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Chapter 1

pp. 13-14

Exercises

1. The following sentences contain verbs created from nouns in accordance with the process described in Section 2 of this chapter. Describe the meaning of each of these new verbs.
   a) We techno'd the night away.
   b) She dog-teamed her way across the Arctic.
   c) We MG'd to Oregon.
   d) You should Band-Aid that cut.
   e) He Tigered that putt.
   f) We Greyhounded to Columbus.
   g) We'll have to Ajax the sink.
   h) He Windexed the windows
   i) You should Clairol your hair.
   j) Let's carton the eggs.

2. Using the examples in the preceding exercise as a model, create five new verbs from nouns. Build a sentence around each of these new verbs to show its meaning.

3. Which of the following forms are possible words of English? Show the words to an acquaintance and see if you agree on your judgments.
   a) mbood   e) sproke
   b) frall   f) flube
   c) coofp   g) wordms
   d) ktleem   h) bsarn

5. Part of linguistic competence involves the ability to recognize whether novel utterances are acceptable. Consider the following sentences and determine which are possible sentences in English. For each unacceptable sentence, change the sentence to make it acceptable, and compare the two.
   a) Jason's mother left himself with nothing to eat.
   b) Miriam is eager to talk to.
   c) This is the man who I took a picture of.
   d) Colin made Jane a sandwich.
   e) Is the dog sleeping the bone again?
   f) Wayne prepared Zena a cake.
   g) Max cleaned the garden up.
   h) Max cleaned up the garden.
   i) Max cleaned up it.
   j) I desire you to leave.
   k) That you likes liver surprises me.

6. Consider the following sentences, each of which is acceptable to some speakers of English. Try to identify the prescriptive rules that are violated in each case.
   a) He don't know about the race.
   b) You was out when I called.
   c) There's twenty horses registered in the show.
   d) That window's broke, so be careful.
   e) Jim and me are gonna go campin' this weekend.
   f) Who did you come with?
   g) I seen the parade last week.
   h) He been lost in the woods for ten days.
   i) My car needs cleaned 'cause of all the rain.
   j) Julie ain't got none.
   k) Somebody left their book on the train.
   l) Murray hurt hisself in the game.

   What is the reaction of linguists to the claim that sentences of this sort are "wrong"?

Chapter 2 pp.

Exercises

1. In order to become more aware of the differences between spelling and pronunciation, answer the following questions about English spelling. (Refer to Section 1.)
   a) Find four words that show four alternative spellings of the sound [f].
   b) Find six words that have the letter <a> pronounced differently.
   c) Find four words in which different groups of letters represent only one sound.
   d) Find two words in which two different sounds are pronounced but not spelled out.

2. How many segments are there in the following words? (Refer to Section 1.2.)
   a) at
   b) math
   c) cure
   d) hopping
   e) psychology
   f) knowledge
   g) mailbox
   h) awesome

3. Is the first sound in each of the following words voiced or voiceless? (Refer to Section 2.1.)
   a) though
   b) thought
   c) form
   d) view
   e) zoom
   f) silk
   g) pan
   h) boat

i) huge   k) judge   m) when (*may vary*)   o) pneumatic
j) choose   l) buns   n) ghetto   p) winced

4. Using the words presented in question 3, state whether the last sound of each word is voiced or voiceless.

5. For each of the following pairs of sounds, state whether they have the same or a different place of articulation. Then identify the place of articulation for each sound. (Refer to Section 4.)
    a) [s] : [l]   e) [m] : [n]   i) [b] : [f]
    b) [k] : [ŋ]   f) [dʒ] : [ʃ]   j) [tʃ] : [dʒ]
    c) [p] : [g]   g) [f] : [h]   k) [s] : [v]
    d) [l] : [ɹ]   h) [w] : [j]   l) [θ] : [t]

6. For each of the following pairs of sounds, state whether they have the same or different manners of articulation. Then identify the manner of articulation for each sound. (Refer to Section 5.)
    a) [s] : [θ]   e) [l] : [t]   i) [ɹ] : [w]
    b) [k] : [g]   f) [ð] : [v]   j) [tʃ] : [dʒ]
    c) [w] : [j]   g) [tʃ] : [s]   k) [h] : [ʔ]
    d) [f] : [ʃ]   h) [m] : [ŋ]   l) [z] : [dʒ]

7. After each of the following articulatory descriptions, write the sound described in phonetic brackets. (Refer to Sections 4–6.)
    a) voiceless velar stop   e) voiced velar nasal
    b) voiced labiodental fricative   f) voiceless interdental fricative
    c) voiced alveopalatal affricate   g) high back rounded lax vowel
    d) voiced palatal glide   h) low front unrounded vowel

8. Which of the following pairs of words show the same vowel sound in your dialect? Mark each pair as *same* or *different*. Then transcribe the vowels of each word. (Refer to Section 6.)
    a) back   sat   h) hide   height
    b) cot   caught   i) least   heed
    c) bid   key   j) drug   cook
    d) luck   flick   k) sink   fit
    e) ooze   deuce   l) oak   own
    f) cot   court   m) pour   port
    g) fell   fail   n) mouse   cow

9. Using descriptive terms like *sibilant*, *fricative*, and so on, provide a single phonetic characteristic that all the segments in each group share. Try to avoid obvious answers such as "consonant" or "vowel." (Refer to Sections 4–6.) *Example:* [b d g u m j] are all voiced.
    a) [p t k g ʔ]   e) [ʌ ə ʊ a]   i) [l ɪ m n ŋ j w]
    b) [i e ɛ æ]   f) [h ʔ]   j) [t d l ɪ n s z]
    c) [tʃ ʒ ʃ dʒ]   g) [u o]
    d) [p b m f v]   h) [s z tʃ dʒ ʃ ʒ]

10. Transcribe the following sets of words. You may use these words to practice transcribing aspiration. (Refer to Sections 5.5 and 7.)

a) tog
b) kid
c) attain
d) despise
e) elbow
f) haul
g) juice
h) thimble
i) peel
j) stun
k) Oscar
l) cooler
m) sigh
n) hulk
o) explode
p) tube
q) spell
r) cord
s) accord
t) astound
u) pure
v) wheeze
w) remove
x) clinical

11. Using H, L, and association lines, transcribe the intonation of the following English phrases. Compare your results with the transcriptions of several classmates. Are they the same? If they aren't, discuss what aspects of intonation (such as emotion or speech context) might account for the differences in transcription. (Refer to Section 8.1.)

a) "Hi, Alice."
b) "Three people got off the bus at the last stop."
c) "My uncle likes to mountain climb."

12. Mark primary and (where present) secondary stresses on the following words. It is not necessary to transcribe them. (Refer to Section 8.3.)

a) sunny
b) banana
c) blackboard
d) Canada
e) (to) reject
f) arrive
g) defy
h) summary
i) Canadian
j) (a) reject
k) secret
l) exceed
m) summery
n) Canadianize
o) difficult

13. Find a fluent speaker of a language other than English and transcribe phonetically ten words of that language. If you encounter any sounds for which symbols are not found in this chapter, attempt to describe them in phonetic terms and then invent diacritics to help you transcribe them. (See Tables 2.28 and 2.29.)

14. Name the articulatory process responsible for the change from standard Spanish to the dialectal variant in each item below. (See Section 9.3.)

a) [poβre] → [proβe] (U.S. southwestern Spanish) 'poor'
b) [grasjas] → [grasja] (Caribbean Spanish) 'thank you'
c) [gatito] → [gatiko] (Costa Rican Spanish) 'kitty'
d) [karne] → [kanne] (Cuban Spanish) 'meat'
e) [pesos] → [pesọs] (Mexican Spanish) 'pesos'
f) [estomayo] → [estoɣamo] (U.S. southwestern Spanish) 'stomach'
g) [alβrisjas] → [aβrisjas] (U.S. southwestern Spanish) 'gift, reward'

15. Compare the careful speech and rapid speech pronunciations of the following English words and phrases. Then name the process or processes that make the rapid speech pronunciation different from the careful speech. Stress is omitted here. (Refer to Section 9.)

	Careful speech	Rapid speech
a) in my room	[ɪn maj ɹum]	[ɪm maj ɹum]
b) I see them	[aj si ðɛm]	[aj siəm]
c) I see him	[aj si hɪm]	[aj siəm]
d) within	[wɪθɪn]	[wɪðɪn]
e) balloons	[bəlunz]	[blunz]
f) careful	[kʰɛɹfʊl]	[kʰɛɹfl̩]
g) sit down	[sɪt dawn]	[sɪɾawn]
h) my advice	[maj ədvajs]	[maj əvajs]
i) Scotch tape	[skɑtʃ tʰejp]	[kʰɑtʃstejp]
j) protection	[pɹowtʰɛkʃn̩]	[pɹ̩tʰɛkʃn̩]
k) hand me that	[hænd mi ðæt]	[hæmiðæt]
l) Pam will miss you	[pæm wɪl mɪs ju]	[pæm̩mɪʃjə]

Appendix:
Hints for Solving Phonology Problems

The task of solving a phonology problem is made easier if certain facts presented in this chapter and summarized here are kept in mind. The data that we consider below are taken from Tagalog (Filipino), a language spoken in the Philippines.

1. In the following data, consider the phones [h] and [ʔ] and determine whether they contrast, or whether they are allophones of one phoneme.

a) kahon	'box'		d) ʔaɾi	'property'
b) haɾiʔ	'king'		e) humagos	'to paint'
c) ʔumagos	'to flow'			

   In order to determine whether the phones contrast, we begin by looking for minimal pairs. These establish which segments are contrastive. For example, in the data in a) through e), a minimal pair occurs in items c–e; b–d is a near-minimal pair. The existence of minimal and near-minimal pairs of words indicates that [h] and [ʔ] contrast. Therefore we can conclude that /h/ and /ʔ/ are separate phonemes.

2. Now consider the following data, and determine whether the two sounds [d] and [ɾ] contrast or whether they are allophones of one phoneme.

a) datiŋ	'to arrive'		f) daɾaʔiŋ	'will complain'
b) dami	'amount'		g) maɾumi	'dirty'
c) dumi	'dirt'		h) maɾami	'many'
d) daɾatiŋ	'will arrive'		i) daʔiŋ	'to complain'
e) manduɾukot	'pickpocket'		j) mandukot	'to go pickpocketing'

   Since there are no minimal pairs in the data which contrast [d] and [ɾ], we proceed to check whether the two sounds are in complementary distribution. Normally, when two sounds are in complementary distribution and therefore allophones of one phoneme, they must be phonetically similar. In Tagalog, [d] and [ɾ] are both voiced alveolar segments; thus, they are sufficiently similar phonetically to be viewed as potential allophones of one phoneme.

   To check whether two (or more) sounds are in complementary distribution, the best thing to do is to list the environments in which the sounds occur:

[d] occurs:	[ɾ] occurs:
–word-initially (e.g., *dami*)	–between two vowels (e.g., *maɾami*)
–following a nasal (e.g., *mandukot*)	

   [d] never occurs between two vowels, and [ɾ] never occurs word-initially or following a nasal. Since the two sounds never occur in identical environments, they are in complementary distribution and their distributions are predictable.

3. If two potential allophones of one phoneme are in complementary distribution, we can be reasonably sure that they are allophones of one phoneme. We can therefore

make a general statement about their distribution, in terms of some natural phonological class. For example: Tagalog [d] and [ɾ] are in complementary distribution and are allophones of one phoneme. The allophone [ɾ] occurs between vowels; [d] occurs elsewhere—here, word-initially, as in items a), b), c), f), and so on, and after nasal consonants, as in items e) and j).

4. Once we have determined that two sounds are allophones of one phoneme, we need to determine what the phoneme that they are both derived from is. Usually this can be done by selecting one of the allophones as basic. In most cases, the allophone chosen to represent the phoneme is the one with the widest distribution (the elsewhere variant). In the Tagalog case, the elsewhere variant is [d], so we posit the phoneme /d/, which has two allophones, [d] and [ɾ]. It may be helpful to set up a traditional phoneme-allophone diagram to illustrate this (see Figure 3.2).

$$/d/$$

[ɾ]   [d]

Between vowels   Elsewhere
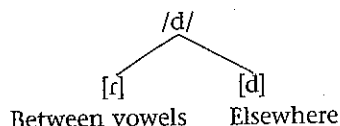
5. Now that we know that [d] and [ɾ] are allophones of the phoneme /d/, we need to determine the phonological rule that accounts for the predictable features of the other allophones. Our rule is probably correct if it describes a common linguistic process (such as assimilation) in terms of natural classes of sounds interacting with neighboring segments and/or syllable structure.

For example, for the above: d → ɾ / V___V

The process at work here is a form of assimilation, in that an underlying voiced stop consonant becomes a continuant when found between two continuants (vowels).

6. We can assume that segments are phonemic if there are no minimal pairs for them but they cannot be shown to be allophones of one phoneme. In such a case, we can conclude that the data simply did not provide minimal pairs.

Exercises

Assume phonetic transcription of the data in all exercises.

1. *Inuktitut* (Eastern) (Native Canadian)
   The data here are in a relatively broad transcription.

a) iglumut	'to a house'	h) pinna	'that one up there'
b) ukiaq	'late fall'	i) ani	'female's brother'
c) aiviq	'walrus'	j) iglu	'(snow)house'
d) aniguvit	'if you leave'	k) panna	'that place up there'
e) aglu	'seal's breathing hole'	l) aivuq	'she goes home'
f) iglumit	'from a house'	m) ini	'place, spot'
g) anigavit	'because you leave'	n) ukiuq	'winter'

   i) List all the minimal pairs in this data. Based on the minimal pairs you have found, list all the contrastive pairs of vowels. (Refer to Section 1.1.)

ii) Using the vowel charts in Figures 2.8 and 2.9 in Chapter 2 as your models, make a chart of Inuktitut vowel phonemes.

iii) Now consider the data again; here it is transcribed in narrower transcription. In it, there are phonetically similar segments that are in complementary distribution. Look for them and then answer the question that follows the data.

aa) iglumut	'to a house'	hh)	piɲɲa	'that one up there'
bb) ukiaq	'late fall'	ii)	anɪ	'female's brother'
cc) aivɪq	'walrus'	jj)	iglʊ	'(snow)house'
dd) aniguvit	'if you leave'	kk)	panna	'that place up there'
ee) aglʊ	'seal's breathing hole'	ll)	aivʊq	'she goes home'
ff) iglumit	'from a house'	mm)	inɪ	'place, spot'
gg) anigavit	'because you leave'	nn)	ukiʊq	'winter'

iv) List the phonetically similar segments that are in complementary distribution. State their distribution in words. (Refer to Sections 2 and 3.)

2. *Hindi* (Hindi is a language of the Indo-European family spoken in India.)
Consider the segments [b] and [b̤] in the data below and answer the questions that follow. The segment transcribed [b̤] is a murmured voiced stop.

a) [bara]	'large'	f)	[b̤ɛd]	'disagreement'
b) [b̤ari]	'heavy'	g)	[bais]	'twenty-two'
c) [bina]	'without'	h)	[b̤əs]	'buffalo'
d) [b̤ir]	'crowd'	i)	[bap]	'father'
e) [bori]	'sackcloth'	j)	[b̤ag]	'part'

i) Are the segments [b] and [b̤] allophones of the same phoneme or do they belong to separate phonemes? If you believe they belong to separate phonemes, give evidence from the data to support your analysis. If you believe they are allophones of the same phoneme, list the conditioning environments. (Refer to Sections 2 and 3.)

3. *Mokilese* (Mokilese is an Austronesian language of the South Pacific.)
Examine the following data from Mokilese carefully, taking note of where voiceless vowels occur.

a) pi̥san	'full of leaves'	g)	uduk	'flesh'
b) tu̥pu̥kta	'bought'	h)	kaskas	'to throw'
c) pu̥ko	'basket'	i)	poki	'to strike something'
d) ki̥sa	'we two'	j)	pil	'water'
e) su̥pwo	'firewood'	k)	apid	'outrigger support'
f) kamwɔki̥ti	'to move'	l)	ludʒuk	'to tackle'

i) The vowel phonemes of Mokilese are /i e ɛ u o ɔ a/. In Mokilese, [i̥] is an allophone of /i/, and [u̥] is an allophone of /u/. No other vowels have voiceless allophones. State in words the conditioning factors that account for this distribution. Be as general as possible in referring to classes of sounds. (Refer to Sections 2 and 3.)

ii) If you have completed the section on rule formalization, write a rule (using features) that accounts for the derived allophones. (Refer to Sections 5 and 6.3.)

4. *Gascon* (Gascon is spoken in southwest France.)

The phones [b], [β], [d], [ð], [g], and [ɣ] are all found in Gascon, as the following examples show. The phone [β] is a voiced bilabial fricative; [ɣ] is a voiced velar fricative. The phone [y] is a high tense front rounded vowel. (Refer to Sections 2 and 3.)

a)	brẽn	'endanger'	n)	gat	'cat'
b)	bako	'cow'	o)	lũŋg	'long'
c)	ũmbro	'shadow'	p)	saliβo	'saliva'
d)	krãmbo	'room'	q)	noβi	'husband'
e)	dilys	'Monday'	r)	aβe	'to have'
f)	dũŋko	'until'	s)	ʃiβaw	'horse'
g)	duso	'sweet'	t)	byðet	'gut'
h)	taldepãn	'leftover bread'	u)	eʃaðo	'hoe'
i)	pũnde	'to lay eggs'	v)	biɣar	'mosquito'
j)	dudze	'twelve'	w)	riɣut	'he laughed'
k)	guteʒa	'flow'	x)	agro	'sour'
l)	ẽŋgwãn	'this year'	y)	ʒuɣɛt	'he played'
m)	puðe	'to be able'			

i) Group the six phones [b], [β], [d], [ð], [g], and [ɣ] into three pairs of sounds. Within each pair, the two phones should be phonetically similar. Describe the members of each pair phonetically in terms of place and manner of articulation and voicing.

ii) List the environments in which the phones [b], [β], [d], [ð], [g], and [ɣ] are found. You may ignore word-final position in your consideration.

iii) What is the evidence, if any, for grouping the pairs of sounds into phonemes? State the evidence for each pair.

iv) Make a general statement about the patterning of the phonemes you have established.

v) Following your analysis, write the following forms in phonemic transcription.

   a) [puɣo]   b) [deðat]   c) [ʃiβaw]   d) [krãmbo]

5. *Swampy Cree* (Swampy Cree is a Native Canadian language of the Algonquian family.)

The following data from Swampy Cree shows a number of different voiced and voiceless consonantal segments.

a)	niska	'goose'	l)	nisto	'three'
b)	kodak	'another'	m)	tʃiːgahigan	'axe'
c)	asabaːp	'thread'	n)	adim	'dog'
d)	waskoːw	'cloud'	o)	miːbit	'tooth'
e)	paskwaːw	'prairie'	p)	pimiː	'lard'
f)	niːgi	'my house'	q)	mide	'heart'
g)	koːgoːs	'pig'	r)	oːgik	'these'
h)	tahki	'often'	s)	tʃiːmaːn	'canoe'
i)	namwaːtʃ	'not at all'	t)	waːbos	'rabbit'
j)	ospwaːgan	'pipe'	u)	naːbeːw	'man'
k)	midʒihtʃij	'hand'	v)	miːdʒiwin	'food'

i) Do [p] and [b] belong to separate phonemes, or are they allophones of one phoneme? If you think they belong to separate phonemes, list data

to support your case. If you think they are allophones, first state the conditioning factors in words, and then, using features, write a rule that accounts for their distribution. (Refer to Sections 2, 3, 5, and 6.3.)

ii) Do the same for [t] and [d], [k] and [g], and [tʃ] and [dʒ].

iii) Make a general statement about the relationship among all the consonantal pairs whose distribution you have examined.

iv) Using Figure 3.14 in Section 6.1 as your model, provide complete derivations of the forms for k) *hand*, m) *axe*, and o) *tooth*.

6. There are a number of natural classes in the vowel and consonant data below. (Refer to Section 5, especially 5.1.) Circle three natural classes in each set of data. Indicate which feature or features define the class, as in the example. The phone [x] is a voiceless velar fricative.

Example: [+voice] —— (b d) tʃ k) h ——[–continuant]

a) i   u   b) p   tʃ   k

    e   o   dʒ

        a   f   θ   ʃ   x

                                            m   ŋ

7. Name a single feature that distinguishes the following pairs of sounds. (Refer to Section 5.)

a) [θ] : [ð]   e) [b] : [m]   i) [ʌ] : [ə]

b) [p] : [f]   f) [s] : [ʃ]   j) [s] : [θ]

c) [u] : [ʊ]   g) [i] : [ɪ]   k) [e] : [ɛ]

d) [i] : [e]   h) [k] : [g]   l) [u] : [o]

8. Complete the feature matrix for each of the sounds indicated. The V abbreviates the features [+syllabic, −consonantal], and the C abbreviates the features [−syllabic, +consonantal]. (Refer to Section 5.)

a) [e]   V
$\begin{bmatrix} +\text{sonorant} \\ o\text{DORSAL} \\ -\text{high} \\ -\text{low} \end{bmatrix}$

b) [ʃ]   C
$\begin{bmatrix} -\text{sonorant} \\ -\text{voice} \\ -\text{nasal} \end{bmatrix}$

c) [m]   C
$\begin{bmatrix} +\text{sonorant} \\ o\text{LABIAL} \end{bmatrix}$

d) [s]   C
$\begin{bmatrix} -\text{sonorant} \\ o\text{CORONAL} \\ +\text{strident} \end{bmatrix}$

e) [g]   C
$\begin{bmatrix} -\text{sonorant} \\ o\text{DORSAL} \\ +\text{high} \end{bmatrix}$

f) [j]
$\begin{bmatrix} -\text{syllabic} \\ -\text{consonantal} \end{bmatrix}$

9. *English/Korean*

As we have seen, phonological adaptation of loan words may reflect facts about syllable structure. The Korean automobile name *Hyundai* has been adapted into English in various ways, one of which follows. Given the Korean form and the English adaptation provided, state two reasons based on syllable structure

conditions that explain why the English form is pronounced the way it is. (Refer to Section 4.)

Korean form		English form
/hjʌndæ/	›	/hʌnde/ [hʌndej]

10. *English*

Many speakers of English have two variants of [l]. One, called *clear l*, is transcribed as [l] in the following data. The other, called *dark l*, is transcribed with [ł]. Use of [l] and [ł] varies according to dialect. Examine the data from one dialect, and answer the questions that follow.

a)	[lajf]	'life'	g)	[pʰɪł]	'pill'
b)	[lip]	'leap'	h)	[fił]	'feel'
c)	[luːz]	'lose'	i)	[hełp]	'help'
d)	[ilowp]	'elope'	j)	[bʌłk]	'bulk'
e)	[dilajt]	'delight'	k)	[sowłd]	'sold'
f)	[slip]	'sleep'	l)	[fʊł]	'full'

Do [l] and [ł] belong to separate phonemes or are they allophones of the same phoneme? If you think they belong to separate phonemes, answer question *i*. If you think they are allophones of the same phoneme, answer questions *ii–iv*. (Refer to Section 2.)

i) List the evidence that makes your case for considering [l] and [ł] as separate phonemes.

ii) State the distribution of [l] and [ł] in words.

iii) Which variant makes the best underlying form? Why?

iv) What role does syllable structure play in your distribution statement? If you have covered Section 6.1, write the distribution statement in rule form.

11. *Canadian French*

For the purposes of this problem, you may assume that syllables in Canadian French have the following structure:

• Maximum number of consonants in an onset: 2. Where there are two onset consonants, the first must be an obstruent, the second a sonorant or a fricative.

• Each vowel forms a syllable nucleus.

• Maximum number of consonants in a coda: 2.

With these stipulations in mind, syllabify the following forms (see Section 4):

a) bukan 'smoke'   c) pudrɔri 'snowstorm'

b) erite 'to inherit'   d) plie 'to fold'

In the following data from Canadian French, each pair of phones is in complementary distribution.

[i] and [ɪ]   are allophones of one phoneme

[y] and [ʏ]   are allophones of a second phoneme

[u] and [ʊ]   are allophones of a third phoneme

It is possible to make a general statement about the distribution of the vowel allophones that accounts for all three phonemes. [y] is a high, front, rounded, tense vowel while [ʏ] is a high, front, rounded, lax vowel.

Examine the data and answer the questions that follow.

a)	pilɣl	'pill'	o)	fini	'finished'
b)	griʃe	'to crunch'	p)	fɪj	'girl'
c)	grɪʃ	'it crunches'	q)	dzɣr	'hard'
d)	pətsi	'little (masc.)'	r)	tryke	'to fake'
e)	pətsɪt	'little (fem.)'	s)	fʊl	'(a) crowd'
f)	vitamɪn	'vitamin'	t)	plɣs	'more'
g)	saly	'hi'	u)	ru	'wheel'
h)	ʒɣp	'skirt'	v)	rʊt	'road'
i)	fymɛ	'smoke'	w)	suvā	'often'
j)	lynɛt	'glasses'	x)	trupo	'herd'
k)	tɔrdzy	'twisted''	y)	sʊp	'flexible'
l)	lɣn	'moon'	z)	tʊʃ	'touch'
m)	pɪp	'pipe'	aa)	fu	'crazy (masc.)'
n)	grimas	'grimace'	bb)	trɣk	'(a) trick'

i) Provide a statement of the distribution of [i] and [ɪ], [y] and [ɣ], [u] and [ʊ] in words. Make your statement as general as possible, but be precise! (You may find Section 4.5 helpful.)

ii) If you have completed the section on rule formalization in Section 6.3, write a single rule that derives the allophones of each phoneme from the underlying form. Use features! Be sure to give your rule a name; use this name in the answer to question *iii*.

iii) Provide derivations for the following underlying forms. (See Section 6.2.)

UR	#	#	'vitamin'	#	#	'glasses'
PR	[vitamm]				[lynɛt]	

12. *English*

The following data contains both careful speech and fast speech forms. Note the differences and answer the questions that follow. Some phonetic detail irrelevant to the question has been omitted from the transcription. Remember that an asterisk before a form indicates that it is not acceptable to (most) native speakers.

	Careful speech		Fast speech	Spelled form
a)	[ǽspəɹən]	k)	[ǽspɹən]	aspirin
b)	[pɔ́ɹsələn]	l)	[pɔ́ɹslən]	porcelain
c)	[nǽʃənəlàjz]	m)	[nǽʃnəlàjz]	nationalize
d)	[ɹízənəbl̩]	n)	[ɹíznəbl̩]	reasonable
e)	[ɪmǽdʒənətɪv]	o)	[ɪmǽdʒnətɪv]	imaginative
f)	[sèpəɹəbílɪti]	p)	[sèpɹəbílɪti]	separability
g)	[mɛ́θəd]	q)	[mɛ́θəd] *[mɛ́θd]	method
h)	[féjməs]	r)	[féjməs] *[féjms]	famous
i)	[mémɚàjz]	s)	[mémɹàjz] *[mémɹàjz]	memorize
j)	[kʰənsìdəɹéjʃn̩]	t)	[kʰənsìdəɹéjʃn̩] *[kʰənsìdɹéjʃn̩]	consideration

i) The schwa deletion between the careful speech forms and the rapid speech forms in items a–f is systematic. State in words the phonetic conditions that account for the deletion.

ii) The same pattern that occurs between the careful speech forms and the rapid speech forms in items a–f does not occur in items g–j. State in words the phonetic difference between these sets of forms that accounts for the lack of schwa deletion.

iii) Now that you have taken items g–j into account, will you have to change your original statement of the phonetic conditions governing schwa deletion in the fast speech forms? If so, do this in words.

iv) If you have completed the section on rule formalization in Section 6.3, convert your statement in *iii* into formal notation.

13. Change the following statements into rule notation. Be sure to name the process in question for each case. (Refer to Section 6.3.)

    a) Voiceless stops become corresponding fricatives between vowels.

    b) A schwa is inserted between a voiced stop and a word-final voiced fricative.

    c) Low unrounded vowels become rounded before *m*.

14. State each of the following rules in English, making reference to natural classes and common linguistic processes. (See Sections 5 and 6.)

Example:
$$\begin{bmatrix} -\text{syllabic} \\ +\text{consonantal} \\ -\text{sonorant} \end{bmatrix} \rightarrow \emptyset \; / \; \underline{\quad} \; \# \quad (\textit{an obstruent is deleted word-finally})$$

a)
$$\emptyset \rightarrow \begin{bmatrix} +\text{syllabic} \\ -\text{consonantal} \\ +\text{sonorant} \\ o\text{DORSAL} \\ -\text{high} \\ -\text{low} \\ -\text{back} \\ +\text{tense} \end{bmatrix} \; / \; \# \; \underline{\quad} \; \begin{bmatrix} -\text{syllabic} \\ +\text{consonantal} \\ -\text{sonorant} \end{bmatrix} \begin{bmatrix} -\text{syllabic} \\ +\text{consonantal} \\ -\text{sonorant} \end{bmatrix}$$

b)
$$\begin{bmatrix} -\text{syllabic} \\ +\text{consonantal} \\ -\text{sonorant} \\ -\text{nasal} \\ -\text{continuant} \\ -\text{delayed release} \\ +\text{voice} \\ o\text{CORONAL} \\ +\text{anterior} \end{bmatrix} \rightarrow [+\text{nasal}] \; / \; \underline{\quad} \; \begin{bmatrix} -\text{syllabic} \\ +\text{consonantal} \\ +\text{sonorant} \\ +\text{nasal} \end{bmatrix}$$

c)
$$\begin{bmatrix} +\text{syllabic} \\ -\text{consonantal} \\ +\text{sonorant} \end{bmatrix} \rightarrow [+\text{round}] \; / \; \begin{bmatrix} -\text{syllabic} \\ +\text{consonantal} \\ o\text{LABIAL} \end{bmatrix} \; \underline{\quad} \; \begin{bmatrix} -\text{syllabic} \\ +\text{consonantal} \\ o\text{LABIAL} \end{bmatrix}$$

15. *Tamil* (Tamil is a Dravidian language spoken in South India and Sri Lanka.)
In the following Tamil data, some words begin with glides while others do not. The symbol [ɖ] represents a voiced retroflex stop and the diacritic [̪] indicates dentals.

Initial j-glide		*Initial w-glide*		*No initial glide*	
a) jeli	'rat'	f) woɖi	'break'	k) arivu	'knowledge'
b) jiː	'fly'	g) woːlaj	'palm leaf'	l) ain̪t̪u	'five'
c) jilaj	'leaf'	h) wuːsi	'needle'	m) aːsaj	'desire'
d) jeŋgeː	'where'	i) wujir	'life'	n) aːru	'river'
e) jiɖuppu	'waist'	j) woːram	'edge'	o) aːdi	'origin'

i) The occurrence of these glides is predictable. Using your knowledge of natural classes, make a general statement about the distribution of the glides. (Refer to Section 2.)

ii) Assuming the glides are not present in the underlying representations, name the process that accounts for their presence in the phonetic forms. (Refer to Section 6.3.)

For the Student Linguist

For more food for thought on phonology, go to **bedfordstmartins.com/ linguistics/phonology** and click on **For the Student Linguist**.