

Phonology Exercises

1. English /p/ and /b/ contrast in initial, medial and final positions as shown by the following sets of minimal pairs:

	Initial Position	Medial Position	Final Position
/p/ - /b/	pit -bit	rapid-rabid	tap-tab

Find minimal pairs for each position for the following consonants:

	Initial Position	Medial Position	Final Position
a. /k/-/g/			
b. /m/-/n/			
c. /l/-/r/			
d. /b/-/v/			
e. /b/-/m/			
f. /p/-/f/			
g. /s/-/ʃ/			
h. /tʃ/-/dʒ/			
i. /s/-/z/			

2. Consider the distribution of [r] and [l] in the following Korean words.

rubi	'ruby'	mul	'water'
kir-i	'road (nom.)'	pal	'arm'
saram	'person'	səul	'Seoul'
irum-i	'name (nom.)'	ilgop	'seven'
ratio	'radio'	ibalsa	'barber'

- a. Write the phonetic environments for [r] and [l] in these Korean words

[r]

[l]

- b. Do [r] and [l] occur in any minimal pairs? Do they have a contrastive distribution?
c. Do [r] and [l] have a complementary distribution?
d. Are [r] and [l] allophones of one or two phonemes?
e. If you think that [r] and [l] are allophones of one phoneme, state the rule that can derive the phonetic allophonic forms.

3. Consider the distribution of [x] (velar fricative) and [ç] (palatal fricative) in the following German words.

nIçt	'not'	ba:x	'Bach'
re:çən	'rake'	la:xən	'to laugh'
ʃlɛçt	'bad'	kɔxt	'cooks'
ri:çən	'to smell'	fərsu:xən	'to try'
hãimliç	'sly'	ho:x	'high'
rɛçts	'rightward'	ʃlʊxt	'canyon'
kri:çən	'to crawl'	fərflʊxt	'accursed'

- a. Write the phonetic environments for [ç] and [x] in these German words

[ç]

[x]

- b. Do [ç] and [x] occur in any minimal pairs? Do they have a contrastive distribution?
 c. Do [ç] and [x] have a complementary distribution?
 d. Are [ç] and [x] allophones of one or two phonemes?
 e. If you think that [ç] and [x] are allophones of one phoneme, state the rule that can derive the phonetic allophonic forms.

4. Consider the distribution of the pairs [i, i̯] and [u, ü] in Mokilese, a language spoken in Micronesia.

uduk	'flesh'	pışan	'full of leaves'
dupükda	'bought'	kaskas	'to throw'
puko	'basket'	poki	'to strike something'
kısa	'we two'	pil	'water'
süpwo	'firewood'	apid	'outrigger support'
kamwɔk̯iti	'to move'	ludʒuk	'to tackle'

- a. Write the phonetic environments for [i, i̯] and [u, ü] in these Mokilese words

[i]

[i̯]

[u]

[ü]

- b. Do [i] and [i̯] or [u] and [ü] occur in any minimal pairs? Do they have a contrastive distribution?
 c. Do [i] and [i̯], and [u] and [ü] have a complementary distribution?
 d. If you think that [i] and [i̯] are allophones of one phoneme, and [u] and [ü] are allophones of one phoneme, state the rule that can derive the phonetic allophonic forms.

5. Consider the distribution of [p], [p^h] and [b] in the following Sindhi words. Sindhi is an Indo-European language spoken in India and Pakistan.

pənu	'leaf'	təru	'bottom'
vədʒu	'opportunity'	k ^h əto	'sour'
ʃeki	'suspicious'	bədʒu	'run'
gədo	'dull'	bənu	'forest'
dəru	'door'	bətʃu	'be safe'
p ^h ənu	'snake hood'	dʒədʒu	'judge'

- a. Find three minimal pairs that show the contrast between [p], [p^h] and [b].
- b. Do [p], [p^h] and [b] have a contrastive distribution in Sindhi?
- c. Are /p/, /p^h/ and /b/ separate phonemes in Sindhi?
- d. Are /p/, /p^h/ and /b/ separate phonemes in English?

6. Consider the following words in Italian.

tinta	'dye'	tin̩go	'I dye'
tənda	'tent'	təŋgo	'I keep'
dansa	'dance'	fungo	'mushroom'
nero	'black'	byaŋka	'white'
dʒɛnte	'people'	aŋka	'also'
sapone	'soap'	faj̩go	'mud'

- a. Find the minimal pairs in this Italian data.
- b. What phonemes do these minimal pairs demonstrate?
- c. Write the phonetic environments for [n] and [ŋ] in these Italian words
- d. Do [n] and [ŋ] occur in complementary or overlapping distribution?

7. Consider the following words in Russian. [ɑ] is a backed version of [a], [t̪] is a velarized version of [l], [s̪] is a palatalized alveolar fricative, and [m̪] is a palatalized voiced bilabial nasal.

atəm	'atom'	pət̪	'he fell'
dva	'two'	dət̪	'he gave'
dar	'gift'	pə:t̪ə	'stick'
mas	'ointment'	ukra:t̪ə	'she stole'
matə	'mint'	bra:t̪	'he took'

- a. Write the phonetic environments for [a] and [ɑ] in these Russian words

[a]

[ɑ]

- b. Do [a] and [ɑ] occur in any minimal pairs? Do they have a contrastive distribution?
- c. Do [a] and [ɑ] have a complementary distribution?
- d. Are [a] and [ɑ] allophones of one or two phonemes?

8. Consider the following words in Same (Lappish). [t^j] and [k^j] are palatalized stops.

pa:t ^j i	'smithy'	fana:s	'boat'
la:k ^j u	'meadow'	vahŋemaht	'parents'
pa:tni	'tooth'	tsabma	'she/he whips'
kihl ^j i:hat	'engagement'	la:itas	'unpleasant'
lieh ^j mu	'mild'	la:t ^j u	'meadow'
pa:k ^j i	'smithy'	nama:ht	'names'
miha:	'a lot'	pa:ʔni	'tooth'

- a. Write the phonetic environments for [t^j], [k^j] and [ʔ] in these Same words.
- b. Are [t^j], [k^j] and [ʔ] in contrastive or complementary distribution?
- c. Are [t^j], [k^j] and [ʔ] allophones of one phoneme or three phonemes?

9. Consider the following words in Totonac, a language spoken in Mexico. [c] represents a voiceless alveolar affricate and [t̪] a velarized [l].

caps ^q	'he stacks'	snapap ^q	'white'
cilinks ^q	'it resounded'	stap ^q	'beans'
kasitt ^q	'cut it'	ʃump ^q	'porcupine'
kuk ^q	'uncle'	ta:qh ^q	'you plunged'
t ^q kak ^q	'peppery'	tihast ^q	'he rested'
mik ^q	'snow'	tuk ^q t ^q	'it broke'

- a. Are the voiced and voiceless vowels in Totonac in contrast, in free variation, or in complementary distribution?
- b. If the voiced and voiceless vowels are in complementary distribution, pick one sound as the basic sound and state the phonetic contexts for its allophones.

10. A Canadian dialect of English has a predictable variant [θj] of the diphthong [aj]. Consider the following words in Canadian English.

bəjt	'bite'	fəjt	'fight'	tajm	'time'
taj	'tie'	baj	'buy'	təjp	'type'
rajd	'ride'	rəjs	'rice'	najnθ	'ninth'
rajz	'rise'	fajl	'file'	fajr	'fire'
rəjt	'write'	ləjf	'life'	bəjk	'bike'

- a. What phonetic segments condition the change from [aj] to [θj]?
- b. What phonetic features characterize the class of conditioning segments?

11. Consider the following words in Tojolabal, a Mayan language spoken in Mexico.

kisim	'my beard'	sak	'white'
tsak'a	'chop it down'	k'ijin	'warm'
koktit	'our feet'	skutſu	'he is carrying it'
k'ak	'flea'	k'uutes	'to dress'
p'akan	'hanging'	snika	'he stirred it'
k'a?em	'sugar cane'	?ak'	'read'

a. Are [k] and [k'] allophones of a single phoneme, in free variation, or in contrast? Don't forget to look for near-minimal pairs.

12. The alveolar segments [t], [s] and [z] are in complementary distribution with their palatal counterparts [tʃ], [ʃ] and [ʒ] in Southern Kongo, a Bantu language spoken in Angola. Consider the distribution of these segments in the following words:

tobola	'to bore a hole'	tſina	'to cut'
tanu	'five'	tſiba	'banana'
kesoka	'to be cut'	ŋkoʃI	'lion'
kasu	'emaciation'	nſelete	'termite'
kunezulu	'heaven'	aʒimola	'alms'
nzwetu	'our'	lolonʒI	'to wash house'
zevo	'then'	zenja	'to cut'
ʒima	'to stretch'	tenisu	'tennis'

a. Write the phonetic environments for [t], [s] and [z] and [tʃ], [ʃ] and [ʒ] in Southern Kongo.

[t], [s] and [z]

[tʃ], [ʃ] and [ʒ]

b. Considering the complexity of the distribution of these segments, which phone is the underlying phoneme for each pair of alveolar and palatal segments in Southern Kongo?

c. State a phonological rule for each pair of alveolar and palatal segments.

[t]-[tʃ]
[s]-[ʃ]
[z]-[ʒ]

d. Write a general phonological rule for all three segmental pairs.

13. Consider the following words from the African language Maninka.

bugo	'hit'	bugoli	'hitting'
dila	'repair'	dilali	'repairing'
don	'come in'	donni	'coming in'
dumu	'eat'	dumuni	'eating'
gwen	'chase'	gwenni	'chasing'

- What are the two forms of the Maninka morpheme with the meaning *-ing*?
- Write a rule that predicts which phonetic form of *-ing* occurs in these words.
- Test your rule by stating the *-ing* forms for the following Maninka words:

da	'lie down'
men	'hear'
famu	'understand'
sunogo	'sleep'

- If your rule predicted *sunogoli* for the last item, modify it to predict *sunogoni* without affecting the other occurrences of *-li*. If your rule predicted *sunogoni*, modify it to predict *sunogoli* without affecting the other occurrences of *-ni*.

14. Consider the following words from the Algonquian language Ojibwe (/c/ is a palatal stop):

anok:i:	'she works'	nitanok:i:	'I work'
a:k:osi	'she is sick'	nita:k:osi	'I am sick'
aye:k:osi	'she is tired'	kijaye:k:osi	'you are tired'
ine:ntam	'she thinks'	kijine:ntam	'you think'
ma:ca:	'she leaves'	nima:ca:	'I leave'
takof:in	'she arrives'	nitakof:in	'I arrive'
pakiso	'she swims'	kipakiso	'you swim'
wi:sini	'she eats'	kiwi:sini	'you eat'

- What are the allomorphs meaning 'I' and 'you'?
- Are the allomorphs for 'I' and 'you' in complementary distribution?
- Which allomorph is the underlying phonemic form for 'I' and 'you'?
- Write a rule that derives the phonetic forms of the allomorphs.
- Is the rule a morphophonemic rule? That is, does it apply to all sounds or just to sounds in the morphemes for 'I' and 'you'?

15. Consider the following words from the Sino-Tibetan language Burmese. The symbol under the nasal consonants indicates that the nasal is voiceless.

ma	'health'	ŋeɪ	'unhurried'
na	'pain'	ŋi	'flame'
mji?	'river'	ŋɔn	'flour'
nwe	'to flex'	ŋa	'order'
nwa	'cow'	ŋwei	'heat' (verb)
mi	'flame'	ŋa	'nostril'

- Do [m] and [ŋ], and [n] and [ŋ] contrast or are they allophones of two phonemes? What is the evidence that supports your answer?
- What do the words mi and ŋi (both meaning 'flame') show?

16. Here are some French words

Phonetic	Gloss
pəti tablo	'small picture'
no tablo	'our pictures'
pəti livr	'small book'
no livr	'our books'
pəti nave	'small turnip'
no nave	'our turnips'
pətit ami	'small friend'
noz ami	'our friends'
pəti wazo	'small bird'
no wazo	'our birds'

- What are the two allomorphs for the words 'small' and 'our'?
- What phonetic environments determine the occurrence of each form?
- Describe the environments by referring to word boundaries and using exactly one phonetic feature that refers to a certain natural class. Use the symbol # to indicate word boundaries, e.g., [#no##livr#].
- What are the basic or phonemic forms for the words 'small' and 'our'?
- State a rule that derives the nonbasic forms from the basic ones.