

Week 7: Phonology

Practice Problems

Remember to think about the sounds, not the spellings!

(1) For each pair of sounds below, provide minimal pairs of English words to illustrate that the sounds are phonemes of English. Note: provide words in standard written form, not IPA.

- (a) [s] and [z]
- (b) [ɹ] and [k]
- (c) [f] and [t]
- (d) [u] and [ʊ]

Solution

A lot of answers could be acceptable here. A few examples: (a) bus and buzz, device and devise, lose and loose; (b) cat and rat, kale and rail (c) fin and tin, fire and tire (d) pool and pull, fool and full

(2) The following data are from Sindhi, an Indo-European language of the Indo-Aryan family, spoken in Pakistan and India. Examine the distribution of the phones [p], [p^h], and [b]. Determine if the three are allophones of separate phonemes or allophones of the same phoneme. What is your evidence? Is the relationship among the sounds the same as in English? Why or why not?

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|--------------------------|-----------------|--------------------------|--------------|
| (a) [pənʊ] | 'leaf' | (g) [barʊ] | 'weight' |
| (b) [dʌk ^h ə] | 'grape' | (h) [k ^h irʊ] | 'milk' |
| (c) [dʌpʊ] | 'fear' | (i) [put ^h i] | 'back' |
| (d) [p ^h əŋʊ] | 'hood of snake' | (j) [bənʊ] | 'forest' |
| (e) [kənʊ] | 'ear' | (k) [p ^h əru] | 'arrow head' |
| (f) [perʊ] | 'foot' | (l) [abʊ] | 'water' |

Solution

The sounds [p], [p^h], and [b] are allophones of separate phonemes (/p/, /p^h/, and /b/). The evidence is the near-minimal triplet [pənʊ] 'leaf,' [p^həŋʊ] 'hood of snake,' and [bənʊ] 'forest', as well as by the minimal pair [perʊ] 'foot' and [p^herʊ] 'arrow head'. The relationship between [p] and [b] in Sindhi is the same as it is in English (they are allophones of separate phonemes); the relationship between [p] and [p^h] is not the same (in Sindhi they are allophones of separate phonemes, and in English they are allophones of the same phoneme).

(3) Consider the following Finnish words. Compare the voiceless alveolar stops with the (non-nasal) voiced alveolar stops. Are these sounds allophones of the same phoneme or are they two separate phonemes? Give evidence from the data for your answer.

- | | |
|--------------------------|------------------------|
| (a) [kuːzi] 'six' | (f) [kadot] 'failures' |
| (b) [kate] 'cover' | (g) [liisa] 'Lisa' |
| (c) [maton] 'of a rug' | (h) [kade] 'envious' |
| (d) [ratas] 'wheel' | (i) [kuːsi] 'sixty' |
| (e) [radan] 'of a track' | |

Solution

They are two separate phonemes. The evidence is the minimal pair [kate] and [kade].

Note, with this question we are also seeing if you know which sounds are alveolar stops!

(4) Korean is argued to be a "language isolate," meaning that it is not linguistically related to other languages. It is spoken in Korea. In the following Korean words, you will find the sounds [s] and [ʃ]. Determine whether [s] and [ʃ] are allophones of the same phoneme or separate phonemes.

- | | | | |
|-------------------|----------------|--------------|---------------|
| (a) [ʃi] | 'poem' | (j) [sal] | 'flesh' |
| (b) [miʃin] | 'superstition' | (k) [kasu] | 'singer' |
| (c) [ʃinmun] | 'newspaper' | (l) [sanmun] | 'prose' |
| (d) [tʰaksanʃige] | 'table clock' | (m) [kasəl] | 'hypothesis' |
| (e) [ʃilsu] | 'mistake' | (n) [miso] | 'smile' |
| (f) [oʃip] | 'fifty' | (o) [susek] | 'search' |
| (g) [paŋʃik] | 'method' | (p) [tapsa] | 'exploration' |
| (h) [kanʃik] | 'snack' | (q) [so] | 'cow' |
| (i) [kaʃi] | 'thorn' | | |

Solution

In Korean, [ʃ] and [s] are allophones of the same phoneme, since they are in complementary distribution. The basic allophone is [s] and the derived allophone is [ʃ]. The sound [ʃ] occurs before [i], and [s] occurs elsewhere.

(5) German is an Indo-European language of the Germanic family, spoken in Germany. Examine the voiceless velar fricative represented by [x] and the voiceless palatal fricative represented by [ç] in the German data below. Are the two sounds in complementary distribution or are they contrastive? If the sounds are allophones in complementary distribution, state the phonetic contexts for each allophone. Note that : marks vowel length, so [u:], for example, is a long vowel.

(a) [buːx]	'book'	(f) [ɛçt]	'real'
(b) [lɔx]	'hole'	(g) [ʃpreːçə]	'(he/she/it) would speak'
(c) [hoːx]	'high'	(h) [lɛçəlɪn]	'to smile'
(d) [flʊxt]	'escape'	(i) [riːçən]	'to smell'
(e) [ɪç]	'I'	(j) [fɛçtən]	'to fence'

Solution

The sounds [x] and [ç] are in complementary distribution. They are allophones of the same phoneme. The sound [ç] appears after front vowels; [x] appears after back vowels

- (6) Ukrainian is an Indo-European language of the Slavic family, spoken in Ukraine. Compare the masculine nominative singular forms of nouns (used for the subject of the sentence) with the vocative forms (used when calling to or addressing someone, as in "Hey Robin."). There is a phonological change between the nominative and the vocative, which adds the endings [-e] to the nominative form. Three pairs of sounds are in allophonic variation. What are these pairs of sounds? What sort of phonological process is at work here? What do you think is conditioning this alternation?

<i>nominative</i>	<i>vocative</i>	<i>gloss</i>
(a) [rak]	[ratʃe]	'lobster'
(b) [junak]	[junatʃe]	'young man'
(c) [ʒuk]	[ʒutʃe]	'beetle'
(d) [pastux]	[pastuʃe]	'shepherd'
(e) [ptax]	[ptaʃe]	'bird'
(f) [boɦ]	[boʒe]	'God'
(g) [pluɦ]	[pluʒe]	'plough'

Solution

The allophonic pairs are the following: [k] and [tʃ]; [x] and [ʃ]; [ɦ] and [ʒ]. Palatalization is at work here, because the velar stop, velar fricative, and glottal fricative all become palatal sounds. The [e] in the vocative suffix is conditioning this alternation. Note that [e] is a mid front vowel, and non-low front vowels often condition palatalization.

- (7) Bukusu is a Niger-Congo language of the Bantu family, spoken in Kenya. The nasal prefix [n-] indicates that the verb is in the first person ('I eat, go sing', etc.). Two different processes occur when [n] stands before another consonant. Look at these words and think about what is happening. The symbols [β], [ɲ] and [x] represent, respectively, a voiced bilabial fricative, a palatal nasal, and a voiceless velar fricative. Note that ː marks vowel length, so [iː], for example, is a long vowel.

(a) [ndi:la]	'I hold'	(j) [ndʒina]	'I scream'
(b) [se:nda]	'I move'	(k) [suna]	'I jump'
(c) [ndʒu:ŋga]	'I watch'	(l) [xala]	'I cut'
(d) [ŋgaβa]	'I divide'	(m) [ŋgeta]	'I pour'
(e) [mbi:ma]	'I weigh'	(n) [ndasa]	'I add'
(f) [xola]	'I do'	(o) [mbula]	'I roam'
(g) [mbuka]	'I perish'	(p) [ndula]	'I trample'
(h) [fuka]	'I cook'	(q) [fwa:ra]	'I dress'
(i) [funa]	'I break'	(r) [mbala]	'I count'

(i) How does the behavior of a nasal differ when it stands before the different types of obstruents (stops, fricatives, and affricates)?

(ii) There are two phonological processes at work here. What are they?

(iii) Write phonological rules to capture the facts about the nasal prefix /n-/ in Bukusu.

Solution

(i) Before a fricative, the nasal is deleted. Before a stop or an affricate, the nasal remains, but assimilates in place of articulation to the stop or affricate.

ii. The two phonological processes at work here are deletion and nasal place assimilation.

iii. /n-/ → Ø / __ fricative; /n-/ → [m] / __ [b]; /n-/ → [ŋ] / __ [ʒ]; /n-/ → [ŋ] / __ [g]; /n-/ → [n] elsewhere.

