24.961 Licensing by Cue and P-Map

[1] With the development of explicit models of syllable structure and prosodic parsing, differences in the range of permitted consonantal contrasts in the onset vs. coda were noted for many languages.

- Place contrasts in Lardil and Japanese
- Laryngeal contrasts in German, Korean, Klamath
- Rhotics in English and German

[2] This was modeled by licensing conditions on codas (Ito 1986, Goldsmith 1990, Lombardi 1991). In the OT framework they can be expressed in terms of positional markedness or positional faithfulness

- Positional markedness: *[+voice, −sonorant]/ V__]σ » Ident-[voice] » *[+voice, −sonorant]
- Positional Faithfulness (Lombardi 1999): Ident-[voice] / σ[__ V] » *[voice, −son] » Ident-[voice]

[3] Steriade (1997, 1999) challenged this reasoning and argued that the relevant factor is not location in prosodic structure but the relative availability of auditory cues to the contrasts in different *segmental* contexts. Two typological surveys were conducted to support this conclusion: laryngeal contrasts and retroflexion.

9. Patterns of obstruent voicing neutralization (Steriade 1997 (6)) – implicational universals: O=obstruent, R=sonorant, inc. vowel

	#_O, O_# e.g. **b**sa vs. **p**sa	R_O e.g. a**b**sa vs. a**p**sa	R_# e.g. a**b** vs. a**p**	_R e.g. **b**a vs. **p**a	R_R e.g. a**b**a vs. a**p**a
Totontepec Mixe	no	no	no	no	yes
Lithuanian	no	no	no	yes	yes
French	no	no	yes	yes	yes
Shilha	no	yes	yes	yes	yes
Khasi	yes	n/a	yes	yes	yes

generalizations (in the above diagram, yes = preserves the contrast)

- A hierarchy of contrast preservation from best to worst: intervocalic, initial prevocalic > word-final > pre-obstruent > between obstruents

- many languages fall at the boundaries between the second and third or fourth and fourth; other positions seem more rare
- Cues to obstruent voicing: (quite different but presumably integrate perceptually)
  Closure voicing and duration
  VOT
  F0 in following and preceding vowel
  Preceding vowel duration

- These phonetic cues project a hierarchy of OT Markedness constraints referring to the contexts that are based on the principle that more cues implies greater distinctiveness and that audible release cues are more salient that closure cues: @ = ±

*@voice / [-son]__[-son], [-son]_#, #__[-son]	»	{closure voice, duration}
*@voice / V__[-son]	»	{ closure voice, duration, V1 durat,F0}
*@voice / V_#	»	{closure voice, duration, V1 durat, F0, release duration and amplitude}
*@voice / V__[+son]		{closure voice, duration, V1 durat, F0, release duration and amplitude, VOT, V2 F0}

- Grammatical constraints refer to general contexts rather than directly to phonetic cues
- hierarchy could be induced by the learner from experience rather than being innate
- assumption that these cues are potentially always available and that speaker/listener utilizes them

[5] Lithuanian has final devoicing and regressive voicing assimilation in obstruent clusters

- Assimilation is subspecies of neutralization with voicing of the cluster determined by the consonant with best cues

áukle ‘governness’	auglingas ‘fruitful’
at-gal [dg] ‘back’	dìrb-ti [pt] ‘to work’
daũg [k] ‘much’	

- Ranking: *@voice / V__[−son] » *@voice / V_# » Ident-[voice] » *@voice / V__[+son]

- Syllabic licensing requires V.ORV parse but this is inconsistent with native speaker intuitions and the fact that obstruents contrast in voicing before nasals even though stop-nasal is not a permitted word-initial cluster and hence not a plausible word-medial onset

- Syllabic licensing does not generalize to other languages in the hierarchy of (4) such as Hungarian, which has regressive assimilation in obstruent clusters but no final devoicing

- Final stops are audibly released in Hungarian and this allows a contrast of single and final geminates (Kenstowicz, Abu-Mansour, and Torkenczy 2000)

kap	'catches'	kab-dok	'catches repeatedly'
dob	'throws'	dop-tam	'I threw'
fed	'covers'	fed-d	'cover imperative'

[6] even in languages like Russian with regressive assimilation and final devoicing, being in a syllable onset does not guarantee a contrast without a following sonorant: kto 'who' vs. gde 'where' but *kdo or *gte (cf. brat 'brother' vs. pravda 'truth')

[7] retroflexes prefer to be in syllable codas, in particular after a vowel and thus avoid word-initial and post-obstruent positions, which are onsets

- In Australian aboriginal languages, the apical-laminal contrast is typically suspended word-initially

  Gooniyandi (Steriade 1995, McGregor 1990)

  duwu ≈ ɖuwu 'cave' (no contrast)
  manmadnga 'poked' vs. miŋmiɖgali 'policeman'

- In the articulation of a retroflex consonant, the tongue tip is curled back at the onset of closure but then moves forward and is released at the alveolar ridge: at offset it is not different from an alveolar; chief acoustic cue is lowering of F3 and F4 in preceding vowel

- *[@retroflex] / C__ » Ident[retroflex] » *[@retroflex] / ___ C

- the syllable licensing analysis abstracts away from the phonetic details and hence cannot distinguish the behavior of [retroflex] from [voice]

- response will be that this difference arises in language transmission rather than being encoded in the grammar (Blevins 2004)

[8] some loose ends

- the constraints are formulated as constraints on contrast [@voice]; it is not clear if an actual lexical contrast is intended or a possible lexical contrast or a phonetic contrast

- the constraints on *[@voice] seem to assume that [voice] is privative and so when it is banned the outcome will be voiceless or determined by context; another constraint against voiceless-voiced is needed to motivate assimilation

- for the suspension of other contrasts, the outcome of neutralization can vary: e.g. in Gooniyandi there is free variation in retroflexion; contrasts in word-final nasal place can be resolved as n (Castillian Sp) or ŋ (Caribbean Spanish) or m ≈ ŋ (Manam)

- We may expect the same distribution of voicing in a language that does not contrast voiced and voiceless obstruents; e.g. intervocalic voicing but final and initial devoicing

- Answer: in the absence of contrast, articulatory effort constraints may take over to determine the output (but they can be over-ruled by uniformity constraints); thus, voiceless in initial onset position is motivated by the claim that it is more difficult to initiate voicing during an obstruent than it is to sustain voicing from a preceding sonorant because the former requires a greater pressure drop across the glottis (Westbury & Keating 1986, J of Ling 22, 145-66)

- The typology that word-final contrasts are more poorly cued than presonorant ones predicts that word-final voicing contrasts could be preserved before sonorants in the next word, where cues would be realized; but Russian and Lithuanian devoice before a sonorant as well; in Cracow Polish a final obstruent voices before a sonorant but this includes underlying voiced and voiceless so the contrast is still suspended. Steriade suggests an Output-Output Paradigm uniformity constraint to the prepausal, isolation form as the normal speech style to which the learner is attuned; some abstraction to the notion Canonical Word is needed

[9] P-Map: perceptual markedness constraints on voicing reinterpreted as faithfulness constraints: P(erceptual)-map (Steriade 2001, 2009)

- is a distinct component of the grammar
- it projects correspondence (faithfulness) constraints and their ranking into the grammar
- a statement of the relative perceptibility of different contrasts across different contexts

[2] motivation

- the predicted range of repairs for a given constraint violation is too broad and needs to be restricted
- repair for the ban on word-final voiced obstruents is devoicing rather than nasalization, deletion, epenthesis , metathesis
- intuition of a “minimal” departure from the input: the output most similar to the input
- P-map projects Δ (b-m) > Δ (b-p) to Ident-[±nasal]/ __] » Ident-±voice]/_]
- Evidence can be the search for cross-linguistically favored repairs or from psycholinguistic studies of sound similarity or such naturalistic domains as loanword adaptation and judgments of rhyme

- Similarity is evaluated on *perceptual representations* and hence will be sensitive to the contexts where different cues will be available; articulation can be quite different: e.g. lip rounding and tongue backing have the same acoustic effect
- Hence confusability may be a distinct source of evidence
- «Some auditory representations are differentiated by fewer and less salient properties than others. This makes them more similar and, in the limit, more confusable» p. 156
- evidence may come from direct judgments of similarity, the acoustic distribution of cues, or linguistic tasks like rhyming and alliteration as well as loanword adaptation

[3]. Contextual differences; voicing typology reformulated

- P-Map: Δ (p-b/ R_R) > Δ (p-b/ _R) > Δ (p-b/R_) > Δ (p-b/ _]) > Δ (p-b/ _O)
- Projects to grammar
- Ident-[@voice]/ R_R » Ident-[@voice]/ _R » Ident-[@voice]/ _] » Ident-[@voice]/ _O
- inverse ranking from the markedness constraints: faithfulness to [voice] in the context with the most cues: typology arises from embedding the Markedness constraint *[voice] in the fixed ranking projected from the P-map

  Lithuanian again

/auglingas/	Id-[@voice]/ _R	*td	*d	Id-[@voice]/ _]	Id-[@voice]/ _ O
> auglingas			**		
auklingas	*!		*		
/daug/					
>dauk			*	*	
daug			**!		
/at-gal/					
> adgal			**		
at-gal		*!	*		
at-kal	*!				
/dirb-ti/					
>dirpti			*		
dirbti			**!		

dirbdi	*!		***		

[4] Perceptual faithfulness cannot account for enhancement effects where other features or cues are inserted to sharpen a contrast: e.g. length on V1 for voicing, aspiration on voiceless stop, F0 raising or lowering: they appear to be violations of faithfulness[1] and hence should be penalized; one position is that enhancement is not in the grammar (Keyser & Stevens); if they are, then the range of phonetic properties under grammatical control is enlarged considerably (e.g. larynx lowering); enhancement is motivated by a distinct set of contrast constraints in Flemming (2004)

appendix

[1] other reflexes of the P-map and [voice]

- [b] is more commonly adapted as [p] rather than [m] in loanwords

English	Cantonese	(Kenstowicz 2012)
kid	khi:t	
boot	pu:t	
bun	pɐn	
good	ku:t	

- in Zwicky's (1976) corpus of rhymes in rock songs, a change in voicing is one of the most common slant rhymes: t-d (7), s-z (9); minimal departure in faithfulness

[2] P-Map and epenthesis sites (Flemming 2007, Fullwood 2013)

- observation: there is a cross-linguistic hierarchy in epenthesis sites for consonant clusters such that for a given C1, epenthesis tracks the sonority of C2, where epenthesis before a lower sonority C2 implies epenthesis before higher sonority C2.

<u>falling</u>	<u>level</u>	<u>rise</u>	
ask	apt	bets	
west	act	sacks, depth	
bulk		rhythəm	cf. rhythm-ic

[1] But if enhancement is limited to lexically noncontrastive properties and richness of the base is suspended then maybe this objection is not warranted.

fault	cycle [kəl]	cyclic vs. metəl, metal-ic
want, wand	metər	metric

- proposal is that hierarchy reflects a faithfulness relation between the sonority slope of C1C2 and C1V so that the more the sonority of C2 is lowered the less faithful CV will be to it; grammars set a sonority threshold
- this also generalizes to schwa syncope

falling	level	rise
America	capital	sep < a > rate
Jessica	animal	cath < o > lic
Alison	Abigail	mem < o > ry
Kennedy	stamina	ev < e > ry
Monica		Barb < a > ra
elephant		Em < i > ly
		Beth < a > ny
		Agatha
		Brit < i > ny
		Ros < a > mond
		Tabetha

[3] cluster simplification conundrum

- a No-Coda violation can be repaired by deleting either the first or the second member of a cluster; but VC2V is by far the more common response;
- this paradigm generalizes to place assimilation: repair to a heterorganic VnpV sequence is VmpV not VntV

/VC1C2V/	No Coda	Max-C
VC1C2V	*	
VC1V		*
VC2V		*

b. reference to cues can now define deletion of C1 as favored since the /VC1C2V/ -> [VC1V] mapping is a greater departure from faithfulness than [VC2V]

c. McCarthy (2010) notes that syncope processes can feed cluster resolution; in a one-step mapping between the input and the output, we cannot distinguish C1 from C2 since both are prevocalic. But in the Harmonic Serial model in which the input gradually converges on the output, the distinction between poorly cued C1 and well-cued C2 can be drawn by reference to the post-syncope output.

(4) *Step 1 in Sudanese Arabic*[7]

kutub aħmad	SYNC	ID(vce)/__V	MAX	AGR(vce)	ID(vce)/__C
a. → kutb aħmad			1	1	
b. kutub aħmad	1 **W**		**L**	**L**	

(5) *Step 2 in Sudanese Arabic*

kutb aħmad	SYNC	ID(vce)/__V	MAX	AGR(vce)	ID(vce)/__C
a. → kudb aħmad					1
b. kutb aħmad				1 **W**	**L**
c. kutp aħmad		1 **W**			**L**

24.961 Introduction to Phonology
Fall 2014