

Key to Questions

Chapter 1

- Q1** In most Japanese songs, the notes are sung on moras: all the Japanese lines have seven moras. Line 2 has a moraic [n] in the second syllable of *re.mon*, line 3 has one in the first syllable of *min.na*, which is also the first half of a long consonant, lines 4 and 5 have diphthongs in *fai.to* and *a.oi*, each counting for two moras, and line 6 has a mora in the first half of the long consonant in *rap.pa*.
- Q2** 1. A ‘silent letter’ in the spelling of a word fails to correspond to a segment in the pronunciation with which that letter typically corresponds in other words. For instance, in the majority of cases, *h* corresponds to [h] in English words, as in *honey* ['hʌni], but it fails to do so in *honest* ['ɒnəst] or *Thomas* ['tɒməs].
2. It is difficult to equate letters with segments, because the segment that a letter corresponds with often depends on other letters in the same word. Letters can hardly be said to be ‘silent’ if their absence changes the correspondent segment of another letter. The *gh* in *light* have the effect of suggesting [aɪ] as the correspondent of *i*, because the spelling *lit* would suggest a pronunciation [lɪt]. In fact, it doesn’t make a great deal of sense to talk about ‘the pronunciation of a letter’. Letters have names, like English [eɪ] for *A*, and that’s how you pronounce them.
- Q3** 1. The syllable [hi] could be accented or unaccented, and the answer is therefore ‘two’. In fact, both *hí* and *hi* exist, ‘fire’ and ‘day’, respectively. Three words could be made with [kentoo], *kéntoo*, *kentóo* and *kentoo*. Here, the last two are actual words, the nouns ‘guess’ and ‘investigation’. The fact that this disyllabic structure has four moras is not relevant, since the accentable element is the syllable.

2. Words that have the same pronunciation, like English [lɛd] (*lead*, ‘type of metal’ and *led*, past tense of *lead* ‘guide’) are known as homophones. And yes, English *lead* [li:d] ‘to guide’ and *lead* ‘type of metal’ are homographs.

Q4 The briefest answer is that no English word will ever have the sound sequence [lð] or [ðəp]. Word-initially, [ð] can only appear in the closed class of grammatical words (function words), as in *the, these, that, their, there, thence, thus*, etc., and there is no function word that begins with [ðəp]. Inside words, [ð] only appears after a vowel, as in *mother* and *to breathe*. By contrast, the sound sequence [distɛnd] occurring in the underlined part of *wildest endings* is perfectly well-formed as a word and in fact represents the word *distend*.

Q5 The suffix *-able* attaches to verbs that can take a direct object. *To die* is an intransitive verb and as such cannot take a direct object, while *seem* is a copular verb and thus is followed by an adjectival or nominal predicate, like *nice* or *a nice person*. By contrast, *imagine* takes a direct object, like *a better world, this* or *that the world is flat*.

Q6 In *unscratchable* there is a verb *scratch*, the base of *scratchable*. In *road tax increase* there are the nouns *road, tax, increase, road tax* and *road tax increase*. That is, its structure is $M [M [M [\text{road}]_N M [\text{tax}]_N]_N M [\text{increase}]_N]_N$

Q7 There are six NPs: *He, the letter, a pen he bought in Italy, a pen, he* and *Italy*. In addition there is the deleted NP *that (A pen that he bought in Italy)*, a relative pronoun that takes the place of the direct object of *of bought*, viz., *a pen*.

Q8 If the vocalizations that represent morphemes did not have structure, there would be **no segmental structure**, and consequently there would be no segments that could be switched round. For the relevance of speech errors for phonological structure, see Levelt (1989: ch. 9) and Shattuck-Hufnagel (1992).

Q9 Yes, sign languages for the deaf have morphosyntactic structure as well as phonological structure, just like spoken languages. The difference is that the medium in which the phonological units are expressed is not **human vocal sound**, but gestures. There are many sign languages in the world, and there is no genetic relationship between the dominant sign language and the dominant spoken language in any community. They are entirely comparable functionally and in terms of processing speed. A person who is deaf at birth and does not learn a sign language will be linguistically and cognitively deprived in the same way as any hearing person would who is artificially prevented from learning a spoken language. The haunting story of the slow pace with which this insight spread to the community of therapists is told in Sacks (1989). It is only recently that research into the morphosyntactic and phonological structure of sign languages has got off the ground.

Q10 1. The word for ‘field’ begins with [ð] because according to FRICATION a word-initial plosive like [d] is not tolerated when the word occurs in non-initial position in the sentence.

2. ‘Cows are grazing in the field’ in language II is [ni xaputi fula].

3. Since fricatives would uniquely occur at the beginning of non-initial words, any occurrence of a fricative would signal the beginning of a word. Detecting the word boundaries in speech is a nontrivial task for the hearer. It must be realized that there are no pauses between words, as will be readily evident to anyone listening to an unfamiliar language. For more information on the relevance of phonological structure for parsing strategies, see McQueen and Cutler (1997) and Cutler (2011).

Q11	<i>Syllables</i>	<i>Morphemes</i>
	[ɛ], [lə], [fənts]	[ɛləfənt], [s]
	[pɑ:m], [ɔɪl]	[pɑ:m], [ɔɪl]
	[ʌn], [sɛt], [lɪŋ]	[ʌn], [sɛt], [lɪŋ]

Q12

1. No, [ɪkt] is a well-formed syllable, and occurs as a rhyme in *licked*, *nicked*, *strict*, etc. There just so happens not to be a morpheme with that shape.
2. The sequence [mrɛk] does not represent a well-formed English syllable.

Chapter 2

Q13 Since the glottis is closed, the air in the lungs is trapped. This prevents the higher air pressure in the lungs from creating a pressure difference across the larynx. The sounds you were making were therefore non-pulmonic. In section 2.8 we will see how air pressure differences can be created in the mouth without the aid of the vocal folds or the lungs.

Q14 Starting on the left, the speech waveform for *ceased* will show a strongly turbulent phase caused by the friction of [s], followed by a periodic signal of the vowel [i:], which is similar to that of [a:] in Fig 2.2, but with the periods showing a resonance profile more like that in Fig 2.3; the periodic vibration fades away and there follows strong turbulence for [s], ending in a straight line representing the silence during the closure of [t], after which the explosion of the [t] will just be visible.

Q15 The period is 4.94 ms. Therefore, the fundamental frequency is 1,000 (ms) divided by 4.94 (ms), or 203 Hz.

Q16 The answers really depend on the kind of English, but we have tried our best to pick out sounds that are stable across the different varieties. There a close/mid-

close front vowel in *here* and a mid-close/mid-open front vowel in *friends*. The front diphthong in *make* begins mid-open and moves to mid-close. A velar plosive, [k], occurs in *make*. For [f] in *friends*, friction is produced at the point where the upper incisors make contact with the lower lip, and for [z] in the same word, alveolar friction is produced. There may be some oral cavity friction for an emphatic pronunciation of [h] in *here*, but typically what friction there is will be produced in the larynx.

Chapter 3

- Q17** The vowel system contains two articulatory routines that are each used once only, nasalization only for [o] to give [õ] and breathy voice for [a] to give [a̤]. More probably, there would just be nasalization for all the vowels, perhaps with the exclusion of nasalized high vowels, to give 10 or 8 vowels in all, or just breathy voice for all the vowels, again giving 10 vowels. Of course, both features may be present, to give 16 or 20 vowels in all.
- Q18** The explanation would be that three vowels can be distinguished so clearly with so little effort that languages will develop them with a degree of probability that approaches certainty, but that we must not revise our view of the world if a language were to be found that had fewer vowels. On the emergent status of distinctive features, see Mielke (2008).
- Q19**
1. (C(C))V(V).
 2. Yes, the second syllable of ‘lizard type’ has a syllabic [m], for example.
- Q20**
1. To answer the question for our own native language, English has [θ], which is absent from Dutch, while Dutch has [y], unlike English.
 2. The final consonant of German *Kiev* will be [f] because of FINAL DEVOICING.

- Q21**
1. The total number of segments in !Xũ is very large indeed.
 2. The number of vowels in Pawaia is large compared with the small number of consonants.
 3. The number of vowels in Haida is small compared with the large number of consonants.
 4. While the number of consonants of Norwegian is close to the world average, the number of vowels is rather large.
- Q22** The smaller the number of segments, the smaller will be the number of contrasts, and the sooner the need will arise to add further segments. For the same reason, binary numbers (numbers that consist of 1 and 0 only) will be longer than decimal numbers as soon as their value exceeds 2.
- Q23** The voiced uvular stop will be most likely to be absent, because the space between the uvular closure and the glottis is even smaller than that between the velar closure and the glottis. [G] is in fact missing in Zaza.
- Q24**
1. Your graphs should look like two parallel inverted Vs, with the lower one representing the voiced plosives.
 2. The [p] and the [g] have lower positions than in the theoretical graphs. The reasons for this must be the same as those that were given for the relative frequency of the system gaps for [p] and [g] in section 3.3.5: the first is relatively hard to hear because of the absence of a resonance chamber in front of the place of articulation, while the second is relatively hard to produce because of the rapid increase in air pressure in the small chamber between the velar closure and the glottis, which will impede the air flow through the glottis needed to allow the vocal folds to vibrate.

Chapter 4

- Q25** *[tuʔa] contains the illegal segment [t], *[plai] has an illegal CC onset, while *[kehunanal] has an illegal coda in the last syllable.
- Q26** *[meŋ] does not have the required two syllables, while *[leʔem] ends in [m], which is not allowed in Konjo codas.
- Q27** The narrow transcriptions are [tsɰkemono], [ɛiɰá] and [óɰeiba]. In effect, the devoiced vowel is phonetically deleted, and the first two words could also be given as [tskemono], [ɛtá].
- Q28** Before [ɰ], [t] affricates to [ts]. If [ɰ] were used, therefore, the word for ‘toast’ would be [to:sɰtsɰ], which output is less similar to the English word than [to:sɰto]. (There are exceptions to this strategy, since ‘donut’ is [do:natsɰ].)
- Q29**
1. The only consonant that can appear word-finally in Japanese is [n].
 2. The consonants that can appear in the coda of non-final syllables are [m n ŋ]. (Japanese also has intervocalic geminate consonants, which simultaneously function as coda of one syllable and onset of the next.)
 3. A vowel is added after the word for ‘rubber’, but not after the word for ‘manganese’, because word-finally only [n], not [m], is allowed as a coda consonant.
 4. On the basis of these data, [s] and [h] can be said to be the voiceless fricatives of Japanese.
 5. The fact that the onset clusters [bl-] and [dr-] in the words for ‘tin’ and ‘hypochondria’ are broken up into separate syllables suggests that Japanese has no complex onsets other than C[j].

- Q30**
1. The onset clusters [br-] and [fl-] and the coda cluster [-lt] are broken up into different syllables.
 2. Clusters that are not broken up, that is, are not fully interpreted, are the onset clusters [st-] and [sk-] and the coda clusters [-nd] and [-nt].
 3. Hawaiian [p] is used for English [b f p]. These consonants are all articulated with the lips.
 4. Hawaiian [k] is used for English [t d s ʃ z θ k]. These consonants are all articulated with the tongue.
 5. We feel uncertain of what the vowels would be, but the consonants would be [p l k]. Thus, [palaki] and [poloka] are among the possible forms.
 6. The sound [s] is not part of the segment inventory of the language, which is why it is replaced by a native segment. It is improbable that native speakers of Hawaiian cannot hear the difference between [s] and [k], even if they were monolingual. Speakers may feel that the difference is somehow not important, much in the same way that many speakers of Dutch or German can hear the difference between English *bet* [bet] and *bat* [bæt], while nevertheless pronouncing both as [bet]. Again, when challenged they might comment that the difference between the English vowels is somehow not essential.

Q31

1. *underlying forms* *morphemes*

we	3PL,OBJ ('them')
n	PROGRESSIVE
oʔ	3SG,SUBJ ('he')
∅	3SG,OBJ ('it' has no phonological form)

	netale		‘lick’	
	picena		‘cut’	
2.		/netale + oʔ/		/we+picena+n+oʔ/ /we+picena+oʔ/
CONTRACTION		netleoʔ		wepcenanoʔ wepcenaʔ
TRUNCATION		netleʔ		<i>n.a.</i> wepcenaʔ
		[netleʔ]		[wepcenanoʔ] [wepcenaʔ]
		‘he licks it’		‘he is cutting them’ ‘he cuts them’

3. The rules are unordered, since they apply in mutually exclusive environments.

Q32 1. The constraint in (11), MAX-IO (deletion of segments is prohibited) is responsible for ruling out [kɪs].

2. MAX-IO has to be ranked above DEP-IO, because otherwise [kɪs] would become the optimal output form.

kɪsZ	MAX-IO	DEP-IO
[kɪs]	*!	
↪ [kɪsɪz]		*

Q33

ʃəvø	*ʃ/3	IDENT (F)
ʃeve	*!	
↪ seve		*

Q34 1. In *[gazi] there are two voiced obstruents, in violation of LYMAN’S LAW, but in [gami] there is only one, since [m] is a sonorant.

2. The reason why RENDAKU fails in (2) is that in all three cases LYMAN’S LAW

would be violated in the second word in the compound, since RENDAKU would lead to two voiced obstruents in the word (e.g. *[gaze]).

3. LYMAN'S LAW must outrank RENDAKU, as in this tableau.

/kita-kaze/	LYMAN'S LAW	RENDAKU
☞ kita-kaze		*
kita-gaze	*!	

Q35

/lem/	ALIGN-STEM-RIGHT	DEP-IO	CODACOND	IDENT(F)
leme	*!	*		
leʔem		**	*!	
☞ leʔeŋ		**		*

1. DEP-IO is not crucially ranked above CODACOND, as the same form, [leʔeŋ] would still be the optimal output form, if their ranking were reversed.

2. Yes, CODACOND is crucially ranked above IDENT(F), because the reverse ranking would produce [leʔem] as the optimal output form.

/lem/	ALIGN-STEM-RIGHT	DEP-IO	IDENT(F)	CODACOND
leme	*!	*		
☞ leʔem		**		*
leʔeŋ		**	*!	

Chapter 5

- Q36** 1, 2, and 3: [p t k]
4. Evidently, [p t k] form a natural segment class.
- Q37** 1. With two binary features F and G, eight natural segment classes can be referred to. Four classes are defined by using one binary feature with each possible value: +F, -F, +G, -G. An additional four are defined by using two features with every possible value combination: +F+G, +F-G, -F+G, -F-G.
2. The combination of [+cons, -son] defines the class of obstruents ([p f t], etc.), [+cons, +son] defines the class of sonorants ([n r l], etc.), [-cons, -son] defines the class of laryngeal segments ([h ʔ]) and [-cons, +son] defines the class of glides ([j w], etc.).
- Q38** In Dutch, [ə] is inserted between the noun stem and the diminutive suffix, whenever the noun stem ends in a [+cons,+son] segment, i.e., after a member of the class of sonorants excluding glides and vowels. If we referred to only [+son], the glide [j] would wrongly be included.
- Q39** In Córdoba Spanish, the assimilation process creating geminates applied to [+cons] segments. Glides and laryngeal segments, i.e., [-cons] segments, did not trigger it.
- Q40** The class of sounds subject to degemination in Dutch is characterized by the feature [+cons].

Q41

p	t	k	ʔ
b	d	g	
f	s	x	h
v	z	ɣ	[−son]
m	n	ŋ	[+approx] [+son]
	l r	[+cons]	[+approx]
w	j	[−cons]	
i	a	u	

Q42 Segments that may appear after [sp st sk] in English, [l r j w] and the vowels, can be characterized by the feature [+approx].

Q43 1. The plosives acquire the feature [+constr].

2. In Southern Oromo, the combination of the features [+constr,−voice,+cons] is necessary to distinguish [tʰ] from the three consonants that do not trigger i-EPENTHESIS. The feature [+constr] is necessary to distinguish ejective [tʰ] from [t], [−voice] is necessary to distinguish it from [d] (which is [+constr] as well), and, finally, the feature [+cons] is necessary to distinguish [tʰ] from the glottal stop [ʔ].

Q44 The class of segments before which the long vowels appear in Scottish English can be characterized as [+cont,+voice].

Q45 1. The devoicing applies to [b d g dʒ], but not to [z].

2. The group of plosives and affricates is [−cont]. Fricatives are [+cont].

Q46 All obstruents are voiceless at the end of a syllable in Dutch. This class can be characterized by the features [+cons,–son]. Since [h] cannot occur word-finally in Dutch, the specification [–son] will suffice.

- Q47**
1. [cə] appears after [t c ɲ].
 2. [l ʌ] must be [+cont] in order for their stems to retain the [kə] suffix.

Chapter 6

Q48 The class of consonants triggering r-DELETION in Bengali is [CORONAL].

Q49 The class of vowels undergoing the nasalization process is [–high].

Q50 1. This can be done with the features [±anterior] and [±distributed], as follows.

lamino-dental	apico-alveolar	lamino-post-alveolar	apico-post-alveolar
ɟ [+ant,+dist]	d [+ant,–dist]	ɟ [–ant,+dist]	d [–ant,–dist]

2. The palatal [j] is [–back] and as such better described a ‘pre-velar’, while velar [g] is [+back], both dependent on [DORSAL].

Q51 1. The complementary distribution of [r] and [l] is determined by the preceding vowel. The [l] occurs word-initially and after a back vowel, while [r] occurs after a front vowel.

2. The context of [r] can be stated as ‘after a vowel with the feature [–back]’, whereas the context for [l] cannot be expressed in terms of distinctive features.

Although the word-internal occurrence of [l] can be expressed as ‘preceded by a vowel with the feature [+back]’, there is no feature to refer to word-initial position.

3. If /l/ is chosen as the underlying representation, a single rule can account for the surface complementary distribution pattern: /l/ becomes [r] after a front vowel.

- Q52**
1. [+spread]
 2. [CORONAL,–cont,–son]
 3. [LABIAL,+voice,–cont] *or* [LABIAL,+voice,+cons]
 4. [–cons] ([+son] is superfluous, as there are no laryngeals in the language.)
 5. [+back, –high]
- Q53**
1. [+cont,–son] (Recall that [h h^w] are not specified for [±cont]. Chapter 5.)
 2. [+constr]
 3. [CORONAL,–anterior, –son]
 4. [CORONAL,+nas]
 5. [+back,+round] in the syllable nucleus. That is, we must not include [w] or any of the labialized consonants, and so stipulate this structural information.
- This issue reappears in Q145.
- Q54**
- Rule (6) applies to both [d]s. At the first application, the first [d] corresponds to the focus [–son] and the second to C₀, and at the second application the second [d] matches the focus [–son], while the term C₀ corresponds to no consonant.
- Q55**
- Rule (1) says ‘Insert a schwa before a word-final postvocalic [r]’ and rule (2) says ‘Delete [r] before consonants or at the word end’.
- Q56**
1. Your answer should consist of four copies of rule (10). In one of them, α and β are replaced with + and +, respectively, in a second with + and –, in a third with – and +, and in the fourth with – and –.
 2. Items (21c,d) take [lar], because their last vowel is [+back]. The plurals of (21a,b) are [køjler] and [kepler].
- Q57**
1. The rule says that word-final mid vowels are raised, causing word-final [e] and [o] to become [i] and [u].
 2. This rule states that a front vowel is deleted before another vowel, if the two

vowels have the same height. That is, [e] is deleted before [e] and [o], [i] is deleted before [i] and [u] and [æ] is deleted before [æ], [a] and [ɔ].

3. The rule says that a coronal voiceless stop is inserted between [n ɲ] (a coronal nasal) and [s ʃ] (a coronal voiceless fricative) in word-final position. That is, word-finally, [t] is inserted between [n] and [s] and [ç] between [ɲ] and [ʃ].

Q58

1. [-son] → [-voice] / [-son] (# #) ___
2. $\emptyset \rightarrow \emptyset / \left[\begin{array}{l} +\text{cons} \\ +\text{approx} \end{array} \right] \text{ --- } \left[\begin{array}{l} \text{LABIAL} \\ -\text{son} \end{array} \right]$
3. $V \rightarrow [\alpha\text{back}] / \left[\begin{array}{l} +\text{high} \\ \alpha\text{ back} \end{array} \right] C_0 + \text{---}$

The notation $C_0)_\sigma \text{---}$ is also correct. Any coda consonant will subsequently become an onset consonant of the syllable with the suffix vowel (see the MAXIMUM ONSET PRINCIPLE, p. 127).

Chapter 7

- Q59** 1. In Southern Swedish, [R] and [r] are allophones of the same phoneme, because their distribution is determined by the phonological context.
2. In Dutch, they are stylistic variants, because their distribution is determined by the formality of the situation.
3. In Provençal, they are different phonemes, because they can be used to form a minimal pair.
- Q60** In Tolitoli, the retroflex lateral flap [L] occurs after back vowels ([o u a]), whereas [l] occurs after front vowels ([i e]) and word-initially.
- Q61** 1. [x] and [ç] are different phonemes in Plautdiitsch, because they contrast, as shown by the minimal pairs given in the question.

2. Old English [ç] occurs after front vowels (in the examples, [ɪ i: e: æ:]), whereas [x] occurs after the back vowels (in the examples, [u: o: ɔ: ɑ:] and [ə] as the second element of a diphthong).

Q62 [r] and [l] are allophones of the same phoneme in Korean. Regardless of whether [r] or [l] is in the English input forms, Korean has [r] in the onset, as shown by *melon*, for instance. In the coda, [l] occurs consistently. This consonant is rare outside a post-vocalic context, although it freely occurs word-initially in loans, as in the word for ‘laser’, in which position the pronunciation may not be distinctly either [l] or [r]. (In British English, there is no coda [r]; any coda [r] in any American English input words is left untranslated.)

Q63 1. No, the distribution of [s] and [z] is contextually determined, with [z] occurring before [+voice, +cons] segments ([d m b] in the examples given) and [s] elsewhere.

2. The untrained Spanish speaker would distribute the sounds such that [z] appears before [d] and [s] elsewhere, i.e. [se lez desire].

Q64 *Sew* [səʊ] and *sewage* ['su:ɪdʒ] are unrelated, both semantically and phonologically. *Blow* and *blew* are arguably derivable from the same UR, but since the number of forms that would go by the rules that would be required to transform [bləʊ] into [blu:] is very small (cf. *grow*, *know*, *throw*), it would seem more reasonable to list the past form. For a derivational description, see Halle and Mohanan (1985). The same consideration applies to the different verbal and nominal stems *-ceive* and *-ception*. There is not even a remotely reasonable case to be made for *brother* – *fraternal* (cf. the different phonological relations between *mother* – *maternal* and *father* – *paternal*). *Cork* – *corkage* are regularly related phonologically via attachment of the nominal suffix [ɪdʒ], though the

form needs to be listed in the lexicon because of its specialized meaning ‘fee to be paid for opening the guest’s own wine in restaurants without a licence to sell wine’. The forms *talk* and *talked* indubitably contain the same UR: the phonology is regular and the semantics of the inflected form is predictable from its morphological structure.

- Q65**
1. If *list* were [lɪs] underlyingly, its present participle would be *[ˈlɪsɪŋ] instead of the correct [ˈlɪstɪŋ].
 2. Its past participle form would be [lɪst], produced by devoicing of [d] after the voiceless obstruent [s]. If [lɪst] is assumed as the UR, ə-INSERTION would insert a schwa between the suffix [d] and the stem, preventing DEVOICING from applying.

- Q66**
1. The words are [ʃuːrəz] and [pɜːsəd]. Because the plural and past suffixes have syllabic forms after non-sibilant sounds, these must have been non-alternating [əz] and [əd], respectively. (In present-day English, these words are [ʃau.ərz] and [prɛst]. Presumably, Middle English [pɜːs] and [prɛs] were alternative forms, of which the second survived.)
 2. Historically, there was a process of weak vowel deletion before [z] after non-sibilants, causing [z] and [s] to develop there, and a similar deletion process before [d] after sounds except coronal plosives, causing [d] and [t] to develop there. However, instead of any vowel deletion rule, a present-day grammar of English will contain vowel insertion rules after sibilants before /z/ (e.g. *kisses*, *fezes*, *dishes*, *camouflages*, *hatches*, *bridges*), and after [t d] before /d/ (e.g. *profited*, *studded*). This shows that the rules of a grammar need not correspond to historical sound changes, as indeed is to be expected, given that grammars are created by making simple generalizations over contemporary input data.

Q67 Given that the first name comes before the surname, [tɔn] is the better choice. In combination with the surname, [tɔm] would be ambiguous between [tɔm] and [tɔn], since the latter is likely to assimilate to [tɔm] before the [b] of *Bleekveld*. With [tɔn], it is possible to suppress the assimilation, as in [tɔn 'ble:kfeld], avoiding the ambiguity. In effect, the parents should be advised not to choose a neutralized output.

Q68 1. The alternants of each prefix in Balantak are [sa-], [sam-], [san-], [saŋ-] and [to-], [tom-], [ton-], [toŋ-].

2. After [sa-], the initial segment of the base is [w l n ŋ m r]; after [to-] it is [j w l ŋ r].

After [sam-], the initial segment of the base is [b]; after [tom-] it is [b p].

After [san-], the initial segment of the base is [t s]; after [ton-] it is [t d s].

After [saŋ-], the initial segment of the base is [k g] or a vowel, just as it is after [toŋ-].

3. The underlying forms must be /saŋ, toŋ/.

4. A deletion rule is required to delete [ŋ] of the prefix before a base starting with a sonorant consonant (the full set [n ŋ m l r j w]) and a place assimilation rule is required to assimilate the place of articulation of the prefix-final [ŋ] to that of the base-initial consonant. Before vowels nothing needs to be done. This would not be so simple if different URs were chosen. With /tom, sam/ or /ton, san/, the assimilation to [ŋ] would have to be effected in the unnatural context 'before dorsal consonants or a vowel'. If /to, sa/ were chosen, an insertion rule would be required to insert [ŋ] before the unnatural context of 'obstruents and vowels'.

Q69 1. The focus of the rule are the [COR] segments [t d s z n]. To exclude [r l], the specification [-approx] should be added to [COR]. The structural change is

[−ant], creating post-alveolar laminal consonants, while the context is ‘after j’ or equivalently ‘after [−ant]’, which specification is unique for [j] before the rule applies. In cases like [sχuntjə] → [sχupcə], the rule should apply to both [n] and [t], so that an optional C should be included, as in

[COR, −approx] → [−ant] / ___ C₀ [−ant].

2. The five allomorphs are [tjə, ətjə, jə, pjə, kjə]. t-DELETION applies after [−son], as shown by forms (b), (c), (d), (e) and (q).
3. ə-INSERTION applies if there is a stem-final sonorant consonant, i.e. [+con,+son], and if the vowel is lax, i.e. after [+nas,−tense], as shown by forms (g), (i), (j), (m) and (n). Note that either schwa, as in forms (f) and (k), or a tense vowel, as in forms (l) and (o), will block the rule.
4. PLACE ASSIMILATION assimilates [t] of the suffix to the place of a preceding nasal segment. It must apply after ə-INSERTION to prevent the [t] from being assimilated after nasals that follow a lax vowel, which would cause form (g) to end up as *[slɔŋkjə], for instance.
5. To prevent DEGEMINATION from creating the context for ə-INSERTION ([mant-tjə] → [man-tjə] → *[man-ətjə]), ə-INSERTION should apply first. To delete both [t]’s in [bɔχt-tjə], DEGEMINATION must apply before t-DELETION ([bɔχt-tjə] → [bɔχ-tjə] → [bɔχjə]). To assimilate the [t] of the suffix to [p], DEGEMINATION must first remove stem-final [t] ([hɛmt-tjə] → [hɛm-tjə] → [hɛmpjə]). In sum, ə-INSERTION > DEGEMINATION, DEGEMINATION > t-DELETION, and DEGEMINATION > PLACE ASSIMILATION. The first two orders combine as ə-INSERTION > DEGEMINATION > t-DELETION. The form [hɛmpjə] shows DEGEMINATION > PLACE ASSIMILATION and in 4 above we saw that ə-INSERTION > PLACE ASSIMILATION. This means that PLACE ASSIMILATION is ordered jointly with t-

DELETION. To check this, construct a table, arranging forms (i), (s), (w), (x) in columns and using six rows for (i) the URs ([bɔm-tjə], etc.), (ii)-(v) the four rules in a correct order, and (iv) Outputs ([bɔmətjə], etc.), as in examples (1), (2), (4) and (6) of this chapter. Incidentally, because PLACE ASSIMILATION only ever applies to the diminutive suffix, it is unattractive to find a solution in which the stem-final [t] as well as the suffix [t] could be the focus of PLACE ASSIMILATION.

- Q70**
1. In the dialect of Utrecht, the alternants of the diminutive suffix are [χi], [əχi], [i], [si], [tsi], [pi] and [ki].
 2. The two additional rules are AFFRICATION, by which [t] becomes an affricate [ts], and FRICATION, a rule by which [t] becomes [χ]. If FRICATION is ordered between ə-INSERTION and DEGEMINATION and if AFFRICATION is ordered last, the rules can be formulated as follows:

FRICATION [t] → [χ] / V __ V

AFFRICATION [t] → [ts] / __ i]_{DIM}

Noter in particular that FRICATION applies at a point when [tt] in ‘foot’ has not yet been degeminated, so as to avoid incorrect *[fuxi].

3.	ɛi-ti	rɔk-ti	bɔm-ti	ra:m-ti	bɔrt-ti	fut-ti	bɔχ-ti
ə-INSERTION	–	–	bɔm-ətɪ	–	–	–	–
FRICATION	ɛi-χi	–	bɔm-əχi	–	–	–	–
DEGEMINATION	–	–	–	–	bɔr-ti	fu-ti	bɔχ-ti
t-DELETION	–	rɔk-i	–	–	–	–	bɔχ-i
PLACE ASS	–	–	–	ra:m-pi	–	–	–
AFFRICATION	–	–	–	–	bɔrtsi	futsi	–
Output	[ɛiχi	rɔki	bɔməχi	ra:mpi	bɔrtsi	futsi	bɔχi]

Q71 1. The lexical representation of ‘breakout’ is [ˈɔɛtbra:k], the form prior to the application or postlexical REGRESSIVE VOICING.

2. Because it is a postlexical rule, REGRESSIVE VOICING would not be expected to have exceptions, which prediction is correct.

3. Native speakers would say the last consonant of the prefix is [t], a judgement which they are expected to base on the lexical representation.

Q72 1. PALATALIZATION creates segments that are not part of the lexical segment inventory and is therefore not structure-preserving.

2. AFFRICATION is structure-preserving, because [tʃ tʃ^h] already occur in the lexical segment inventory.

3. Properties that are consistent with the status of AFFRICATION as a lexical rule are (a) its inability to apply across word boundaries, given that the right-hand context is a suffix, and (b) the fact that it is structure preserving, while (c) the fact that it refers to morphological information necessarily implies that it is a lexical rule.

Q73 1. (1) VOWEL NASALIZATION $V \rightarrow [+nas] / _ n)_\sigma$

(2) n-DELETION $n \rightarrow \emptyset / [V, +nas] _)_\sigma$

(3) ə-DELETION $\text{ə} \rightarrow \emptyset / _)_F$

2.	fin	fin-ə
VOWEL NASALIZATION	ẽ	–
n-DELETION	∅	
ə-DELETION	–	∅
Output	[fẽ	fin]

- If [n] resyllabifies as an onset in the syllable [ɔm] after VOWEL NASALIZATION and before n-DELETION, the vowel will be nasalized, while [n] will be preserved. The resyllabification is known as LIAISON.
- n-DELETION must be postlexical, because it must apply after words combine into phrases. That is, [yn] (or rather its lexical representation [ɔ̃n]) and [ɔm] must be phrased together with the following words before the rule can apply.
- ə-DELETION must be postlexical, because, again, information about the following word is needed to decide whether it is deleted. In this case, [ə] does not delete in the context [d] __ [d]. This failure of ə-DELETION between identical consonants can be seen as an OCP effect, a ban on sequences of identical segments, to be discussed in section 9.3.2 and in Chapter 10. If [ə] were to delete, a sequence of identical consonants would be created.
- VOWEL NASALIZATION must apply before a word-final [n] is resyllabified into a following onsetless syllable. Therefore, if it is postlexical, it must be ordered before LIAISON. This would be unexpected, as generalizations would normally refer to the prosodic structures that are present at the relevant level of representation. As it happens, the rule has exceptions, such as the loanwords and

proper names *abdomen* [abdɔməŋ], *pollen* [pɔləŋ], *Citroën* [sitroɛŋ] and *Le Pen* [lə pɛŋ], confirming the lexical status of VOWEL NASALIZATION.

7. We could either assume an UR [ɔndə], which will be converted to [ɔ̃d] by a ‘free ride’ on the grammar that we need anyway, or we could assume [ɔ̃də] as the UR, which is possible because nasalized vowels are produced by a lexical rule and must by implication belong to the lexical segment inventory. If we go by the rule-of-thumb that we do not make URs more abstract than they need to be, the second option would be preferred. Perhaps psycholinguistic research will some day tell us whether this question is meaningful.

Q74 No, the rule applies freely to all forms, also to the underived nouns /la:kən/ ‘bedsheet’ (section 6.4) or /te:kən/ ‘sign’ (section 8.3.1).

Q75 1. The rule that produces [ɛ:] is lexical, because it must refer to the morphological status of [d] to be able to distinguish *made* and *stayed*, for instance.

2. The rule is not neutralizing, since the product of the rule, [ɛ:], does not already appear independently in other words.

3. It is not structure-preserving, for the same reason. However, because the rule is evidently lexical, there is the prediction that [ɛ:] could readily be incorporated in URs, in loanwords, for instance.

4. The rule does not show non-derived environment blocking, because it readily applies to a morphologically non-complex form like *day*.

Q76 1. BATH-raising is a lexical rule, because it refers to morphological information like ‘underived stem’. It is debatable whether it is structure preserving. The output vowel may coalesce with [ɛə] of *bared* or [ɪə] of *beard*, in which case its output already exists (Wells 1982: 511).

2. If a child learning Danish as a second language were to pronounce *Dansk* ‘Danish’ (Danish [dænsk]) as [dɛənsk] or [dɪənsk], that would show BATH-raising is productive.

Q77 In unguarded speech, RP *cents* and *sense* would be expected to be homophonous, since the phonological representations are the same. Phonetic implementation rules are not expected to take account of the history of the phonological surface representation they are required to translate into phonetics. Nevertheless, speakers would appear to be able to take all sorts of considerations into account when pronouncing linguistic expressions, and may for instance apply fewer optional assimilations in less frequent forms, or make words they use for the first time in their discourse longer than other words. In this connection, Hayes (1994) speaks of ‘the beast’ in man, suggesting that speakers can influence their speech behaviour from outside the language system, so to speak. The phenomenon that phonologically identical surface representations often reveal small differences in the direction of what a pronunciation of their underlying representations would be is known as **incomplete neutralization** (Port and O’Dell 1985). For instance, Dutch [no:t] may have a slightly longer vowel if its UR is /no:d/ ‘need, emergency’ than when it is a pronunciation of /no:t/ ‘nut’ (Warner et al. 2004)

Q78 The lengthening must be created during phonetic implementation. Languages vary in the extent to which they allow lengthening in sonorant segments before voiced obstruents in the coda, Arabic being extremely reluctant and English extremely liberal in this respect (Kluender et al. 1988). If we were to interpret the duration differences as resulting from phonological duration distinctions, English would have to be analysed as having minimally a three-way quantity

opposition for vowels and sonorant consonants: one mora for the vowel in *bit* and two moras for [ɛn] in *sense*, two moras for the vowels in *bid* and *beat* and three [ɛn] in *sends* and [ein] in *saint*, and three moras for the vowel of *bead* and four for [i:n] in *scenes*. This is not a pretty analysis.

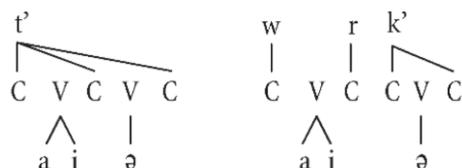
- Q79** When the assimilation produces a segment which is indistinguishable from [ʃ], it is reasonable to assume that the assimilation is phonological, i.e. that the features of the right-hand [ʃ] have spread to the left-hand consonant. However, where the assimilation results in a gradual shift from [s] to [ʃ], it is reasonable to describe it as the effect of phonetic implementation. In a gestural model, for instance, the tongue tip gesture for [s] could be shortened and/or that for [ʃ] be extended forward in time.

Chapter 9

- Q80** They all break the SYLLABLE CONTACT LAW.
- Q81**
1. First, the Amharic words have one, two or three syllables, while the disguised forms all have two. Second, the Amharic words have a variety of vowels, but the disguised forms always have [ai] and [ə], in that order.
 2. The consonants are preserved, but the vowels are not.
 3. The number of different consonants in the word. If there are at most two different consonants, there are three surface consonants in the disguised form, and if the number of different consonants in the word is three, there are four surface consonants in the disguised form.
 4. Use the template CVCVC if there are at most two different consonants, and CVCCVC if there are three. Associate the consonants to the C-slots, left-to-right, one-to-one, spreading the last. Associate [ai] and [ə] to the V-slots.
 5. In Arabic, adjacent C-slots and adjacent V-slots associate with the same

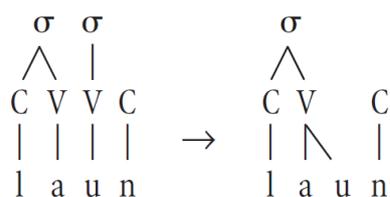
vowel or consonant, creating long vowels and geminates, but in this secret language adjacent C-slots are filled by different consonants if available.

6.

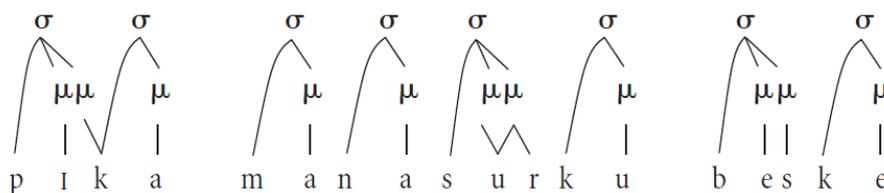


Q82 First, a V-slot associates with at most one vowel segment, which causes all diphthongs, which consist of two vowel segments, to be long. Second, association is left-to-right, one-to-one, only $[\tilde{i}a:]$ can arise from the association of $[\tilde{i}a]$ to VVV, never $[\tilde{i}:a]$.

Q83 Together with its syllable node, a word-initial V-slot is deleted if associated with a high vowel after a V-slot. The high vowel re-associates leftward with the V-slot on the left, creating a diphthong, as shown below for the relevant structure in *catalá universal*. The transcriptions with consonantal glides indicate the non-syllabic nature of the remaining vowel.

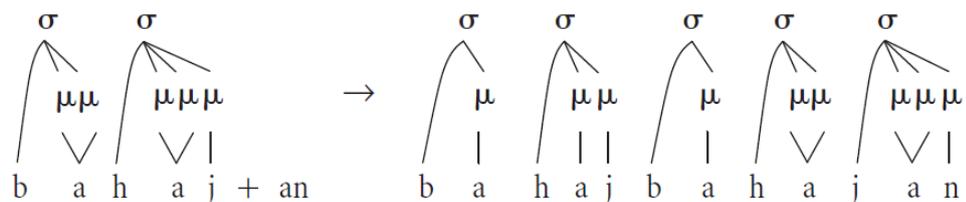


Q84 Since the Koya syllable has maximally two moras and has WEIGHT-BY-POSITION, these structures must be as given below.



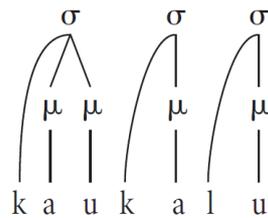
Q85 This is determined by the number of moras in the prefinal syllable. If there is one, the following schwa is deleted. Tera must have moraic consonants, since otherwise this generalization could not equate short vowels-plus-coda consonants with long vowels.

- Q86**
1. All syllables that are not stem-final are short, regardless of whether they were short in the stem, as in (b), (d) and (e), or long, as in (a), (c), (e) and (f).
 2. The vowel in the stem-final syllable is long if its syllable has no coda, but short if it does.
 3. In a moraic representation we can say that stem-final syllables have two moras. The adjustment of the vowel duration then follows from the presence of the moraic stem-final consonant. For the word-final syllable, we can either assume these are obligatorily trimoraic, forcing the vowel to be long, or that they obligatorily have a long vowel, in which case the final consonant is non-moraic. Assuming the first option, here are the structures for ‘house’ and ‘doll house’:



With a CV-tier, the equivalence of the rhymes in the stem-final syllables is less easily expressed, because the first occurrence would be VC and the second VV. This case represents the same type of argument against the CV-tier as the one given in the text on the basis of compensatory lengthening.

Q87 1.



2. Regardless of their ranking, the three constraints will select [kau.ka.lu] as the winner, as shown by the tableau. Because ONSET and DEP(σ) are unranked, as indicated by the dotted column separation lines, we cannot determine for which of these constraints [a.lu.ka.lu] incurs its fatal violation, which is why they are both indicated as fatal. For the same reason, the shading of cells is suspended (see (22) in chapter 4).

	ONSET	DEP(σ)	MAX(μ)
$\mu\mu$ kalu k a l u			
☞ kau.ka.lu		*	
au.ka.lu	*!	*	
a.lu.ka.lu	*!	**!	
ka.lu.ka.lu		**i	
ka.ka.lu		*	*!

3. A constraint that discriminates between [a.θoa.θo] and *[θoo.a.θo] is ALIGN-STEM-LEFT, which requires the first segment of the input to correspond with the first segment of the output, parallel to ALIGN-STEM-RIGHT, as discussed in section 4.5 for Konjo. Since the first segment in *[θoo.a.θo] ([θ]) obviously doesn't correspond to the first segment /a/ in /aθo + a.θo/, it incurs a violation for that constraint. It doesn't matter how ALIGN-STEM-LEFT is ranked relative to the other three. The indications of fatal violations again ignore ranking.

	ONSET	DEP(σ)	MAX(μ)	ALSTEMLEFT
☞ a.θoa.θo	*	*		
a.θa.θo	*	*	*!	
a.θo.a.θo	**!	**!		
θoo.a.θo	*	*		*!

4. The reduplicated form of [ko.kao] would be [koa.ko.kao], which form satisfies ONSET, MAX(μ) and ALIGN-STEM-LEFT, while not violating DEP(σ) more than is needed to preserve RED. Note that the order of the segments is as in the input /kokao + kokao/. The constraint LINEARITY was proposed by Prince & Smolensky (1993) to make this explicit.

Q88 A rule-based account that does not refer to the syllable would have to say that [COR,+approx] is [-cons] in the context before a word boundary or before a consonant, like

$$\left[\begin{array}{c} \text{COR} \\ +\text{approx} \end{array} \right] \rightarrow [-\text{cons}] / _ \left\{ \begin{array}{l} \# \\ \text{C} \end{array} \right.$$

The disjunction ‘either a consonant or a word boundary’ is unnecessary if the syllable coda can be referred to.

Q89 1. In the words in I and III, /r/ is ambisyllabic. For the words in I this is because it occurs internally within a foot, opening a weak syllable (RIGHT CAPTURE), while in III it is because the next word is vowel-initial (LIAISON). It is ambisyllabicity that thus explains the occurrence of the flap.

2. Following Harris (2004), yes. Word-initially and foot-initially /r/ is realized as approximant [ɹ]. Elsewhere is it either [ɹ] or [r].

Q90 1. If the BP rhyme is maximally bimoraic and [ɲ] is ambisyllabic, this consonant will occupy the second mora of the syllable it closes, meaning that

there is no room for the second element of a diphthong.

2. We assume that, as in English, foot-internal syllable-initial consonants (e.g. [ˈsɪnu]) are made ambisyllabic, and thus contrast structurally with foot-initial consonants (e.g. [boˈneka]).
3. We can then say that vowels nasalize before nasal consonants within their rhyme.
4. This solution accounts for the fact that all vowels nasalize before [ŋ], because it is ambisyllabic regardless of whether it is foot-initial or foot-internal.

Chapter 10

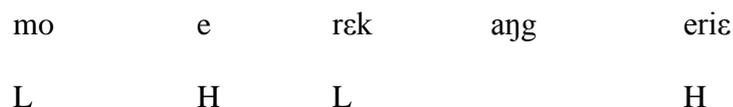
- Q91** 1. In English, changing the pitch on *Jonathan* from (2a) to (2b) changes the way in which the speaker intends the hearer to integrate the communication in their conversation. For instance, (2b) might be an opening move in a conversation, while (2a) might be the answer to a question. The word itself is one of many proper names available for labelling a male person, which is its meaning, something which doesn't change when going from (2a) to (2b). The statement is too vague to be properly evaluated. If 'meaning' is read as 'interpretation', it is clearly wrong. If it refers to word meaning, it gets closer to what is meant.
2. When we change the vowel in the English word *tail* from [eɪ] to [aɪ], we don't change its meaning. We do get a different word, *tile*. The same is true for pitch.
 3. In itself, the statement is correct, if it means that German has front rounded vowels. There is of course room for discussion. We might wonder whether the sole existence of a derived front rounded vowel, by either a lexical or a post-lexical rule, is enough to characterize a language as a front rounded vowel language. The point of the statement, which was made by Larry Hyman in a

2013 talk on language typology at Oxford University, is of course to show how classifying languages is not a fruitful typological enterprise. Many languages would belong to many types. Another way of saying this is that the task for the linguist is to identify phonological properties and then see languages as conglomerates of these properties. This activity will naturally lead to research questions on why certain features would appear to go together, or what causes certain properties to be frequent or rare, or what circumstances might promote their existence.

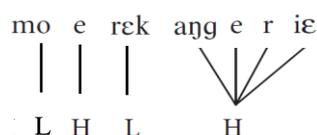
- Q92**
1. H, L, HL, LH, LHL
 2. When LHL occurs with a single syllable, as in the case of the word for ‘companion’, all three tones are pronounced. Unlike Etung, therefore, the language does not obey the No Crowding Constraint in (9).



- Q93**
1. The underlying tone pattern for both words is LH.
 2. The association in Tharaka must not start with the second TBU, but with the first.
 3. The Tharaka word for ‘way of releasing oneself quickly’ will be realized as [mòérékánǵeríé]. The underlying representation



will be realized as



- Q94** 1. The word [amakosi] will be realized as [ámàkòsǐ]. After the initial lexically specified association, the following structure obtains.

ama kosi
 | /
 H L HL

which by the ASSOCIATION CONVENTION (7a and 7b) will be changed into

ama kosi
 | | / /
 H L HL

2. Part (c) of the ASSOCIATION CONVENTION (7) cannot apply, because contour tones on short vowels are disallowed in Zulu. Thus, *[ámàkòsǐ] is ruled out, and final L will be deleted.

- Q95** 1. It is the mora, since long vowels have two tones (contour tones) and short vowels one.

2. akivara ataasiq akivaa
 | | | | | | | | |
 H L H HLH H LH
 ‘I answered him’ ‘one’ ‘he answered him’

3. The direction of association is right-to-left. The location of the leftmost H can only be determined with reference to the right word edge.

4. apirai apiraaí
 | | | | | |
 H LH HLH
 ‘He asked them’ ‘Did he ask them?’

5. Since in the last two syllables there are four TBUs and three tones, the leftmost H must spread to an extra TBU on the left if it occurs in the same syllable.
6. Right-to-left, as shown by the interrogative form of j., where the final syllable has [a:i], not *[ai:]. After the addition of a mora, [i] and [a] associate with the final two moras, with leftward spreading of [a].

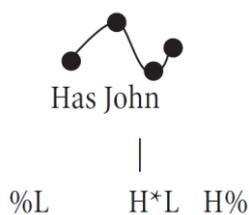
- Q96** 1. In the Bakwiri word game, the segments of the second syllable are exchanged with those of the first. The location of tonal and moraic structure is unchanged, however. [ndàkóó] therefore becomes [kòndáá].
2. In [lùùṅgá] a long vowel occurs in the first syllable, but [líóβá] has two different vowels in the same syllable.
3. The word for ‘door’ has a short (monomoraic) second syllable, and only one of the two vowels can be moraic. The game form must therefore either be [βààlíw] or [βààljó]. The first of these must be excluded because the language has no codas.
4. The glottal stops are apparently there because the syllables concerned begin with a vowel. The glottal stops are more perceptible word-internally than at the beginning of a word, which is why transcriptions often leave them out in word-initial position. Note that not all languages will separate adjacent heterosyllabic vowels by means of a glottal stop, but keep the voicing going, making the two vowels sound like a diphthong or a long vowel.
- Q97** In Kinshingelo, the segment strings in the last two *syllables* of the *word* are reversed, while the *tonal* and moraic (*timing*) structure remain intact. Obviously, this operation cannot be carried out without reference to these elements of the phonological representation, which must for that reason exist.
- Q98** Example (19f) shows that the mora is the TBU. Like many languages, Kalabari does not associate more than one tone to a TBU, and to salvage both tones, monosyllabic intransitive verbs must have a long vowel.
2. The intransitive melody is associated from the right, one-to-one, as suggested by (19d,e), where the first two syllables share the L.

Q99 [ikpa] would have a single L. On the assumption that the OCP remains in force after REDUPLICATION, the sequence of two L-tones in the reduplicated form would be reduced to a single one, which is associated with as many TBUs as remain in the word. There would thus be no need for the TWIN SISTER CONVENTION to operate.

Q100 1. hee jai wai kuma
 ||\ ||\
 HL LH
 ‘shaman’ ‘glutinous fish stew’

2. There are two arguments. One is that the entire tone melody of the possessive copies onto the stem. If we assumed tone strings, H in (a), HL in (b) and LH in (c), we would expect the final tone to spread onto the stem. In (a), we might still think that the H of the possessive spreads onto the stem, but (b) shows the HL melody, rather than a spread L. The second argument is that the copying generalization abstracts away from the unaccented first syllable. That is, the initial L of [jɨ́] is not copied along with the H-melody we see on the stem, and when the stem has an initial L, it is not overwritten, but retained, as shown in (d), (e) and (f). If we say that the melody is inserted into the accented syllable, the first in (a), (b) and (c) and the second in (d), (e) and (f), all is well.

Q101 After a low-pitched beginning of *Has*, due to %L, there is a rise to the beginning of the syllable *John*, where a falling-rising pitch movement occurs. The pitch accent H*L and the boundary H% are pronounced in the same syllable, as shown in



- Q102** The fact that H spreads to all syllables, and never to only some, suggests that a single L-tone is responsible for the low-toned syllables. When it is deleted, all TBUs with which it was associated will associate with H.
- Q103** Masculine nouns have a H-tone on the penultimate mora and feminine nouns on the final mora. Toneless moras are provided with L.
- Q104** 1. If the glides were onset consonants, a five-way contrast would be expected. The three-way contrast suggests that the other option is correct, meaning that the glides form the beginning of the rhyme.
2. Since the language has an onset /fi/ after which the lower set L, ML and LH occur (see text), the higher set H, HL and LH would be expected to occur after an empty onset. This is correct. Since empty onsets don't consistently have a glottal stop, the distributional difference will help to make the distinction between /fi/ and Ø (i.e., no onset) more perceptible.
1. Onsetless /i/ will combine with the three higher tone melodies H, HL and LH, just like glide-initial rhymes. As it happens, all three happen to be words. With H, /i/ is 'doctor', with HL 'to cure' and with LH 'skin of e.g. peanut'.
- Q105** 1. The association of a tone is a temporal link with a TBU, causing the tone to be pronounced during or very near that TBU, depending on the detailed phonetic alignment of the language. Phonological alignment is the specification of an edge defining the tone's position in the structure. The H in (1a) aligns with the right edge of the IP and associates with the penultimate syllable. There is no reason why the H should first associate with all the syllables to the right of its underlying position in the first syllable and then be delinked from all of them except from the penultimate syllable.

2. There must be a higher-ranking constraint which prevents it from association with the final syllable. This may be because it reserved for an intonational boundary tone, such that the penultimate syllable is the next best, the next rightmost. Volk (2011) assumes the penultimate syllable is stressed, causing it to gain a mora and to attract the H-tone to the second mora. Since not all varieties of the language lengthen the penultimate syllable, the assumption of a boundary tone on the last syllable may be the more general explanation.
3. The verb begins with a voiced obstruent. Implosives and voiced obstruents frequently repel high tones on syllables they open.
4. The final H in the IP will exceptionlessly associate with the penultimate syllable regardless of whether its onset is a voiced obstruent, as in /zi:/ in (1b).

Chapter 11

Q106 By using different symbols for the two vowels, A.C. Gimson made it explicit that he interpreted them as different segments, not as the same segment with an unstressed short allophone and a stressed long allophone. Daniel Jones' transcription might be argued to be ambiguous in this respect. It could be allophonic, with length being contextually determined by stress, or phonemic, if the length mark is taken to indicate a different vowel from [ə]. From the transcriptions of the other vowels in the inventory we know that both authors in fact considered them different segments, since they treated the difference between [ə] and [ə:] (or [ɜ:]) just like the evidently distinct lax and tense vowels, which both appear in stressed syllables: [i] (or [ɪ]) vs. [i:]. as in *bit* and *bead*, etc.).

- Q107** 1. [ána gú rúa tában tóru], [ána gú rúa tabán] and [taban tóru séme].
2. First, Nubi has no phonetic stress. Second, because of an accent deletion rule, the word prominence is not obligatory, even though all words potentially do have a single prominence.
- Q108** Because closed word-initial syllables are not reduced, a diagnostic for stress in English, while open ones do, a diagnostic for stresslessness, closed syllables can be feet by themselves. Thus, *canteen* and *Santana* have degenerate feet, while *banana* and *Sinatra* have stray initial syllables (cf. Pierrehumbert & Beckman 1988: 148). Contrasts arise in the standard varieties because of the stresslessness of ‘Latin prefixes’, as in *contain* ([kən]) vs *canteen* ([kæn]).
- Q109** 1. A left-edge trochee would incorrectly predict initial stress in (b) and (c), while a right-edge trochee would incorrectly predict penultimate stress in (a).
2. With a left-edge iamb, penultimate stress is predicted in any event, so that the fact that the penult is closed tells us nothing about quantity-sensitivity.
- Q110** 1. In (a) and (b), there is a stray syllable at the right word edge, resulting in antepenultimate main stress, while in (c), with its even number of syllables, the footing is exhaustive, leading to penultimate main stress.
2. The heavy first syllable appears to reject inclusion in the same foot with another syllable, even if it is light, as seen in (d) and (e). This supports Hayes’ rejection of the uneven trochee.
- Q111** To begin with, footing is from the right. A trochee or iamb from the left would never lead to main stress on the penult in (9c), which would be stray, because the final syllable is extrametrical. If [po] were allowed to be a degenerate foot and footing is from the left, it would not be clear why (9a,b) can’t have a degenerate second syllable, since both foot types would impose a single foot on

the first heavy syllable. A degenerate over the second syllable would have the word stress. A moraic trochee from the right would group [napo] into a foot in (9c), predicting antepenultimate stress. An iamb from the right is thus the only option. (9a,b) have an initial monosyllabic iamb, because a disyllabic iamb cannot be formed with a heavy weak syllable. Before the final syllable, cases (9c,d) have disyllabic iambs, while (9d,e) have monosyllabic iambs, all leading to penultimate main stress.

- Q112** 1. Stress systems have been widely reported to have a default stress location. By specifying all Sezer words for stress, the implicit claim is that within that group, there is no default stress location for those words. This has not so far been demonstrated.
2. According to Sezer (1983), stress is on the antepenultimate syllable if it is closed and the penult is open, and penultimate stress otherwise. Items (a) and (c) have penultimate stress, even though that syllable is open and the antepenult is closed, while item (e) has antepenultimate stress, even though both antepenult and penult are open.
3. The objection could be raised against phonological representations generally. We must neither include non-English segments like [qø] in an English affix nor create non-existing stress patterns. The assumption is that phonological systems are subject to a grammar which successfully excludes [qø] and impossible tones or stress patterns. In Optimality Theory, this property of grammars is known as **Richness of the Base**. Characterizations of well-formedness are ideally a by-product of successful grammars. If all is well, they will reject any ill-formed output, without discriminating between monomorphemic and morphologically derived words (cf the Duplication Problem, section 4.5) (Özşelik 2014).

- Q113** The domain of the obligatory occurrence of [ŋ] is the foot. That is, if the nasal and the dorsal consonant are within the same foot, as in ['(ŋ).krə).mənt], the nasal is obligatorily realized as [ŋ], whereas if they are not, as in the verb [m.'(kri:s)] or the noun ['(m).,(kri:s)], the nasal is realized as either [n] or [ŋ].
- Q114** 1. The inclusion of [pər] in the pitch level of [nɑxt] suggests that [pər] is unstressed, and thus a stray word-initial syllable. A stressed syllable, like [va:], will begin a new pitch level.
2. Dutch [fɪ] is not realized in foot-medial position.ε
- Q115** 1. Unexceptional stress on the last syllable is obtained by a right-edge iamb. The presence of a coda consonant in the last syllable makes no difference to stress location, from which we may non-crucially conclude that the coda is not moraic.
2. Within the foot, tone does not vary; tone must spread within its domain. Since feet are maximally binary, an antepenultimate syllable will not obligatorily have the same tone as the tone of the penultimate and ultimate syllables, as shown by items (r)-(t). The surface form of (r) is [(ká).(lè.'sù)], for example.
3. Voiceless plosives exclusively occur in feet with H and voiced plosives exclusively in feet with L. One analysis would assume that plosive voicing is determined by tone, in which case [b d g] and [p t k] are allophones of plosives that are unspecified for [±voice]. The second analysis would have it that tone is only contrastive in feet without plosives, in which case voicing in plosives is contrastive and determines tone. This second solution is considerably less plausible than the first. It would imply, first, that the distribution of plosives is subject to [±voice]-agreement within the foot (cf. item (t), *[ká.gà.'tón] *[ká.ká.'dòŋ]), which suspiciously mimics the tone restriction; second, that tone

spreads both left to right (cf. items (k), (l), (q) and (s)) and right to left within the foot (cf. items (m), (n), (p) and (t)); and third, that in the case of left-to-right spreading, as in (k), (l), (q) and (s), an unstressed syllable would impose the voicing of plosives as well as its tone on a stressed syllable. Apart from the complicated nature of the analysis, this last property goes against the general finding that stressed syllables have more contrasts than unstressed ones (section 11.1). The first analysis is therefore to be preferred. Observe that the situation in Shanghai Wu glottal rimes is not directly comparable to the rejected analysis for Yabem, since there the relation is strictly between onsets and rimes in the same syllable (section 10.9).

4. It is the prefix [ká], whereby the underlying form has a velar plosive with no specification for [\pm voice]. Let's indicate that as /Ká/.

5. On the basis of the conclusions in the above answers, the prefixed forms /Ká-Kún/ and /Ká-Kùn/ will be footed as iambs, whereby the tone of the strong syllable will spread to the weak, deleting the original tone. This gives [(ká.'kún)] for 'I called out' and [(gà.'gùn)] for 'I speared something'. These are in fact the Yabem forms.

Q116 1. Short-voweled closed syllables are bimoraic if Coda- μ has its way and monomoraic otherwise, but there is no way in which long vowels can opt out of being bimoraic.

2. To prevent degenerate feet, FTBIN \gg PARSE- σ . However, regardless of this choice, there is no way of stopping WSP from selecting the candidate with stress on the penult, as shown below. To enforce the selection of candidate (d) over (c), a constraint can be used to require the alignment of the left word edge

with a foot. If $\text{PARSE-}\sigma \gg \text{FTBIN}$ is assumed, the selection of candidate (b) over candidate (a) can be enforced by a constraint which requires all feet to be as close as possible to the left word edge. These two types of alignment constraints, which must outrank WSP, are discussed in the next section.

ta.lob.bo	FTBIN	PARSE- σ	WSP
a. (ta).(lob.bo)	*!		
b. (ta.lob).(bo)	*!		*
⊖ c. ta.(lob.bo)		*	
d. (ta.lob).bo		*	*

- Q117** 1. The word has is an even number of syllables, causing exhaustive bisyllabic footing.
- 2.

ŋan.ki.ri.ki.rim.pa.ji	FT BIN	PARSE- σ	ALIGN (ω ,FT,L)	ALIGN (FT, ω ,R)	ALIGN (ω ,FT,R)	ALIGN (FT, ω ,L)
a. ('ŋan.ki)(,ri.ki)(,rim.pa),ji		*		σσσσ#, σσσ#!, σ#	σ#	#σσσσ, #σσ
b. ('ŋan.ki)(,ri.ki).rim.(,pa.ji)		*		σσσσ#, σσσ#!		#σσσσσ, #σσ
⊖ c. ('ŋan.ki).ri.(,ki.rim).(,pa.ji)		*		σσσσ#, σσ#		#σσσσσ, #σσσ

- Q118** 1. The form [,a.ta ,ta.wa . 'ha.ke] cannot be derived with the help of an iamb. For one thing, an iambic parse will put the first syllable in a weak position.
2. $\text{FTBIN} \gg \text{PARSE-}\sigma$, so that monosyllables at the word edge are stray. $\text{ALIGN (FT},\omega,\text{R}) \gg \text{ALIGN (FT},\omega,\text{L})$, so that the stray syllable occurs at the left word edge. Beyond that, these constraints are unranked.

	a.ta.ta.wa.ha	FTBIN	ALIGN (FT, ω ,R)	PARSE- σ	ALIGN (FT, ω ,L)
a.	a.(,ta.ta).('wa.ha)		$\sigma\sigma\#$	*	$\sigma\sigma\sigma\#$
b.	(,a).(,ta.ta).('wa.ha)	*!	$\sigma\sigma\sigma\#$, $\sigma\sigma\#$		$\sigma\sigma\sigma\#$, $\sigma\#$
c.	(,a.ta).('ta.wa).ha		$\sigma\sigma\sigma\#!$, $\sigma\#$	*	$\sigma\sigma\#$
d.	(,a.ta).(,ta.wa).('ha)	*!	$\sigma\sigma\sigma\#$, $\sigma\#$		$\sigma\sigma\sigma\sigma\#$, $\sigma\sigma\#$

Q119 1. Item (a) cannot be parsed as a trochee. Even if longer forms with final main stress were forced by PARSE- σ into a trochaic structure, as in *[(,ak.to).('pa)], [i.fa] would incorrectly be predicted to be *[('i.fa)]. Neither could (d) be derived with a trochee.

2. Creek is quantity-sensitive, as shown by the secondary stress on the first syllable, which refuses to be a weak branch, as in rejected candidate (d). The form also shows that codas are moraic, candidate (b) being ungrammatical. ALIGN(FT, ω ,L) decides the fates of candidates (a), (c) and, along with PARSE- σ , candidate (e). If ALIGN(FT, ω ,R) were to outrank ALIGN(FT, ω ,L), candidate (c) would be the winner.

	al.pa.to.ci	WSP	CODA- μ	PARSE- σ	ALIGN (FT, ω ,L)	ALIGN (FT, ω ,R)
a.	(,al ^μ). (pa.'to).ci			*	# σ	$\sigma\sigma\sigma\#$, $\sigma\#$
b.	(al.,pa).(to.'ci)		*!	*	# $\sigma\sigma$	$\sigma\sigma\#$
c.	(,al ^μ).pa.(to.'ci)			*	# $\sigma\sigma\!$	$\sigma\sigma\sigma\#$
d.	(al ^μ .'pa).(to.'ci)	*!			# $\sigma\sigma$	$\sigma\sigma\#$
e.	(,al ^μ).pa.('to).ci			**!	# $\sigma\sigma\!$	$\sigma\sigma\sigma\#$

- Q120** 1. Wolof is quantity-sensitive, because the location of stressed syllable depends on the quantity of the vowels in the first two syllables.
2. It is trochaic, in view of the initial stress in words with short vowels in the first two syllables, like (d).
3. Item (i) shows that coda consonants are not moraic. If the first two syllables are bimoraic, as they are in (f), stress on the first syllable results. Since geminates are represented as moraic, the first syllable of [deg. 'goo] will have to be bimoraic, which incorrectly predicts *['deg.goo]. The unexpected peninitial stress may indicate that geminates are not in fact moraic in Wolof. If so, they could be distinguished from singletons by being directly associated with the rime of the first syllable, just as a singleton coda consonant is, while additionally having an association as an onset in the second syllable.
- Q121** In view of the fact that in the polysyllabic data no final vowel deletion has taken place, the more likely scenario is that monosyllabic words acquired a second syllable with minimally distinct segments from the first. This can be interpreted as a way of avoiding a poor segmental basis for the realization of tones, while it may also fulfill a minimal word condition for the language.

Chapter 12

- Q122** 1. BINARY must rank below ALIGNFOC, which makes the violation of BINARY unavoidable.
2. When *liburua* is the focus constituent, a ϕ -boundary must appear before it. Lower-ranking BINARY will now make itself felt again by forcing *Amaiari* and *amumen* to occur in the same ϕ , despite the requirement of lowest-ranking ALIGNXP that there must be a ϕ -boundary before the XP *amumen liburua*. With *liburua* as the focus constituent, the prosodic structure will be ϕ (*Amaiari*

amumen)_φ *(liburua)*_φ *(emon dotzo)*_φ.

Q123 The φ-structures are

(1) φ(I was explaining)_φ φ(to the students)_φ φ(the problem)_φ φ(of the double negation)_φ
φ(in English)_φ

(2) φ(I was explaining)_φ φ(to the students)_φ φ(the problem)_φ

Example (2) is ungrammatical because a condition on HEAVY NP SHIFT is that the NP that is moved must contain minimally two ωs, and in (2) it contains only one, *the problem*.

Q124 In *This is represented in (6)*, the adverbial phrase *in six* can be included with its verb *represented* in the same φ, a case of restructuring, because the next constituent is a single phonological word *in six*, where *in* is a function word and as such a weak syllable. As a result, the stress pattern of *rèprésénted* changes to *réprésènted* before *six* in the same φ. However, in *This is represented in (6a)*, the adverbial *in six a* consists of two phonological words, *in six* and *a*. As a result, it is not included in the same φ as *represented*, so that the rhythm rule cannot apply.

Q125 In the examples in (1), the vowel is the first segment of a lexical category N or Adj. As a result, it begins an ω, causing the preceding [s] to be in a different ω. Incidentally, this domain juncture rule will require that the two ωs occur in the same IP.

Chapter 13

Q126 1. Rule 1 could be termed VOICED PLOSIVE DELETION, rule 2 POST-NASAL VOICING and rule 3 PLACE ASSIMILATION, but more or less explicit names would also be correct.

2.	/n-gomo/	/n-kuja/
(1) VOICED PLOSIVE DELETION	nomo	<i>n.a.</i>
(2) POST-NASAL VOICING	<i>n.a.</i>	ŋguja
(3) PLACE ASSIMILATION	<i>n.a.</i>	ŋguja
	*[nomo]	[ŋguja]
	/n-gomo/	/n-kuja/
(1) VOICED PLOSIVE DELETION	nomo	<i>n.a.</i>
(3) PLACE ASSIMILATION	<i>n.a.</i>	ŋuja
(2) POST-NASAL VOICING	<i>n.a.</i>	ŋuja
	*[nomo]	[ŋguja]
	/n-gomo/	/n-kuja/
(2) POST-NASAL VOICING	<i>n.a.</i>	ŋguja
(1) VOICED PLOSIVE DELETION	nomo	nuja
(3) PLACE-ASSIMILATION	<i>n.a.</i>	<i>n.a.</i>
	*[nomo]	*[nuja]
	/n-gomo/	/n-kuja/
(2) POST-NASAL VOICING	<i>n.a.</i>	ŋguja
(3) PLACE ASSIMILATION	ŋgomo	ŋguja
(1) VOICED PLOSIVE DELETION	ŋomo	ŋuja
	[ŋomo]	*[ŋuja]

	/n-gomo/	/n-kuja/
(3) PLACE ASSIMILATION	ŋgomo	ŋkuja
(2) POST-NASAL VOICING	<i>n.a.</i>	ŋguja
(1) VOICED PLOSIVE DELETION	ŋomo	ŋuja
	[ŋomo]	*[ŋuja]
	/n-gomo/	/n-kuja/
(3) PLACE ASSIMILATION	ŋgowo	ŋkuja
(1) VOICED PLOSIVE DELETION	ŋomo	ŋkuja
(2) POST-NASAL VOICING	<i>n.a.</i>	ŋguja
	[ŋomo]	[ŋguja]

Only the last order derives the correct surface forms [ŋomo] and [ŋguja].

Q127 1. PROGRESSIVE DEVOICING should devoice fricatives after a voiceless obstruent and REGRESSIVE VOICING should voice obstruents preceding a voiced plosive. The order depends in part on how explicit the formulation of the rules is. With the least explicit formulations, the order is FINAL DEVOICING, PROGRESSIVE DEVOICING, REGRESSIVE VOICING and DEGEMINATION.

2. PROGRESSIVE DEVOICING $\left[\begin{array}{l} + \text{cont} \\ - \text{son} \end{array} \right] \rightarrow [-\text{voice}] / [-\text{voice}] (\#) \text{ —}$

REGRESSIVE VOICING $[-\text{son}] \rightarrow [+ \text{voice}] / \text{ —} (\#) \left[\begin{array}{l} - \text{cont} \\ + \text{voice} \end{array} \right]$

It is unnecessary to specify the focus of PROGRESSIVE DEVOICING as [+voice], since any [-voice] fricatives would retain their specification as [-voice]. That is, the rule would apply without effecting a change, i.e. vacuously. Second, in the right-hand context of REGRESSIVE VOICING, [-son] could be specified instead

of [-cont], if we assume that PROGRESSIVE DEVOICING applies first, which rule leaves only voiced plosives behind in the context concerned.

3.	/vɑnd#te:χəl/	/lup#zœyvər/	/ka:z#za:k/
FINAL DEVOICING	vɑnt#te:χəl	<i>n.a.</i>	ka:s#za:k
PROGRESSIVE DEVOICING	<i>n.a.</i>	lup#sœyvər	ka:s#sa:k
REGRESSIVE VOICING	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>
DEGEMINATION	vɑn#te:χəl	<i>n.a.</i>	ka:#sa:k
	[vɑnte:χəl]	[lupsœyvər]	[ka:sa:k]
		/kɔp#bal/	/le:z#brɪl/
FINAL DEVOICING		<i>n.a.</i>	le:s#brɪl
PROGRESSIVE DEVOICING		<i>n.a.</i>	<i>n.a.</i>
REGRESSIVE VOICING		kɔb#bal	le:z#brɪl
DEGEMINATION		kɔ#bal	<i>n.a.</i>
		[kɔbal]	[le:zbrɪl]

Q128 In Kaatsheuvel Dutch, the diminutive form of the river *Linge* will be [lɪŋəkə], given that the final schwa, contrary to the epenthetic schwa, is already present when s-INSERTION (21) applies.

Q129 The rules FLAPPING and PRE-FORTIS-CLIPPING stand in a counterbleeding order. The reverse order would decrease the number of forms to which PRE-FORTIS-CLIPPING (8) could apply.

Q130 The tableau below shows how plosives in intervocalic position, whether voiced or voiceless in the input, are wrongly predicted to be voiceless in the output.

/la gana/	SPIRANTIZATION	IDENT(CONT)	VOICING	IDENT(VOICE)
a. la gana	*!			
⊗ b. la kana			*	*
c. la yana		*!		
/la kama/	SPIRANTIZATION	IDENT(CONT)	VOICING	IDENT(VOICE)
d. la gama	*!			*
⊗ e. la kama			*	
f. la yama		*!		*

Q131 The tableau below shows how [pana] is incorrectly characterized as optimal.

/pan-æ/	PALATALIZATION	IDENT(ANTERIOR)	æ-BACKING	IDENT(BACK)
a. panæ	*!		*	
b. paɲæ		*!	*	
⊗ c. pana				*
d. paɲa		*!		*

Q132 Level 1

/la gana/	IDENT(VOICE)	VOICING	SPIRANTIZATION	IDENT(CONT)
a. la gana			*!	
b. la kana	*!	*		
↻ c. la yana				*
/la kama/	IDENT(VOICE)	VOICING	SPIRANTIZATION	IDENT(CONT)
d. la gama	*!		*	
↻ e. la kama		*		
f. la yama	*!			*

Level 2

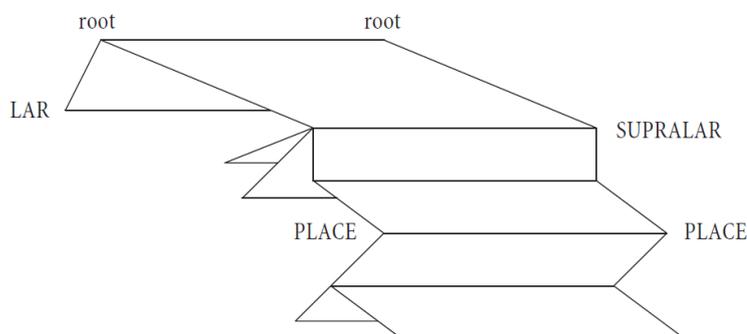
/la ɣana/	VOICING	IDENT(VOICE)	IDENT(CONT)	SPIRANTIZATION
a. la gana			*!	*
b. la kana	*!	*	*	
☞ c. la ɣana				
/la kama/	VOICING	IDENT(VOICE)	IDENT(CONT)	SPIRANTIZATION
☞ d. la gama		*		*
e. la kama	*!			*
f. la ɣama		*	*!	

Chapter 14

Q133 1. The [CORONAL] node spreads to the PLACE node of a preceding [t d n l] in English CORONAL ASSIMILATION .

2. The PLACE node spreads from the consonant to the SUPRALAR node of a preceding nasal in Hindi.

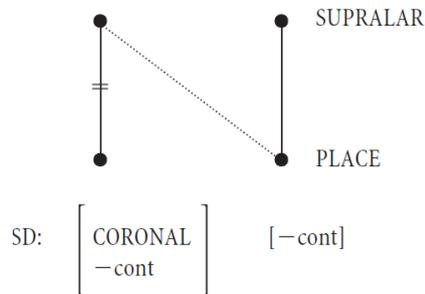
Q134 The picture you end up with should look as shown.



Q135 You cannot, because the place tier and the root tier are not adjacent, and hence do not define a plane.

Q136 Natural feature classes are non-abstract to the extent that the nodes in a feature tree can be defined in phonetic terms. For instance, the laryngeal node could phonetically be defined as ‘activity in the larynx’, the supralaryngeal node as ‘activity in the vocal tract’, etc.

Q137 English PLACE ASSIMILATION can be stated in the display format as follows:



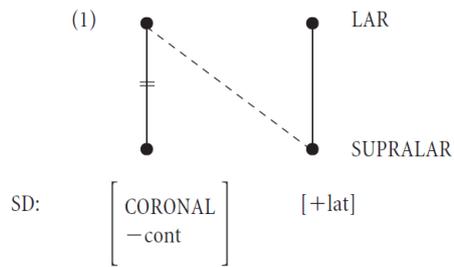
Q138 1. In order to account for the Yorkshire English and Durham English assimilation facts, we could assume the rules in (1) and (2).

(1) YORKSHIRE VOICELESSNESS ASSIM $[-\text{son}] \rightarrow [-\text{voice}] / _ \#\# [-\text{voice}]$

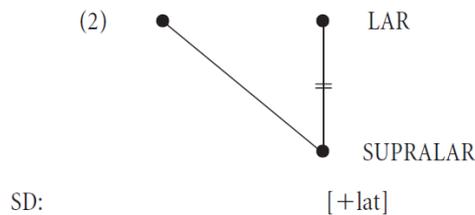
(2) DURHAM VOICING ASSIM $[-\text{son}] \rightarrow [+voice] / _ \#\# [+voice]$

2. Given that the feature $[-\text{voice}]$ needs to be referred to in the structural change and the structural description of YORKSHIRE VOICELESSNESS ASSIMILATION, it cannot be left unspecified and be filled in only at the end of the derivation.

Q139 Two ordered rules are necessary to derive the correct Klamath output forms. The first rule should spread the SUPRALARYNGEAL node of a lateral consonant to a preceding $[n]$ or $[l]$. The second rule should delink the supralaryngeal node of the lateral consonant, which, if it is specified as $[-\text{voice}]$ or as $[\text{+constricted}]$, will leave behind only its laryngeal specification, causing it to end up as $[h]$ or $[?]$. The rules can be formalized as (1) and (2) below.



We assume that in the case of [nl], rule (1) creates a geminate structure, as shown.



Rule (2) cannot apply to this structure, which will be supplied with the feature [+voice] by default.

Q140 1. The full representation for the four types of initial plosives is the following:

voiced	voiceless unaspirated	voiceless aspirated	preglottalized aspirated	voiced
$\left[\begin{array}{l} +\text{voice} \\ -\text{spread} \\ -\text{constr} \end{array} \right]$	$\left[\begin{array}{l} -\text{voice} \\ -\text{spread} \\ -\text{constr} \end{array} \right]$	$\left[\begin{array}{l} -\text{voice} \\ +\text{spread} \\ -\text{constr} \end{array} \right]$	$\left[\begin{array}{l} +\text{voice} \\ -\text{spread} \\ +\text{constr} \end{array} \right]$	

2. Assuming radical underspecification, the voiced plosives could be characterized by the presence of the feature [+voice] in the underlying representation, the voiceless aspirated plosives by [+spread] and the preglottalized voiced plosives by the feature combination [+voice,+constr]. The features [-voice], [-spread] and [-constr] could then be left unspecified, to be filled in by default rules.

3. The voiceless unaspirated plosives are left unspecified underlyingly. The neutralization of the coda plosives can be described with the help of a rule delinking [LAR].

Q141 1. NASALIZATION in Sundanese should transfer the nasality of a nasal consonant to any following vowel, but is blocked by any consonant, except when this is a laryngeal segment.

2. If the rule is formulated such that it spreads [+nas] from a nasal consonant to the SUPRALARYNGEAL node of a following vowel (V-position), it will be blocked by any segment that has a supralaryngealspecification. Since [h] and [ʔ] do not have a SUPRALARYNGEAL node, these segments are invisible for the spreading [+nas], and their transparency is straightforwardly accounted for..

Q142 1. One default rule needs to assign [-voice] to a stem-initial obstruent and one needs to assign [+voice] to an intervocalic obstruent.

2. The two [±voice]-melodies are [-voice] and [+voice][-voice]. Similar to the avoidance of the first TBU at the start of the tonal association in Kikuyu in chapter 10, the melodies cannot associate to a stem-initial obstruent. The features must not spread, because a [-voice] melody would produce ungrammatical forms like *[itupi] and [titupi] if it did.

3. Whereas [ʊdɔdɔ] does not have an underlying [±voice] melody, [ədəpigɔ] is specified for a [+voice][-voice] melody.

4. Underlying form	/TɔKɔ/	/TɔTɔKaKe/
		\
Melody association	[-voice]	[+voice][-voice]
	/Tɔkɔ/	/TɔdɔkaKe /
Default rules	[tɔkɔ]	[tɔdɔkage]

5. The form is not ungrammatical, because the second consonant in [kɔnɔpiɔ] is a sonorant and therefore not a [±voice]-bearing segment. The underlying [-voice] melody, skipping the stem-initial obstruent, will therefore be associated to the third consonant.

Q143 Yes, it does. If there is only one lexical floating [+ATR] feature, it must either be on the left or on the right of any occurrence of [-ATR] which is associated to a segment.

Q144 1. In Siansaksa, the initial (C)V-sequence of each of two adjacent words are exchanged. BACK HARMONY applies so as to spread the feature [±back] from left to right through the word, whereby the vowels [i] and [e] are transparent, neither undergoing nor imposing BACK HARMONY. For instance, exchanging [sa] and [hæ] in [saksalaisia hæty:tet:i:n] initially gives [hæ]-[ksalaisia] and [sa]-[ty:tet:i:n], which BACK HARMONY turns into [hæksælæisiæ satu:tet:i:n].

2. The analysis accounts for the fact that the first word in the game form in (a) is not *[hæksælæisiæ], because only the initial (C)V sequence is inverted and not the entire first syllable.

3. The analysis accounts for the fact that the second form in (a) is not *[satu:tet:i:n], because [a], being a back vowel in Finnish, will trigger BACK HARMONY, changing [y] into [u].

4. Because [i] is transparent, it neither undergoes nor imposes BACK HARMONY, which is why, in [hitsansa], the original back vowels remain back.

Q145 Complex segments like *[px] or *[dj] would require more than one specification for place and manner. Apparently, a segment cannot be a complex place segment and a manner-contour segment at the same time. Indeed, such representations would raise the question why the manner contour should not occur at both places of articulation, to give the non-existent complex segment *[bmgŋ]. Note that [ŋmkp] is well-formed.

Q146 The first consonant and the first vowel of a verb stem are reduplicated, as in [fafja], derived from [fja]. Since [fefle] and [kpokplo] are derived from the verbs stems [fle] and [kplo], respectively, it must be the case that while [fj-] and

[fl-] are clusters, [kp] is a single consonant, a complex place segment. Similarly, [ts] is a single segment in [tsitsi], from [tsi], because if [ts] were a cluster, the reduplicated form would be *[titsi].

- Q147** 1. [ʃ] is [-ant,-distr], [ç] is [-ant,+distr], while [s] is [+ant], without contrasting for [±distr]. Lee-Kim (2014) describes [s] as dentalized, so that [+distr] may be the redundant specification. Incidentally, the same three-way place contrast and co-occurrence restrictions with [i] exist for the unaspirated and aspirated CORONAL affricates.
2. The segment in the nucleus can be described by spreading the PLACE node of the onset fricative to the empty SUPRALAR node of the segment in the nucleus. Since [-cons] implies [+approx] (section 5.4) and [+son] implies [+voice], those two features can be supplied by default.
3. In the feature model presented in chapter 6, vowels are minimally described in terms of a specification of DORSAL, while [ɹ ɹ̥] are [-cons,+son] segments with a CORONAL specification. On the basis of that difference in the specification of articulation place, it could be argued that [ɹ ɹ̥] are unlike vowels, and thus phonological consonants.
4. In the feature model of chapter 6, [j] is [COR,-ant,-distr] and [i] is [DORSAL,+high,-back,-round]. This predicts that languages may contrast [j] and [i], in the margin as well as in the nucleus of the syllable. A different feature model was introduced in section 14.6.2, where [i] and [j] have the same CORONAL-DORSAL place specification. This predicts that [i] and [j] are distinguished solely on the basis of their position in the syllable. Languages that do contrast [i] and [j] in identical syllable positions do exist, even though they are rare. The more common case is illustrated in (22) in chapter 9. The less frequent contrastive case exists in Limburgish dialects in which [i] and [j]

contrast in the second mora, as in Maastricht Limburgish [hæjs] ‘glove’ and [heis] ‘hoist’. In Zwara Berber, [j] and [i] as well as [w] and [u] contrast in the monomoraic nucleus (Gussenhoven 2017). And in Korean, [j w] behave like vowels for the choice of allophone of a preceding /l/, as in /il+wʌl sam+il/ [i.rwʌl sa.mil] ‘January 3’, even though they do not contrast with consonantal semivowels (Lee 1993). To accommodate languages with contrasts between semivowels and vowels in the same syllable position, we could increase the feature inventory to characterize the two types of sounds. To account for contrasts between [w] and [u], along that between [j] and [i], Padgett (2008) introduced a feature [\pm vocalic], which is independent of [\pm consonantal]. This will allow [+vocalic, –cons] to appear in either the syllable margin or in the nucleus, giving a contrastively non-syllabic [i] by the side of [j], just as it will allow [–vocalic,–cons] segments to appear in both of those positions, giving a contrastively syllabic [w] by the side of [u].

5. Since [w] is a LABIAL-VELAR segment, as is [u], in chapter 6 as well as in section 14.6.2, the feature representation we have adopted predicts that that they differ only by virtue of their position in the syllable. To accommodate languages in which they contrast in the same position, like Zwara Berber, Padgett’s solution will need to be adopted. Note that without this enlarged feature set, contrasts between [u] and a LABIAL approximant ([β]) or [u] and a VELAR approximant ([u]) are of course already describable.

- Q148** 1. If the two suffixes did not have different underlying forms, they would be realized identically in their unassimilated form in the (a) examples.
2. The dental consonants in the third column are [COR,+ant,+distr], the alveolar ones in the fourth column are [COR,+ant,–distr], while the palatoalveolar

consonants in the last column are [COR, –ant,+distr].

3. It is impossible to account for CORONAL HARMONY by leftward spreading of the [CORONAL] node to consonants unspecified for [CORONAL], because the transparent CORONAL consonants would incorrectly be assimilated, while the consonants that have a [CORONAL] node would incorrectly be left unassimilated, besides incorrectly blocking the spreading of the [CORONAL] node.

4. If it is assumed that laterals and [t d t'] are unspecified for [CORONAL] underlyingly, they will get a [CORONAL] node with the features [+ant,–distr] by a default rule. Before that happens, CORONAL HARMONY can spread the [CORONAL] node of the rightmost CORONAL consonant to preceding consonants that have a [CORONAL] node, delinking these nodes and spreading to the next consonant on the left if there is one.