The Sound Structure of English (McCully)

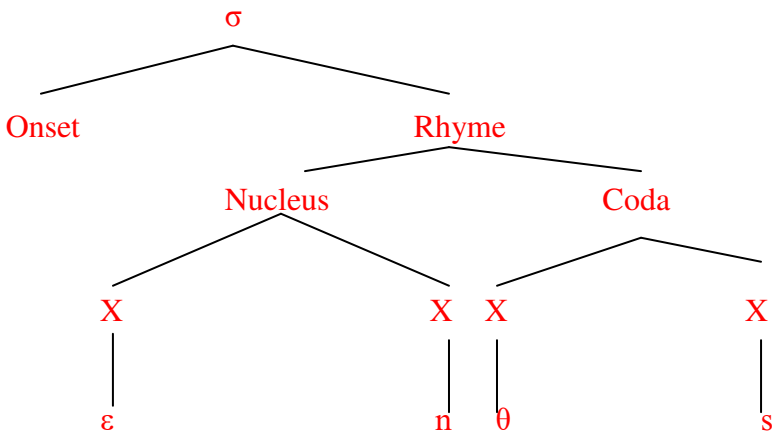
CHAPTER 11: Website

CHAPTER 11: PROBLEMS, THEORIES AND REPRESENTATIONS

COMMENT ON IN-CHAPTER EXERCISES

11.1, PAGE 181-182. Study the following list of syllables. Next, transcribe them as they would occur in your variety of English. Next, draw the appropriate syllable tree for the *Rhyme* of each syllable. Last, look carefully at the last position in their Codas (ie. the syllable-final position). What consonants occur there – and which consonants might *never* occur in that position of the syllable? Because today I'm feeling more than usually charitable I've done the first example for you.

i. tenths /tɛnθs/



(ii) films
(iii) aunt
(iv) grind
(v) grinds

The point I'm driving at here is that the consonants which can fill the second position of the coda appears to have something in common. This notion is explored on pages 182-183 of the mian text, but here's the short answer: they are share *coronal* articulations, that is, in feature-based terms, they are all [+coronal]. Even when core syllables are maximally filled (eg. *grind*, /ɡɹaɪnd/) and are then inflected (/ɡɹaɪndz/) it appears that these inflectional segments, now functioning as part of an appendix to the syllable (see main text, page 182) are also [+coronal].

11.2, PAGE 183-84. Study the following list of consonant phonemes, and then using the features you've already found in this section of text, attach feature specifications to each one. You should find that each phoneme has a different feature specification (ie. that the phonemes are distinguishable precisely by their different feature specifications). I have done the first example for you:

/s/ [- voice], [+ continuant], [- labial], [+ coronal]
/z/ ?
/t/ ?
/d/ ?
/b/ ?
/p/ ?

/z/ [+voice], [+continuant], [-labial], [+coronal]
/t/ [-voice], [-continuant], [-labial], [+coronal]
/d/ [+voice], [-continuant], [-labial], [+coronal]
/b/ [+voice], [-continuant], [+labial], [-coronal]
/p/ [-voice], [-continuant], [+labial], [-coronal]

11.2, PAGE 184. Suppose there are distinctive features of the following kind: [±high, ±low, ±back, ±round]. [±round] can be taken to mean 'produced with lip-rounding'. Now consider the following list of vowels (for the sake of simplicity, ignore whether a particular vowel is [±tense]). Assign features to each vowel. Your list should assign different feature specifications to each vowel. I've done the first example for you.

/i:/ [+high], [-low], [-back], [-round]
/e/ ?
/æ/ ?
/o:/ ?
/u:/ ?

/i:/ [+high], [-low], [-back], [-round]
/e/ [-high], [-low], [-back], [-round]
/æ/ [-high], [+low], [-back], [-round]
/o:/ [-high], [-low], [+back], [+round]
/u:/ [+high], [-low], {+back], [+round]

11.2, PAGE 185. Study the following list of forms. I've given a short list of words – all monosyllables - and have given their phonemic transcriptions. In the right-hand column, though, I've transcribed these words *phonetically*, and have shown, in the first example, that the vowel is (or has somehow become) nasalised. To indicate nasality I've used the standard diacritic [∼] over the vowel. Your job is two-fold: first transcribe the other words in the list both phonemically *and* phonetically; and second, suggest why it is that vowels get nasalised.

Word	**Phonemic transcription**	**Phonetic transcription**
<can>	**/kan/**	**[k^{h}ãn]**
<lamp>		
<hen>		
<hand>		
<hang>		

Since it's so simple to dispose of, let's take the second problem first. The underlying vowels may all become nasalised because they are all followed by some sort of nasal consonant within the same syllable.

Now here are some possible transcriptions (made to capture my own variety):

Word	**Phonemic transcription**	**Phonetic transcription**
<can>	**/kan/**	**[k^{h}ãn]**
<lamp>	**/lamp/**	**[lãmp]**
	(or more radically, /laNp/, see the website mateirals relating to chapter 9, 'Further note')	
<hen>	**/hɛn/**	**[hɛ̃n]**
<hand>	**/hand/**	**[hãnd]**
<hang>	**/haŋ/**	**[hãŋ]**
	(or more radically, /haNg/, see note to <lamp> above)	

11.2, PAGE 189

(1) Consider the following:

Regressive assimilation (assimilation of place)

Phrase	**Phonemic transcription**	**Phonetic transcription**
<in Paris>	/ɪn paɹɪs/	[ɪm p^{h}aɹɪs]

Find four or five similar examples, and construct an appropriate phonological rule which will uniquely specify the relationship between the underlying and surface forms of your examples.

(2) Consider the following:

Progressive assimilation (assimilation of voice)

<play> /p leɪ/ ⟶ output [p^{h}l̥eɪ]

[-voice]⟶

Find four or five similar examples, and construct an appropriate phonological rule.

Some similar examples to (1) are

that pen	**/ðat pɛn/**	**[ðap˺ p^{h}ɛ̆n]**
good book	**/gʊd bʊk/**	**[gʊb̥ bʊk]**
fine mesh	**/faɪn mɛʃ/**	**[fãɪm mɛʃ]**
thin king	**/θɪn kɪŋ/**	**[θĩŋ k^{h}ɪŋ]**
	(more radically, /θɪn kɪNg)	

Some similar examples which would undergo a devoicing rule such as that formulated in (2) are:

clean	**/kli:n/**	**[kl̥ĩ:n]**
try	**/tɹaɪ/**	**[tr̥aɪ]**
pew	**/pju:/**	**[pj̥u:]**
rice dish	**/ɹaɪs dɪʃ/**	**[ɹaɪs tɪʃ]**

An appropriate phonological rule might be something like the following, where 'C' stands for consonant:

/C/ ⟶ [C] / /C/_____
[+voice] [-voice] [-voice]

11.3, PAGE 190. Ascribe major class features (and only those features, ie. [±consonantal], [±sonorant] and [±syllabic]) to the following segments: /t/, /l/, /s/, /j/, and /u:/. I have done the first example for you:

/t/ [+consonantal, - sonorant, - syllabic]
/l/ ?
/s/ ?
/j/ ?
/u:/ ?

In terms of *major class features* you'll find that /t/ and /s/ have identical feature specifications. How can you use distinctive features to further differentiate these two consonants? (Hint: you'll find the answer in your work on 11.2.)

/t/ [+consonantal, - sonorant, - syllabic]
/l/ [+consonantal, +sonorant, +syllabic]
/s/ [+consonantal, -sonorant, -syllabic]
/j/ [+consonantal, +sonorant, -syllabic]
/u:/ [-consonantal, +sonorant, +syllabic]

The answer to the last question is that /s/ is [+continuant], while /t/ is [-continuant].

11.6, PAGE 205. In what follows I'm going to construct an OT tableau for the English syllable *imp*, using the above ranking together with the conventions introduced in this section. I'm radically simplifying the group of *faithfulness* constraints, of which so far we've seen only one specific manifestation, IDENT-IO, and here intending the cover term *faithfulness* to mean 'keep everything as it is in the input – don't add, delete, or change'. (For further work on these constraints, and specifically on their role in syllable structure, see Kager 1999, chapter 3.)

Where no particular ranking has yet been established between the constraints, I use a dotted vertical line.

Study this tableau carefully, and then construct a similar tableau to indicate the well-formedness of the syllable *grind* /gɹaɪnd/. I have supplied a candidate set for you, so

your task is merely to see in what ways the various candidates violate (*), or fatally violate (*!) each constraint.

The tableau supplied for *imp* is reproduced here:

OT tableau for *imp*, /ɪmp/

Candidates (/ɪmp /)	PEAK	SONORITY	*faithfulness*	ONSET	*COMPLEX(ONSET)	NOCODA
☞ [ɪmp]				*		*
[pɪmp]			*!			*
[ɪpm]		*!	*	*		*
[mɪp]			*!			

And here is a completed tableau for *grind*:

OT tableau for *grind*, /graɪnd/

Candidates (/graɪnd /)	PEAK	SONORITY	*faithfulness*	ONSET	*COMPLEX(ONSET)	NOCODA
☞ [graɪnd]					*	*
[rgaɪdn]		*!	*		*	*
[gəraɪnd]			*!			*
[rgk]	*!		*			*

Note that the disfavoured candidates have all incurred high-level violations (indicated by the '*!* symbol in each relevant box). The winning candidate still violates some constraints – but these are non-fatal violations and they are low-ranked constraints compared to those high-ranked constraints violated by potential competitors.

11.6, PAGE 206. Study the following data. The data relate to non-rhotic accents, although the phenomenon also occurs in rhotic ones. First, phonemically transcribe the words in the left-hand column. Next, phonemically transcribe the phrases in the right-hand column. Last, consider liaison: what transitional phenomena can you observe in your pronunciation and transcription of the *phrases*? I've done the first example for you.

Word	Transcription	Phrase	Transcription
<law>	/lɔ:/	<law and order>	?/lɔ:rən˞.. /
<cinema>		<cinema is>	
<Crimea>		<Crimea is>	
<spa>		<spa is>	

This exercise is reproduced from 10.6.

The question is essentially this: why do literate speakers of English so often *reject* the appearance of 'r' in *law and…*, while they accept (and use) linking 'r' in eg. *cure is* EVEN WHEN those same speakers' underlying representation of *cure* is non-rhotic (/kjɔ:/ or /kjʊə/)?

The same question is posed and answered by Giegerich (1992: 282-283):

Let us imagine…a nonrhotic speaker who is illiterate, as well as having no knowledge of the history of the language or of rhotic accents. This speaker will probably have acquired linking /r/… But given his poor education, he has no way of distinguishing the contexts for linking /r/ from those for intrusive /r/…; he will therefore use intrusive /r/ in precisely those phonological contexts in which linking /r/ occurs, that is, after vowel phonemes that might also be (but in instances where they are actually not) reflexes of historic /r/. For this speaker, /r/ simply occurs indiscriminately, in the appropriate contexts….

For literate speakers, however – ie. those who make a distinction between permissible linking 'r' (which is allowed following non-high vowels, and/or in words which have historic rhyme 'r') – a phonological constraint is available which limits linking and intrusive 'r' (such linkage can only follow [-high] vowels) BUT FURTHERMORE such speakers are also able to draw on their knowledge of the *spelling system* of English, so that such speakers are able to stigmatise the appearance of intrusive 'r' in environments where it had never occurred historically and had (therefore) never been part of the spellings of the words in question.

*

CHAPTER 11: SUGGESTED SOLUTIONS TO END-OF-CHAPTER EXERCISES

The first three exercises (11A-C) at the end of chapter 11 are in fact related.

Exercise 11.A. We've so far transcribed words such as *sing* as /sɪŋ/. For speakers of several present-day varieties of English, however – as well as for speakers of several historically-attested varieties - the relevant transcription would be /sɪŋg/. Compare also *sink*, which is plausibly /sɪŋk/ cross-varietally. Given this data, consider whether /ŋ/ is a phoneme of English.

This is a topic which we began to track in chapters 9 and 10, and to which in our work here in the website we've begun to suggest some answers. The problem relates to the underlying representations of the nasals which we've usually transcribed /n, m, ŋ/. One significant thing about these nasal consonants is that where they appear post-vocalically they may have forms which suggest that some underlying nasal has actually assimilated to the form of a following consonant. In *lamp*, for instance, the syllable-final consonant is bilabial, and the nasal is bilabial; in *sing*, the spelling of the word suggests that the /g/ was once pronounced (and is still pronounced in some varieties), and since /g/ is velar, it seems no accident that the relevant nasal phoneme is also velar.

Instead of merely transcribing the 'bilabial nasal' as /m/ and the velar nasal as /ŋ/, we could instead posit that all the nasal consonants were related to some 'underlying nasal', which (following Giegerich and others) we might symbolise as /N/. If we were to do this, then our underlying transcriptions for *lamp* and *sing* might look like this:

/laNp/ /sɪNg/

Given the relative abstractness of such transcriptions we would then need a rule or rules to convert those underlying representations into surface (phonetic) forms: for the /N/ of

lamp **we'd need to ensure that the /N/ surfaced as /m/; for the /N/ of *sing* we'd need to ensure not only that /N/ surfaced as velar, but also that in some varieties a rule of /g/-deletion would apply.**

We'll track this matter further in the answer to 11B.

Exercise 11.B. More on /ŋ/. In what was one of the founding texts of classical generative phonology, Chomsky and Halle (1968: 85n.) propose two rules to account for surface [ŋ]. The rules (adapted here from Hyman 1975:75) are as follows:

1. /n/ ⟶ [ŋ]/_____ {k, g}
2. /g/ ⟶ ø/ [ŋ]____

Is such a rule-based account either adequate or necessary to account for the distribution of /ŋ/ or [ŋ]?

These two rules, applying in that order, do seem to account for eg. surface [sɪŋ] from underlying /sɪng/ BUT ONLY if the underlying representation is /sɪng/ and not eg. /sɪNg/. The data and very partial analysis we re-examined in the answer to 11A., however, suggest that a more explanatory rule might be available to us, one that not only accounts for surface [ŋ] but also accounts for surface [m] in words such as *lamp*, whose underlying representation might well be /laNp/.

The relevant argumentation and rule is supplied by Giegerich (1992: 241-248). An entity such as /N/ he calls an *archiphoneme*. Note that archiphonemes do not somehow 'underlie' phonemes. Rather, archiphonemes are the expression of the natural class to which a phoneme belongs. /n, m, ŋ/ for instance belong to the natural class of nasals, and it seems plausible to suggest an analysis such as the following (adapted from Giegerich 1992: 244)

/N/ ⟶ [n]/_____ /d, t/ (and maybe also 'nothing', ie. where underlying /N/ appears word-finally, as in *can*)

/N/ ⟶ [m]/_____/p/ (and maybe also /b/, *lamb*?)

/N/ ⟶ [ŋ]/_____/g, k/

(If we allow such a rule to apply to eg. *sing* then in many varieties we'd also need a word-final /g/-deletion rule, which would operate after the nasal archiphoneme had been realised as [ŋ].)

Naturally it would be possible to refine these three statements into *one* rule, just as it would to refine on the conditions relevant to each sub-rule…but I'm not going to do so here. What I needed to do was make a point, and the point was this: what we began all those chapters ago to transcribe as /ŋ/, and which we there claimed to be a consonant phoneme of English, may well turn out NOT to be part of the inventory of English consonant phonemes. Instead, the underlying representation of [ŋ] would be /N/.

I track this matter just a little further in the answer to 11.C.

Exercise 11.C. Given their apparent distribution, what grounds can you find for arguing that /ŋ/ and /h/ are *not* phonemes of English?

Another way of looking at /ŋ/, supposing for a moment that we wish to allow it to remain as part of the consonant inventory of English, would be to claim that /ŋ/ and /h/ - more properly, [ŋ] and [h] – wre actually *allophones* of some underlying phoneme. This isn't as stupid as perhaps it might seem: /h/, after all, occurs only in one environment, syllable-initially, and with the further restriction that if it does so appear then it must occur on its own in the onset. Further, if /ŋ/ appears, and if we allow it to be a phoneme, then it, too, has an exclusive environment reserved for it: syllable-finally. Therefore we *might* want to say that while /h/ and /ŋ/ *can't be phonemes*, they *are* allophones ([h], [ŋ]) – of some underlying phoneme whose nature is still to be determined.

Though it's worth a moment of theoretical reflection, that analysis can't really be right. One feature of allophones of a given phoneme, for instance, is that all the allophones of that phoneme have some sort of phonetic identity in common. Consider for the last time the allophones of underlying /p/ - [p^h, p̚] and so on. They all have stoppedness (they are all [-continuant]) in common, and crucially, they all have labiality in common. But to claim that [h] and [ŋ] have anything in common would be very difficult; they seem radically ill-assorted. Further, it would be difficult to motivate (justify) a rule which would relate the underlying phoneme for these two allophones to those allophones.

Therefore the answer to the above question would seem to be that we should allow /h/ to be a phoneme of English, while suspecting that [ŋ] is the realisation of underlying /N/ - the nasal archiphoneme.

Exercise 11.D. Consider the following forms:

at ease	**a tease**
an aim	**a name**
an ocean	**a notion**

It's difficult (if not impossible) to differentiate the phonetics of the respective forms. Consider how an OT-style analysis might begin to analyse the relevant distinctions. Note that you won't find 'a solution' anywhere in chapter 11.

Hint: think about how word-edges are aligned (or not aligned) with the edges of syllables.

The phrases above all *seem* to be homophonic. Yet the pairs are subtly different. Take *a tease*/ *at ease*. In *a tease*, the allophonic transcription would be [ə t^hi:z] (/t/ is initial in a stressed syllable), whereas one possible pronunciation of *at ease* might be [əÐ i:z], where [Ð] represents the flapped variety of /t/ many GA speakers also have in words such as *butter*. Note that [ə Ði:z] would be an implausible realisation of *a tease*.

One way OT-style phonology might handle this sort of potential problem is to claim that there is a group of constraints whose concern is *alignment*, that is, constraints such as 'the left/right edge of syllable must coincide with the left/right edge of words', or 'the left/right edge of word roots coincides with the left/right edge of prosodic Words', or 'the right edge of a grammatical word coincides with the right edge of a syllable'. That is, alignment constraints ensure that everything 'lines up'. This isn't just tidy-mindedness; among other things properly-formulated alignment constraints help to limit excessive *epenthesis* (the insertion of segments, see Kager 1999: 109ff.)

Take *a tease* again. One thing we might want to do is to ensure that the evaluation process inherent to OT selects the candidate whose /t/ is aligned with the left edge of the word *tease*, and not the potential candidate whose /t/ has been shunted in the general direction of the preceding preposition. That is, there appears to be an alignment constraint operating here that says something like 'align the left edge of a morpheme with the left edge of a syllable'. (I'm going to call this 'Align-L' for short.) If we now construct a radically simplified tableau – and one in which I'll illegitimately use the symbol '#' to stand for 'morpheme-boundary' for clarity - you can see the result:

Candidates (/ə# ti:z /)	ALIGN-L
☛ [ə #ti:z]	
[ət# i:z]	*!

A full discussion of alignment and OT is well beyond the scope of this book and website, but you'll find more about alignment in Kager 1999:109ff. – work which explicates the classic paper of McCarthy and Prince (1993), whose full reference is

McCarthy, John and Alan Prince (1993). 'Generalized alignment'. In G.E. Booij and J. van Marle (eds.) *Yearbook of morphology 1993*. Dordrecht: Kluwer, 79-153.

You will also find an interesting OT account of alignment, inckluding an analysis of English plural and possessive morphology, in

Archangeli, Diana and Terence Langendoen eds. 1997. *Optimality theory: an overview*. Oxford: Blackwell, chapter 4, espeicially p.121ff.

Exercise 11.E. Consider the example *softness*, /sɒftnəs/. Suppose you were trying to construct a set of OT constraints which would evaluate the following candidate set (where '.' indicates a syllable division):

[sɒft.nəs]
[sɒf.tnəs]
[sɒftn.əs]
[sɒ.fə.tə.nəs]
[m.naargh]

What constraints would you use? How would you rank those constraints?

Once you have worked out what constraints you might use, attempt to construct the relevant OT tableau, showing how such a tableau encodes the most harmonic output.

Although we shall need to say just a little more about the strength of the candidate [sɒft.nəs] we can actually use the constraint set we used when we were considered *grind* in 11.6, PAGE 205 above. In the tableau below I have used the constraints we used in discussion of *grind*, and have kept their relative hierarchy, but have NOT so far accounted for any sorts of alignment. Recall also that '.' (here used once again for clarity) symbolises a syllable-division:

Candidates (/sɒftnəs /)	PEAK	SONORITY	*faithfulness*	ONSET	*COMPLEX(ONSET)	NOCODA
☞ [sɒft.nəs]						*
[sɒf.tnəs]		*!			*	*
[sɒftn.əs]		*!		*		*
[sɒ.fə.tə.nəs]			*!			*
[mnaargh]		*!	*			*

Our existing constraint set, then, works very well. [sɒft.nəs] has well-formed syllabic peaks, obeys sonority restrictions, is faithful to the input (ie. no segments have been added or deleted), has onsets, and has no *complex* onsets. In fact the only constraint the winning candidate violates is the low-ranked 'NoCoda' constraint.

In very general terms, one or more of the set of possible alignment constraints (and there are many of them, forming what Kager calls 'a family of constraints' (1999: 121)) are relatively highly ranked in the world's languages BUT – as hinted at in the tableau above, and not least by how well that tabelau works – in many languages, morphological requirements don't seem to be *quite* as important as prosodic well-formedness. That seems to be the case in the example above: *[sɒf.tnəs] would be ruled out by its violation of sonority constraints (/tn/ is ill-formed as an onset on a number of grounds, among them sonority) in any event, irrespective of whether we were to include alignment constraints into the evaluating set. That said, alignment of various kinds is a very general phenomenon of the world's languages, and must be taken account of in any phonological grammar. In the tableau above, for instance, we might want to include our primitive 'Align-L' constraint between 'faithfulness' (a cover term for another family of constraints whose operation ensures that there will be maximal correspondence between input and output) and 'Onset' (the requirement that English syllables should have onsets) – largely on the intuitive grounds that several of the lower-ranked constraints seem so often and so easily violable, whereas alignment interacts interestingly (and in some cases, critically) with morphology in order to select the most harmonic output form (recall the discussion of *at ease* and *a tease* above).
<u>And so….</u>

Goodbye. Thank you for using this textbook and its website. I hope you've enjoyed the work. Above all I hope that working through the various chapters and exercises of *The sound structure of English* has convinced you that in the phonology of English there aren't really any 'right answers' – though some provisional answers seem much more

robust than others! There's still a great deal that's arguable; still a great deal that's unknown; and still a great deal of interesting work to be done….

Thank goodness.

Chris McCully
November 2008