy syllables



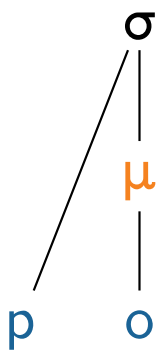
heavy syllables



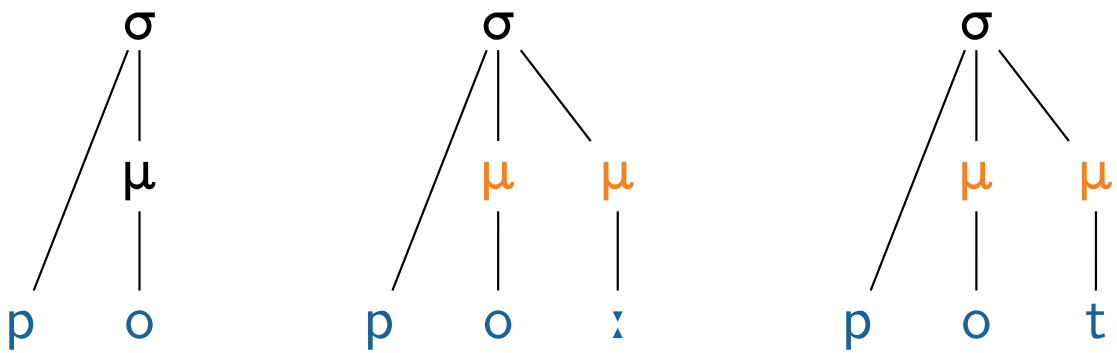




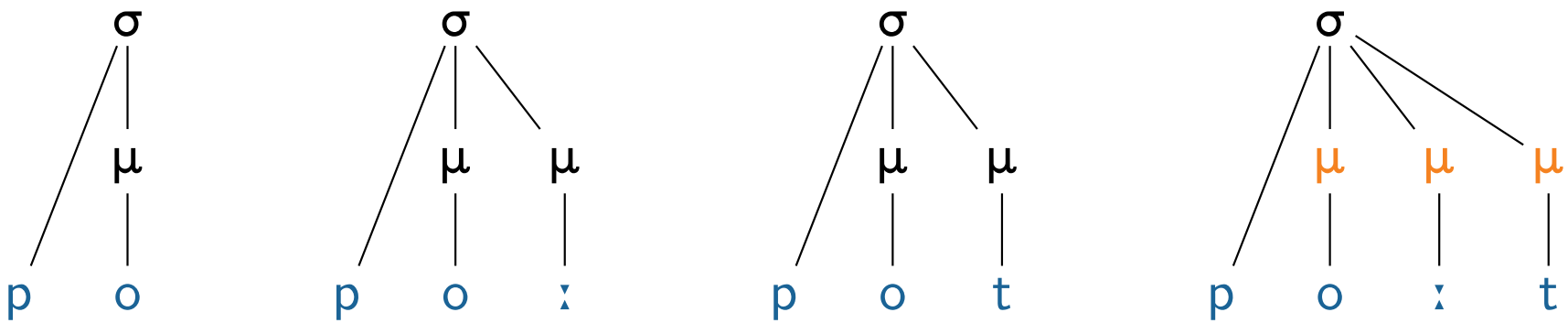
moras



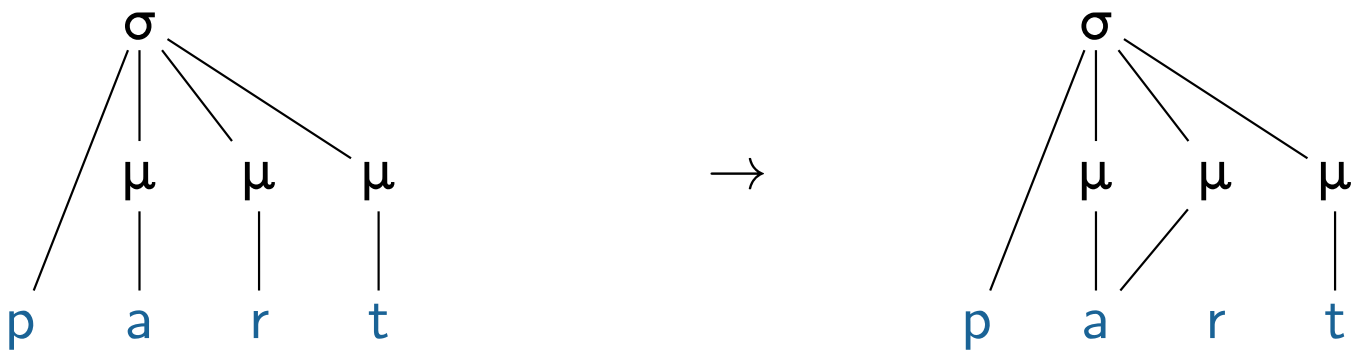
moras



moras



compensatory lengthening



stressability

- *lĕm.on* vs. *dē.mon* in English

stressability

- *lĕm.on* vs. *dē.mon* in English
- It. *fátto* fat:o ‘fact’, *fáto* fa:to ‘fate’

stressability

- *lĕm.on* vs. *dē.mon* in English
- It. *fátto* fat:o ‘fact’, *fáto* fa:to ‘fate’
- *città nera* ʧit:an:e:ra ‘black city’

extrametricality

- agrée, defý, lamént, salúte, consíder, mátter

extrametricality

- agrée, defý, lamént, salúte, consíder, mátter; but cáncel, devélop, abándon

extrametricality

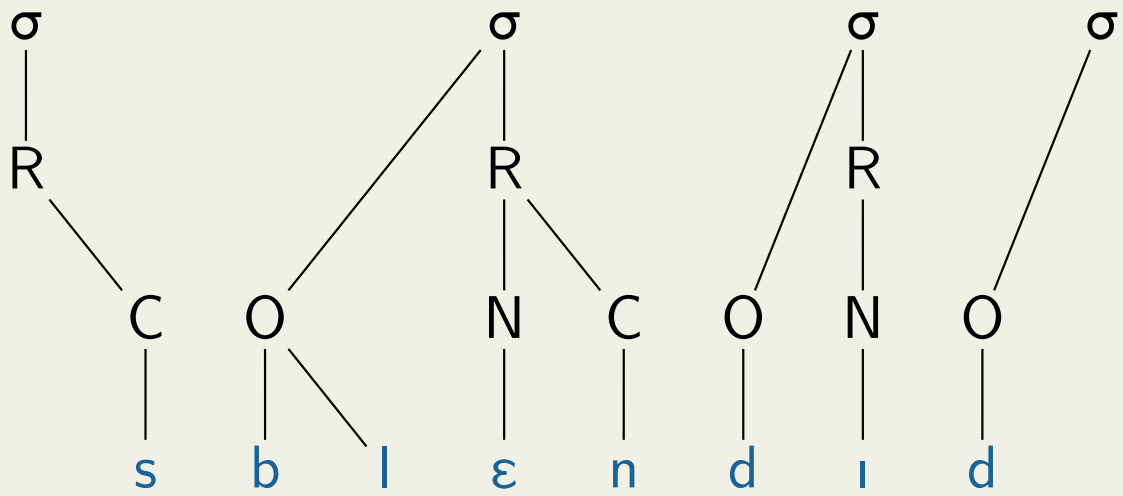
- agrée, defý, lamént, salúte, consíder, mátter; but cáncel, devélop, abándon
- cánce⟨l⟩, develo⟨p⟩, abando⟨n⟩

extrametricality

- agrée, defý, lamént, salúte, consíder, mátter; but cáncel, devélop, abándon
- cánce⟨l⟩, develo⟨p⟩, abando⟨n⟩
- *V̆# → *V̆⟨C⟩# (dog, cat, van, forget, submit, etc.)

word-final degenerate syllables

if C# is weightless, it must be an onset



closed syllable shortening

data

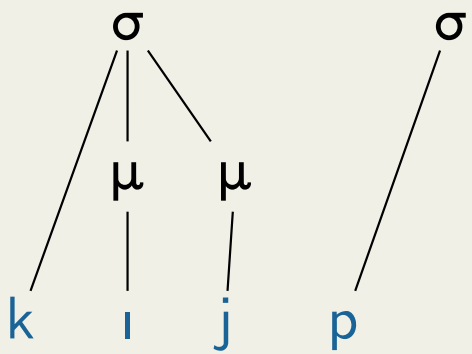
keep kɪjp ∼ *kept* kɛpt, *kɪjpt

closed syllable shortening

data

keep kɪjp ∼ *kept* kɛpt, *kɪjpt

analysis

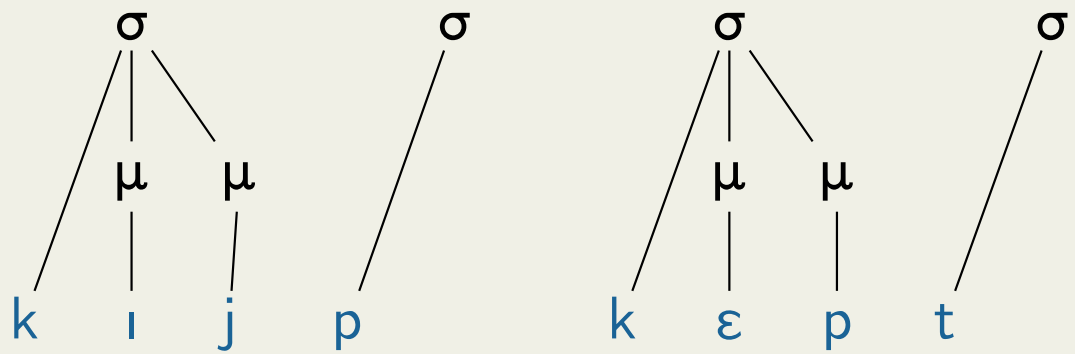


closed syllable shortening

data

keep kɪjp ∼ *kept* kɛpt, *kɪjpt

analysis

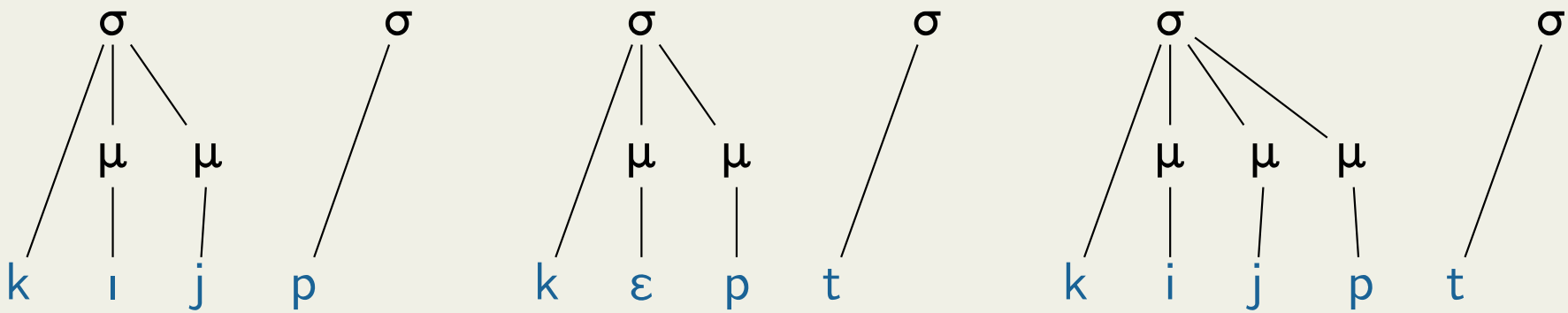


closed syllable shortening

data

keep kɪjp ∼ *kept* kɛpt, *kɪjpt

analysis

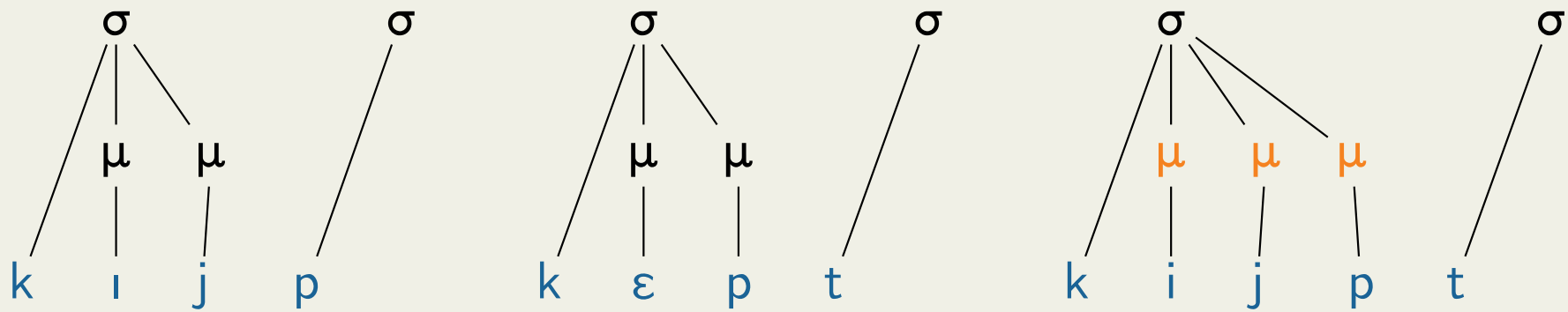


closed syllable shortening

data

keep kɪjp ∼ *kept* kɛpt, *kɪjpt

analysis



condition

superheavy syllables are illicit: a σ cannot contain more than two μs

typology

the nucleus

typology

the nucleus

- may branch in English and Hungarian

typology

the nucleus

- may branch in English and Hungarian
- may not branch in French and Spanish

typology

the nucleus

- may branch in English and Hungarian
- may not branch in French and Spanish

the onset

typology

the nucleus

- may branch in English and Hungarian
- may not branch in French and Spanish

the onset

- may branch in English and French

typology

the nucleus

- may branch in English and Hungarian
- may not branch in French and Spanish

the onset

- may branch in English and French
- (probably) may not branch in Hungarian (*paprika* is a dactyl)

typology

the nucleus

- may branch in English and Hungarian
- may not branch in French and Spanish

the onset

- may branch in English and French
- (probably) may not branch in Hungarian (*paprika* is a dactyl)

the rhyme

typology

the nucleus

- may branch in English and Hungarian
- may not branch in French and Spanish

the onset

- may branch in English and French
- (probably) may not branch in Hungarian (*paprika* is a dactyl)

the rhyme

- may branch in English and Hungarian

typology

the nucleus

- may branch in English and Hungarian
- may not branch in French and Spanish

the onset

- may branch in English and French
- (probably) may not branch in Hungarian (*paprika* is a dactyl)

the rhyme

- may branch in English and Hungarian
- may not branch in Hua and Cayuvava (i.e., these languages have only open syllables)

coda constraints

onsets

can usually contain the whole consonant inventory of the given language

coda constraints

onsets

can usually contain the whole consonant inventory of the given language

codas

are usually constrained

coda constraints

onsets

can usually contain the whole consonant inventory of the given language

codas

are usually constrained

- English coda cannot copy the following onset in its entirety (no true geminates)

coda constraints

onsets

can usually contain the whole consonant inventory of the given language

codas

are usually constrained

- English coda cannot copy the following onset in its entirety (no true geminates)
- Japanese coda can only contain nasality independently of the following onset

coda constraints

onsets

can usually contain the whole consonant inventory of the given language

codas

are usually constrained

- English coda cannot copy the following onset in its entirety (no true geminates)
- Japanese coda can only contain nasality independently of the following onset: only homorganic nasal+plosive clusters and geminates

coda constraints

onsets

can usually contain the whole consonant inventory of the given language

codas

are usually constrained

- English coda cannot copy the following onset in its entirety (no true geminates)
- Japanese coda can only contain nasality independently of the following onset: only homorganic nasal+plosive clusters and geminates
- Hua and Cayuvava coda cannot contain anything

coda constraints

onsets

can usually contain the whole consonant inventory of the given language

codas

are usually constrained

- English coda cannot copy the following onset in its entirety (no true geminates)
- Japanese coda can only contain nasality independently of the following onset: only homorganic nasal+plosive clusters and geminates
- Hua and Cayuvava coda cannot contain anything

an asymmetry

coda constraints

onsets

can usually contain the whole consonant inventory of the given language

codas

are usually constrained

- English coda cannot copy the following onset in its entirety (no true geminates)
- Japanese coda can only contain nasality independently of the following onset: only homorganic nasal+plosive clusters and geminates
- Hua and Cayuvava coda cannot contain anything

an asymmetry

- the onset is obligatory in some languages (e.g., Hua), but never absent

coda constraints

onsets

can usually contain the whole consonant inventory of the given language

codas

are usually constrained

- English coda cannot copy the following onset in its entirety (no true geminates)
- Japanese coda can only contain nasality independently of the following onset: only homorganic nasal+plosive clusters and geminates
- Hua and Cayuvava coda cannot contain anything

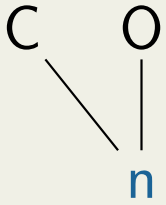
an asymmetry

- the onset is obligatory in some languages (e.g., Hua), but never absent
- the coda is absent in some languages (e.g., Hua), but never obligatory

geminates

true (tautomorphemic) geminates

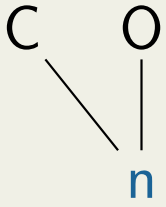
Hungarian/Italian *Anna* ɑnːɑ/anːa (cf. English anə)



geminates

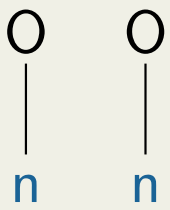
true (tautomorphemic) geminates

Hungarian/Italian *Anna* ɑnːɑ/anːa (cf. English anə)



fake (heteromorphemic) geminates

English *keenness* kɪjnːəs



constraints on the nucleus

minimal sonority in the nucleus

idx	sounds
9	low Vs
8	mid Vs
7	high Vs
6	r
5	l
4	nasals
3	vd fricatives
2	vl fricatives
1	vd plosives
0	vl plosives

constraints on the nucleus

minimal sonority in the nucleus

- Hungarian: ≥ 7 (i.e., only vowels)

idx	sounds
9	low Vs
8	mid Vs
7	high Vs
6	r
5	l
4	nasals
3	vd fricatives
2	vl fricatives
1	vd plosives
0	vl plosives

constraints on the nucleus

minimal sonority in the nucleus

- Hungarian: ≥ 7 (i.e., only vowels)
- Serbian, Croatian: ≥ 6 (i.e., vowels and [r])

idx	sounds
9	low Vs
8	mid Vs
7	high Vs
6	r
5	l
4	nasals
3	vd fricatives
2	vl fricatives
1	vd plosives
0	vl plosives

constraints on the nucleus

minimal sonority in the nucleus

- Hungarian: ≥ 7 (i.e., only vowels)
- Serbian, Croatian: ≥ 6 (i.e., vowels and [r])
- Czech, Slovak: ≥ 5 (i.e., vowels, [r], and [l])

idx	sounds
9	low Vs
8	mid Vs
7	high Vs
6	r
5	l
4	nasals
3	vd fricatives
2	vl fricatives
1	vd plosives
0	vl plosives

constraints on the nucleus

minimal sonority in the nucleus

- Hungarian: ≥ 7 (i.e., only vowels)
- Serbian, Croatian: ≥ 6 (i.e., vowels and [r])
- Czech, Slovak: ≥ 5 (i.e., vowels, [r], and [l])
- English stressed: ≥ 7

idx	sounds
9	low Vs
8	mid Vs
7	high Vs
6	r
5	l
4	nasals
3	vd fricatives
2	vl fricatives
1	vd plosives
0	vl plosives

constraints on the nucleus

minimal sonority in the nucleus

- Hungarian: ≥ 7 (i.e., only vowels)
- Serbian, Croatian: ≥ 6 (i.e., vowels and [r])
- Czech, Slovak: ≥ 5 (i.e., vowels, [r], and [l])
- English stressed: ≥ 7
- English unstressed: ≥ 4 (i.e., any sonorant)

idx	sounds
9	low Vs
8	mid Vs
7	high Vs
6	r
5	l
4	nasals
3	vd fricatives
2	vl fricatives
1	vd plosives
0	vl plosives

constraints on the nucleus

minimal sonority in the nucleus

- Hungarian: ≥ 7 (i.e., only vowels)
- Serbian, Croatian: ≥ 6 (i.e., vowels and [r])
- Czech, Slovak: ≥ 5 (i.e., vowels, [r], and [l])
- English stressed: ≥ 7
- English unstressed: ≥ 4 (i.e., any sonorant)
- Imdlawn Tashlhiyt Berber: ≥ 0 (i.e., any segment)

idx	sounds
9	low Vs
8	mid Vs
7	high Vs
6	r
5	l
4	nasals
3	vd fricatives
2	vl fricatives
1	vd plosives
0	vl plosives