

## 24.901 Syllable-2

### 1. sonority preference hierarchy for syllabic nuclei

- in most languages syllable nuclei are restricted to vowels
- may be extended to consonants
- but follows sonority hierarchy: vowel > glide > liquid > nasal > obstruent

	V	L	N	Ob nuclei
Spanish	+	-	-	-
Czech	+	+	-	-
German	+	+	+	-
Berber	+	+	+	+

Spanish: *abr-ir* 'to open', *aber.tura* 'opening' < /abr-tura/

Czech: *prst* 'finger', *slza*, but *ohn-o*, *ohen* 'fire' < /ohn/; *pad-l*, *pad-l-a*

German: *Nebel* [nebl], *nebl-ig* 'fog'; *handl-ung*, *handel-n* [dln]; *haben* [bm]

Berber: *trɣlt* 'you locked'; *tɣznt* 'you stored'

- while a consonant (liquid) may be syllabic this option is generally taken only if a vowel is not available: cf. German [nebl] but [nebliç] not [nebliç]

### 2. analysis with the syllable-building rules

/abr-tura/

(ab)r(tu)(ra)            initial parse

(ab)er(tu)(ra)            epenthesis

(a)(ber)(tu)(ra)            reparsing

### 3. problems

- little evidence for earlier stage of (ab)er(tu)(ra)
- alternative of mapping to syllable template: combines epenthesis with syllabification on initial parse with empty nuclear slot filled by a later separate rule
- directional mapping to [C C V C]: right to left correctly positions epenthetic vowel in *Speslavo* (cf. *yugo-slavo*)
- mapping is segment-driven matching phoneme to appropriate corresponding template slot
- restrictions on coda and onset may be stated in template: e.g. Tiberian Hebrew bars pharyngeals from coda: /ya-ʃmo:r/ -> yiʃmo:r 'he will guard' but /ya-ʃbo:d/ -> yaʃabo:d 'he will work' with epenthesis and vowel copy as repair

4. differential location of epenthetic vowel in modern colloquial Arabic dialects (Ito 1986)

Cairene:       ?ul-t    'I said'  
                   ?ul-ti-lu/?ul-t-lu/ 'I said to him'  
                   Ø -> i / CC \_ C vs. left-to-right mapping to CVC template

Iraqi:           gil-t     'I said'  
                   gil-it-la 'I said to him'  
                   Ø -> i / C \_ CC vs. right-to-left mapping to CVC template

- directional mapping accounts for four-consonant clusters

Cairene:       ?ultil-ha       'I said to her' /?ult-l-ha/

Iraqi:           gilti-l-ha 'I said to her' /gilt-l-ha/

- a colleague related an anecdote concerning a lecture he attended by an Iraqi engineer who pronounced sixty as [sikisti] causing some confusion.
- Broselow (1982) observes that Egyptian learners of English tend to pronounce *Fred* as [fired] while Iraqi's say [ʔifred].

5. Imdlawn Tashlhiyt Berber (SW Morocco)

- François Dell & Mohammed Elmedlaoui (1985, 1989, ...)
- Influential in development of Optimality Theory (Prince & Smolensky 1993, 2004)
- syllabic nuclei span entire sonority hierarchy
- CVC template with extra-templatic coronals at word edges
- vowel-initial syllable only possible word-initially
- glides [w,y] and high vowels [i,u] are same phonemes and differ in syllable role: nucleus vs. margin (onset or coda)
- while any phoneme can be a nucleus, there is no ambiguity of syllabic parse

yattuy	'it is high'	ratḳti	'she will remember'
ikṛzawn	'he ploughed for you'	bḳdl	'exchange!'
trḡlt	'you locked'	tzṃt	'it is stifling'
txznt	'you stored'	ildi	'he pulled'
tṃsxt	'you transformed'	ratlult	'you will be born'
tṫtḳt	'you sprained'		

- odd-even position not sufficient

disyllabic:      ratlult /ra-t-lUl-t/      'you will be born'

trisyllabic:      ratrglt /ra-t-rgl-t/      'you will lock'

## 6. Dell & Elmedlaoui syllabification algorithm

- associate a core (onset-nucleus) syllable with any sequence (Y)Z, where Z is a low vowel, high vocoid, a liquid, a nasal, a fricative, a stop
- looking for a sonority peak

/t-IzrUal-In/	'those from Tazrwalt'
t-Izr(wa)l-In	low vowel
(ti)zr(wa)(li)n	high vocoid
(ti)(zr)(wa)(li)n	liquid

/I-haUl-tn/	'he made them plentiful'
I(ha)Uln	low vowel
(i)(ha)(ul)tn	high vocoid      block by hiatus: two successive nuclei
(i)(ha)(w)tn	liquid
(i)(ha)(w)(tŋ)	nasal

- left-to-right parse when equal sonority rank

/baIn-n/	/t-ftk-t/	
(ba)Inn	-----	low vowel
-----	-----	high vowel      (ba)(i)nn blocked by hiatus
-----	-----	liquid
(ba)(yn)n	-----	nasal      left to right (cf. *(ba)y(nŋ))
-----	(t)tk	fricative
-----	(t)(t)k	stop      left to right (cf. *(t)k)
	(t)(t)k	coda

## 7. Optimality Theory (Prince & Smolensky 1993, 2004)

- critique of rule-based system of phonological grammar

- rewrite rules offer a general format to express phonological generalizations but any restrictions to limit the space of possible grammars must be imposed from the outside
- proposed alternative: replace rules by UG well-formedness constraints that directly state optimal (harmonic) structures
- constraints conflict and individual grammars arise from prioritizing constraints (aka typology by ranking)
- two modes of input-output mapping entertained
- harmonic serialism: start with input and make a range of minimal changes (add/delete a segment; change a feature value; impose a syllabic parse; etc.) to generate a set of candidate outputs; select most optimal given the constraint ranking; resubmit output to make more changes; the successive rounds of modify-evaluate-modify-evaluate.. will eventually converge on a single structure to which no more changes can be made; it is defined as the output
- parallel alternative: one process of modification of input to generate a larger candidate set and just one round of evaluation that assesses all candidates in parallel
- predicts “top-down, look-ahead” effects where property constructed later in derivation from a rule based perspective could influence the choice of an earlier stage
- OT model explored for c. 20 years; received model of grammar but not without its critics and skeptics
- Parallel approach explored first; but fails to deal satisfactorily with opacity where correct surface output form crucially depends on some prior (intermediate) change

8. brief exemplification with ITB (see Prince & Smolensky 2004:11-19)

- Constraints
  - Onset: a syllable has a nonvocalic onset
  - H(armonic) Nucleus: a more sonorous nucleus is better than a less sonorous one
- Ranking: Onset » Hnuc

Tableau for input /haul-tn/

Candidates	ONS	HNUC
☞ ~.wL.~		l
~.ul.~	* !	u

- a syllable whose nucleus is less sonorous than its onset is selected because the competing parse that better satisfies Hnuc has been eliminated by the higher ranking constraint

- this is an example of a “top-down” effect from the perspective of the syllabification rules since the application of the nucleus projection must “look ahead” to see if an onset has been constructed to avoid a hiatus
- Dell and Elmedlaoui’s algorithm sidesteps this problem by combining the nucleus projection and onset creation rules into a single rule; while this “works”, Prince and Smolensky criticize it as being formally arbitrary; from a cross linguistic perspective, constraints on nuclei and onsets are different and one would want to separate them out as distinct statements in a grammar
- If Hnuc » Onset the grammar will select ha.ul.tn parse with hiatus (non-optimal syllable sequence) but a more optimal nucleus; this would be the parse in languages like Japanese that freely tolerate hiatus

9 serial syllabification for /txznt/

(16) Constraint Tableau for Serial Syllabification of /txznt/ (partial, first step)

Candidates	ONS	HNUC	Comments
☞ tx(zN)t		n	optimal: onsetted, best available nucleus
txz(N)t	* !	n	no onset, HNUC irrelevant
t(xZ)nt		z !	z  <  n
(tX)znt		x !	x  <  n
txz(nT)		t !	t  <  n

- tx(zN)t becomes input to second step

10. parallel syllabification of /txznt/

(17) Parallel Analysis of Complete Syllabification of /txznt/

Candidates	ONS	HNUC	Comments
☞ .tX.zNt.		n x	optimal
.Tx.zNt.		n t !	n  =  n ,  t  <  x
.tXz.nT.		x ! t	x  <  n , t irrelevant
.txZ.Nt.	* !	n z	HNUC irrelevant
.T.X.Z.N.T.	* ! ***	n z x t t	HNUC irrelevant

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