

More on syllable structure typology

- At the right are the rankings that get all 12 points in the syllable structure typology that we talked about last time.

Q: What happens if we split DEP into a C and V version and add some markedness constraints against consonants, vowels, clusters, and diphthongs?

Extended syllable structure typology		onset required		onset not required
		ONS, MAX >> DEPC	ONS, DEPC >> MAX	MAX, DEPC >> ONS
coda not allowed	NOC, MAX >> DEP	1. CV _{ep.ep}	2. CV _{del.ep}	3. (C)VC _{ep}
	NOC, DEP >> MAX	4. CV _{ep.del}	5. CV _{del.del}	6. (C)VC _{del}
coda allowed	MAX >> DEP, DEP >> NOC	7. CV(C) _{ep}	8. CV(C) _{del}	9. (C)V(C)
	DEP >> MAX, MAX >> NOC	10. CV(C) _{ep}	11. CV(C) _{del}	12. (C)V(C)

- ONSET – syllables should have onsets
 NoCODA – syllables should not have codas
 *CC – CC sequences are penalized
 *VV – VV sequences are penalized
 *C – I hate consonants
 *V – I hate vowels
 DEP_V – don't insert vowels
 DEP_C – don't insert consonants
 MAX_V – don't delete vowels
 MAX_C – don't delete consonants

Q: How many different *rankings* are there for these constraints? _____

Q: How many unique *languages* are there for these constraints? _____

length	words	languages
1	2	6
2	6	37
3	14	87
4	30	128
5	62	144
6	126	149
7	254	149
8	510	149
9	1022	149

Q: Which of the candidates in (3) could never win no matter how the constraints were ranked?

/input/	Constraint 1	Constraint 2	Constraint 3
candidate A	1	0	0
candidate B	0	1	0
candidate C	0	0	1
candidate D	0	0	2

Q: Why?

Q: Are any of the candidates in (4) harmonically bounded by the other candidates?

/input/	Constraint 1	Constraint 2	Constraint 3
candidate A	0	2	0
candidate B	1	1	0
candidate C	0	0	2
candidate D	0	1	1

Q: If so, which?

- To figure this out we take each candidate and ask the following question. For candidate *x* to beat each of the other candidates, how would the constraints have to be ranked?
- To aid in this calculation we will use a notational device from Prince (2002) called an Elementary Ranking Condition (ERC). Based on three-valued relevance logics, ERCs are just logical statements about rankings.
- To determine whether candidate A is a **contender** (non-harmonically-bounded), we assume that it is the winner and ask of each constraint whether it favors our assumed winner (A), another candidate (B, C, D), or neither. The answers to these questions are encoded as *w*'s, *L*'s and *e*'s respectively.

- In (3) the comparison between A and B gives us the Elementary Ranking Condition (*w, L, e*), this tells us that that for candidate A to triumph over B constraint 1 must dominate constraint 2.

- Comparison of A with C and D respectively yields the Elementary Ranking Condition (*e, L, w*) in each case. This tells us that that for candidate A to triumph over C and over D constraint 3 must dominate constraint 2.

- To determine whether candidate D is a contender we do the same. Comparison of D with A yields (*e, w, L*), comparison of D with B yields (*w, e, L*), and comparison of D and C yields (*e, L, w*).

/input/	Con. 1	Con. 2	Con. 3
candidate A	0 <i>e</i>	2 <i>w</i>	0 <i>L</i>
candidate B	1 <i>w</i>	1 <i>e</i>	0 <i>L</i>
candidate C	0 <i>e</i>	0 <i>L</i>	2 <i>w</i>
candidate D	0	1	1

- So, for D to beat A Con. 2 must dominate Con. 3 but for D to beat C the opposite must hold. This **inconsistency** reveals that D will always lose to either A or C, and thus that D is not a contender.

- In addition to giving us a handy notation for ranking arguments (and an easy method for spotting inconsistent statements about rankings), the logic of elementary ranking conditions helps us draw inferences about rankings.

2. Ranking arguments

/v/	ons	noc	maxV	maxC	depV	depC	*cc	*vv	*c	*v	ranking arguments
a. .cv.						*			*	*	w,e,e,e,e,l,e,e,l,e e,e,w,e,e,l,e,e,l,l
b. -			*								w,e,l,e,e,e,e,e,w e,e,l,e,e,w,e,w,w
c. .v.	*									*	l,e,e,e,e,w,e,w,e l,e,w,e,e,e,e,e,l
/c/	ons	noc	maxV	maxC	depV	depC	*cc	*vv	*c	*v	
d. .cv.					*				*	*	e,e,e,w,l,e,e,l,l
e. -			*								e,e,e,l,w,e,e,w,w
/vv/	ons	noc	maxV	maxC	depV	depC	*cc	*vv	*c	*v	
f. .cvv.						*		*	*	**	e,e,e,e,w,e,l,w,e w,e,e,e,l,e,l,l,e e,e,w,e,e,l,e,l,l
g. .cv.cv.						**			**	**	e,e,e,e,l,e,w,l,e w,e,e,e,l,e,l,e e,e,w,e,e,l,e,l,l
h. -			**								w,e,l,e,e,e,e,w e,e,l,e,e,w,e,w,w
i. .vv.	*							*		**	w,e,e,e,e,l,e,e l,e,e,e,w,e,l,w,e l,e,w,e,e,e,l,e,l
j. .v.v.	**									**	l,e,e,e,w,e,w,e l,e,e,e,e,w,e,e l,e,w,e,e,e,e,l

/cv/	ons	noc	maxV	maxC	depV	depC	*cc	*vv	*c	*v
k. .cv.									*	*
l. -			*	*						
m. .v.	*			*						*
/cc/	ons	noc	maxV	maxC	depV	depC	*cc	*vv	*c	*v
n. .ccv.					*		*		**	*
o. .cv.cv.					**				**	**
p. -				**						
q. .cvc.		*			*				**	*
/vc/	ons	noc	maxV	maxC	depV	depC	*cc	*vv	*c	*v
r. .cv.cv.					*	*			**	**
s. .cv.				*		*			*	*
t. .cv.			*		*				*	*
u. -			*	*						
v. .cvc.		*				*			**	*
w. .v.cv.	*				*				*	**
x. .v.	*			*						*
y. .vc.	*	*							*	*

3. Knowing what you know

Q: What do you know if you observe that /v/ surfaces as [cv] and [v] surfaces as [cv.cv]?

w,e,e,e,e,l,e,e,l,e
e,e,w,e,e,l,e,e,l,l
e,e,e,e,e,l,e,w,l,e
w,e,e,e,e,l,e,e,l,e
e,e,w,e,e,l,e,e,l,l

Recursive Constraint Demotion (batch version with ERCs):

- Find all columns that have W's but no L's
 - Put those constraints in the top 'stratum' and remove the ERCs with W's in these columns
- If there is no column with at least one W and no L, then there is **no** ranking for this ERC set
- Repeat until all the ERCs are gone

4. Sonority in nuclei and margins: acceptable nuclei

	non-hi V	hi V/glide	rhotic	lateral	nasal	fricative	stop
Kabardian	yes	no	no	no	no	no	no
Hawaiian	yes	yes	--	--	no	--	no
Sanskrit	yes	yes	yes	no	no	no	no
Lendu	yes	yes	yes	yes	no	no	no
English	yes	yes	yes	yes	yes	no	no
Central Carrier	yes	yes	--	--	yes	yes	no
Imdlawn Tashliht Berber	yes	yes	yes	yes	yes	yes	yes

(-- indicates that the language doesn't have this type of segment)

Q: How would you describe this typological pattern in terms of sonority?

☞ To account for phonological phenomena sensitive to sonority phonologists have proposed the following **scale of constraints** on the sonority of nuclei. To explain the typological generalizations this scale is assumed to be the same in all languages. This is called a **meta-ranking**.

5. Nuclear sonority constraint scale

*NUC/STOP >> *NUC/FRIC >> *NUC/LAT >> *NUC/RHOT >> *NUC/HI-V >> *NUC/NON-HI-V

Q: What does this do to the factorial typology? What are **two** ways to explain observed typological patterns?

6. **Imdlawn Tashliht Berber** – It's usually pretty easy to decide where the syllable boundaries go because only very sonorous segments are allowed to be the nuclei of syllables. In this case it isn't so straightforward.

a. /t-rks/	tr.ks	'she hid'
b. /ra-t-kti/	ra.tk.ti	'she will remember'
c. /bd-dl/	bd.dl	'exchange'
d. /t-rba/	tr.ba	'she carried on her back'
e. /i-saul/	i.sa.wl	'he spoke'
f. /i-haul-tn/	i.ha.wl.tn	'he made them (masc.) plentiful'
g. /t-rgl/	tr.glt	'you locked'
h. /ra-t-rgl-t/	ra.tr.glt	'you will lock'
i. /t-xzn-t/	tx.znt	'you stored'
j. /t-msx-t/	tm.sxt	'you transformed'
k. /t-ftk-t/	tf.tkt	'you sprained'
l. /t-izruul-in/	ti.zr.wa.lin	'those (fem.) from Tazrwalt'
m. /rks-nt/	r.k.sn	'they hid'
n. /bain-n/	ba.jn	'they (masc.) appear'
o. /iattui/	jat.tuj	'it is high'
p. /t-lur-tn-t/	tlur.tnt	'she gave them (fem.) back'
q. /dum-x/	dumx	'I last'
r. /ra-t-lul-t/	rat.lult	'you will be born'
s. t-zmt	tzm	'it (fem.) is stifling'

Q: What constraints are crucially involved?

Q: Where are our old favorites like Onset, NoCoda, and *CC?

Q: How do you get different languages in the typology in (4)?

Homework:

Do an OT analysis of the Berber data. Define your constraints, motivate your rankings, and present relevant tableaux.