### Class 1: Intro and course overview; containment vs. correspondence

### To do for next time

- Optional background reading: Prince & Smolensky (1993) pp. 24-28, 93-104
- Required reading: McCarthy & Prince (1995) excerpt

### 1. Course overview

## (1) Correspondence beyond I-O

Two of the most important aspects of phonology are

- Restrictions on possible surface forms
- Restrictions on relationships between surface forms

In OT, these end up being roughly markedness and faithfulness.

There's more than one way to regulate relationships between surface forms—faithfulness to shared underlying representations is only one possibility.

- <u>Reduplication</u>: Reduplicative over- and underapplication effects suggest direct surface correspondence between bases and reduplications (which opens the door to direct correspondence between other surface forms). Or do they? We'll consider some alternative treatments of base-reduplicant similarity too. And if we have time, there's correspondence between parts of a word in the absence of reduplication to think about.
- <u>Positional faithfulness</u>: Preservation of contrasts seems to depend on context. Is this contextsensitive faithfulness or context-sensitive markedness? We'll weigh the evidence.
- <u>Antifaithfulness and anticorrespondence</u>: There's evidence for required relationships between surface forms that are other than similarity (A must correspond to A)—requirements that A correspond to  $\neg A$  and requirements that A correspond to some B.
- <u>O-O correspondence and stratal OT</u>: We'll review some issues in cyclicity and lexical phonology. Can all the effects be captured by output-output correspondence, or do we need derivational levels in OT?
- <u>Similarity-based correspondence</u>: I'll take the opportunity to push a particular view of how similarity between output forms is assessed.
- <u>What makes a base a base</u>: The flow of information from word to word is not always symmetrical; often one member of a paradigm (the base) seems to have privileged status—what decides which form becomes a base?

# (2) Phonology in and from the lexicon

- <u>Markedness and allomorph choice</u>: When multiple allomorphs of an affix exist, the choice is sometimes governed purely by phonological properties of the stem, sometimes only probabilistically so. We'll see some cases and ask how we can describe the second type of system.
- <u>Morphological classes and irregularity...</u>: What phonological factors affect how a word is assigned to a conjugation, declension, etc. class?

- ...with an excursion into ineffability: And what about when a word refuses, for phonological reasons, to undergo some morphological operation?
- <u>Exemplars and neighborhoods</u>: We'll look at proposals that a word's lexical entry is shaped by how and how often it's been heard/used, and look at evidence that a word's phonological behavior is shaped by its neighbors'.
- <u>If time: Evolutionary phonology</u>: Many researchers argue that certain aspects of typology are determined not by constraints on learnable or usable grammars, but by possible pathways of phonological change.

## 2. Containment review

Prince & Smolensky's (1993) conception of faithfulness was very different from McCarthy & Prince's (1993, 1995) correspondence approach that is widely used today.

P&S's approach is known retrospectively as *containment*, because the output contains all the input structure.

### (3) Deletion as underparsing

input: /bladupli/

	σ	σ	σ	(there could be additional structure here)
	/ \	\	/ \	
output:	bla	d u	pli	equivalently writeable as [b <l>a.du.p<l>i]</l></l>

By Stray Erasure (McCarthy, Steriade, Itô), any segment not syllabified is left unpronounced/ignored by the phonetics.

This output candidate has two violations of P&S's constraint PARSE.

# (4) Epenthesis as overparsing

/adpi/

σ / \

а

input:

output:

 $| \ / \ |$ d p i also writeable as [ $\Box a.d\Box.pi$ ], perhaps pronounced "?adəpi"

Prosodic positions not filled by any segment get one later from "the phonetics".

This output candidate has two violations of P&S's constraint FILL, or one of FILL<sup>Margin</sup> and one of FILL<sup>Nucleus</sup>.

• Why don't P&S distinguish between FILL<sup>Nuc</sup> and FILL<sup>Coda</sup>?

open circle means it's a question for you to answer.

#### (5) Some advantages of containment

- Faithfulness constraints, like markedness constraints, are evaluated by looking only at the output form. No comparison to the input is necessary.
- Turbid representations: Goldrick and Smolensky build on containment to allow unpronounced structure to drive opacity.

Schematic example—theirs are much more complicated and they have additional machinery that I refer you to Goldrick (2001) for.

Tiberian Hebrew (Malone 1993, cited in McCarthy 2000)

	/melk/ 'king'	/qara?/ 'he called'	/de∫?/ 'tender grass'
$\emptyset \rightarrow V / C\_C#$	melek		de∫e?
$? \rightarrow \emptyset / \text{coda}$		qārā	de∫e
(spirantization	melex		)

• Why is this hard to analyze in standard OT? Sketch it.

• Can we formulate an OT analysis given the output representation  $[de \int \square <?>]?$ 

### (6) Some disadvantages of containment

- How do we penalize
  - Feature changes  $(/t/ \rightarrow [r])$ ?
  - Metathesis  $(/nm/ \rightarrow [mn])$ ?
  - Coalescence  $(/\eta p/ \rightarrow [m])$ ?
  - Splitting (iffier, but say  $|\breve{a}| \rightarrow [an]$ )?

If all these things are attested, then they are an option for Gen, so where they don't occur, they have to be ruled out by Eval.

- McCarthy & Prince (1995) argue that the general invisibility of unparsed structure (e.g., to OCP constraints) is a strike against containment. (But cf. the Goldrick & Smolensky proposal).
- Is it reasonable to expect a 'phonetic component' to fill in epenthetic material?
  - The choice of epenthetic segment varies from language to language.
  - It even varies according to context within a language.

Kaun (1999 BLS paper): epenthetic vowel in Turkish may undergo rightward rounding harmony, subject to a constraint requiring trigger and target to match in height and a constraint preferring front Vs as triggers of rounding harmony.

 $\begin{array}{ccc} fulot & \longrightarrow & fulu \\ \bigstar & & \bigstar \\ fylørt & \longrightarrow & fylyt \end{array}$ 

Shademan (2003 MA thesis and WCCFL talk): epenthetic V in initial CC clusters in loans into Farsi

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Is the following V /a/? \rightarrow yes \rightarrow [e] (pelan)

\downarrow^{no}

Is the following V front? \rightarrow yes \rightarrow Is C<sub>2</sub> coronal? \rightarrow yes \rightarrow copy (kitinora)

\downarrow^{no}

\downarrow^{no}

\downarrow^{no}

Is the following V hi? \rightarrow yes \rightarrow Is C<sub>2</sub> nas/liquid/flap? \rightarrow yes \rightarrow copy (dumuse)

\downarrow^{no}

\downarrow^{n
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### 3. Correspondence review

Faithfulness constraints are evaluated through comparison of the input and output representations (or other representations, as we'll see).

The correspondence relation tells us which input and output segments are paired up for comparison. Each input-output pair has its own correspondence relation.

## (7) Part numbering

- Every segment in a representation (input or output) is given a unique index (and perhaps every unit of structure, including features, moras, syllables...).
- A pair of segments (one in the input, one in the output) belongs to the correspondence relation if they bear the same index.

 $/p_1a_2t_3o_4k_5/ \rightarrow [p_1a_2t_3o_4k_5]$  means that the correspondence relation is

 $\{(/p_1/,[p_1]), (/a_2/,[a_2]), (/t_3/,[t_3]), (/o_4/,[o_4]), (/k_5/,[k_5])\}^1$ 

Or, we could say that  $p_1/C[p_1]$ ,  $a_2/C[a_2]$ , etc.

(People sometimes ask "what's the definition of the [sic] correspondence relation?" For any given input-output pair, the correspondence relation is defined by just listing the segment pairs that participate.)

# (8) Correspondence-differing candidates

These are also output candidates for  $/p_1a_2t_3o_4k_5\!/$ 

 $\begin{array}{l} [p_5a_1t_4o_2k_3] \\ [p_1a_1t_1o_1k_1] \\ [p_6a_7t_8o_9k_{10}] \end{array}$ 

but they're so outrageously bad that we don't usually bother including them in a tableau. (When you see a candidate without indices, you can assume that the correspondence relation is the obvious one.)

Sometimes candidates distinguished only by their correspondence relation are worth comparing...

• Fill in the violations:

	$/t_1 u_2 i_3 /$	IDENT[ROUND]	IDENT[BACK]
а	$[t_1y_2]$		
b	$[t_1y_3]$		
С	$[t_1y_{2,3}]$		

...but only if we have some reason to believe that we know which is the winner!

• Can you think of ways we might know which of these was the real winner in some analysis?

<sup>&</sup>lt;sup>1</sup> Should correspondence be symmetric? Does it matter?

#### (9) Good and bad correspondence relations

Constraints regulate various aspects of the correspondence relation. (See McCarthy 19\$\$ for basic list)

For input segments *a*, *b*, *c*; output segments *x*, *y*, *z*.

Max-IO	$\forall a \exists x \ aCx$ (the constraint doesn't care if a and x are similar)
Dep-IO	$\forall x \exists a \ aCx$ (the constraint doesn't care if <i>a</i> and <i>x</i> are similar)
MAX and You'll als	DEP are made more specific: MAX-C, MAX-V. o see MAX and DEP for features, moras, syllable nodes, etc.
IDENT-IO[F]	If $aCx$ , a and x must bear identical values for feature [F].
You'll als	o see IDENT[+F] (if <i>a</i> C <i>b</i> and <i>a</i> is [+F], <i>b</i> must be [+F] too) and IDENT[-F].

• How is this different from MAX/DEP[F]? (Try them for the /tui/ case above.)

UNIFORMITY-IO	If $aCx$ and $bCx$ , $a=b$ ("No coalescence")
INTEGRITY-IO	If $aCx$ and $aCy$ , $x=y$ ("No splitting")
LINEARITY-IO	If a precedes b, and $aCx$ , $bCy$ , y must not precede x. ("No metathesis")
I-CONTIGUITY-IO (Can <i>y</i> = <i>x</i> or <i>z</i> ? Don't	If $aCx$ , $cCz$ , $a$ precedes $b$ and $b$ precedes $c$ , then $\exists y \ bCy$ . ("No skipping") know.)

O-CONTIGUITY-OI If aCx, cCz, x precedes y and y precedes z, then  $\exists b \ bCy$ . ("No intrusion") (Can b=a or c? Don't know.)

(McCarthy & Prince's definition of O/I-CONTIG is: "the portion of [O/I] standing in correspondence forms a contiguous string".)

L/R-ANCHOR-IO(X) If *a* is at the L/R edge of X in the input (X = word, stem, phrase, whatever) and *x* is at the L/R edge of X in the output, aCx.

- This is McCarthy & Prince's 1995 definition. Would anything change if we said instead "If a is at the L/R edge of X in the input and aCx, then x is at the L/R edge of X in the output"?
- *Try this on your own:* Rewrite each constraint in terms of how violations are assessed. You can probably think of a few possibilities for INTEGRITY...
   Example: MAX assesses 1 violation for every *a* s.t. ¬∃*b aCb*