Phonology Practice Exercises
Linguistics 201

Tongan

Tongan is an Austronesian language which is spoken by about 100,000 people, primarily in the south Pacific, in places such as Tonga, American Samoa and Fiji. There are also a few speakers in North America, Australia and New Zealand.

Consider the Tongan data below and then answer the questions that follow.

1. [fata] 'shelf'
2. [motu] 'island'
3. [motomoto] 'unripe'
4. [movete] 'to come apart'
5. [sisi] 'grand'
6. [mosimosi] 'to drizzle'
7. [fesi] 'to break'

What is the distribution of the phones [s] and [t] in Tongan? Are they separate phonemes, or are they allophones of the same phoneme?

If you think they are separate phonemes, state the evidence showing that the two sounds are contrastive. If you think they are allophones of the same phoneme, write a phonological rule that accounts for their distribution.

Sindhi

Sindhi is an Indo-European language which is spoken primarily in Pakistan by about 21 million people.

1. [pənu] 'leaf'
2. [vədʒu] 'opportunity'
3. [ʃɛki] 'suspicious'
4. [ɡədo] 'dull'
5. [dɔɾu] 'door'
6. [pʰənu] 'hood of snake'
7. [təru] 'bottom'
8. [kʰəto] 'sour'
9. [bədʒu] 'run'
10. [bənu] 'forest'
11. [bəfju] 'be safe'
12. [dʒədʒu] 'judge'

What is the distribution of the phones [p], [b] and [pʰ] in Sindhi? Are they separate phonemes, or are they allophones of the same phoneme? Give evidence for your answer by either providing a rule for the distribution of the allophones or a minimal pair for the phonemes.
Micmac

Micmac is an Algonquian language which is spoken by about 7,000 people in eastern Canada, in places such as Cape Breton Island, New Brunswick, and the Gaspé Peninsula of Quebec. In fact, the name Gaspé comes from the Micmac word gespeg, meaning "land's end".

1. [pis] 'flea' 7. [sipsulk] 'to cause trembling'
2. [sabus] 'pierced' 8. [tibol] 'it falls'
3. [talsip] 'when' 9. [sebai] 'to hunt'
4. [walpok] 'pool' 10. [alispei] 'to be wet'
5. [ababo] 'thread' 11. [pabi] 'play'
6. [kalibu] 'caribou' 12. [apsem] 'to warm'

Are [p] and [b] separate phonemes in Micmac, or are they allophones of the same phoneme? Give evidence for your answer by either providing a rule for the distribution of the allophones or a minimal pair for the phonemes.

Mokilese

Mokilese is another Austronesian language, which is spoken on a pair of small islands in the Federated States of Micronesia, by about 1,000 people. Examine the Mokilese data below and then answer the questions that follow.

Phonetically, Mokilese has *voiceless vowels* (which are denoted with the diacritic for voicelessness underneath them). What is the natural class of vowels that can be devoiced in Mokilese? What is the phonetic environment which determines when these vowels become voiceless?
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If you think they are separate phonemes, state the evidence showing that the two sounds are contrastive. If you think they are allophones of the same phoneme, write a phonological rule that accounts for their distribution.

Answer:

They are allophones of the same phoneme. [s] (the restricted allophone) is only found before [i], and [t] (the basic allophone) is found before all the other vowels.

Rule: /t/ → [s] / ___[i]
Sindhi

Sindhi is an Indo-European language which is spoken primarily in Pakistan by about 21 million people.

1. [pənu] ‘leaf’ 7. [təru] ‘bottom’
2. [vədʒu] ‘opportunity’ 8. [kəto] ‘sour’
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Answer:

[p], [b] and [pʰ] are contrastive phonemes in Sindhi. There is a nice minimal set for all three:

1. [pənu] ‘leaf’
6. [pʰənu] ‘hood of snake’
10. [bənu] ‘forest’
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Are [p] and [b] separate phonemes in Micmac, or are they allophones of the same phoneme? Give evidence for your answer by either providing a rule for the distribution of the allophones or a minimal pair for the phonemes.

Answer:

[p] and [b] are allophones of the same phoneme in Micmac. [b] (the restricted allophone) only appears between two vowels, and [p] (the basic allophone) appears everywhere else (with one or two consonants on either side, or at the edge of a word).

/p/ → [b] / V___V
Mokilese

Mokilese is another Austronesian language, which is spoken on a pair of small islands in the Federated States of Micronesia, by about 1,000 people. Examine the Mokilese data below and then answer the questions that follow.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>pisan</td>
<td>‘full of leaves’</td>
</tr>
<tr>
<td>b)</td>
<td>tupukta</td>
<td>‘bought’</td>
</tr>
<tr>
<td>c)</td>
<td>puko</td>
<td>‘basket’</td>
</tr>
<tr>
<td>d)</td>
<td>kisa</td>
<td>‘we two’</td>
</tr>
<tr>
<td>e)</td>
<td>supwo</td>
<td>‘firewood’</td>
</tr>
<tr>
<td>f)</td>
<td>kamwokiti</td>
<td>‘to move’</td>
</tr>
<tr>
<td>g)</td>
<td>uduk</td>
<td>‘flesh’</td>
</tr>
<tr>
<td>h)</td>
<td>kaskas</td>
<td>‘to throw’</td>
</tr>
<tr>
<td>i)</td>
<td>poki</td>
<td>‘to strike something’</td>
</tr>
<tr>
<td>j)</td>
<td>pil</td>
<td>‘water’</td>
</tr>
<tr>
<td>k)</td>
<td>apid</td>
<td>‘outrigger support’</td>
</tr>
<tr>
<td>l)</td>
<td>ludjuk</td>
<td>‘to tackle’</td>
</tr>
</tbody>
</table>

Phonetically, Mokilese has voiceless vowels (which are denoted with the diacritic for voicelessness underneath them). What is the natural class of vowels that can be devoiced in Mokilese? What is the phonetic environment which determines when these vowels become voiceless?

**Answer:**

Only high vowels ([i], [u]) can be devoiced in Mokilese. They become voiceless if they are surrounded by voiceless consonants.
Distinctive Features and Rules

Below are some (formal and informal) descriptions of phonological rules. Write out each rule in formal notation, using the appropriate distinctive features for each segment involved in the rule.

You may find the feature table at the end of section 3.3 in your textbook to be of use in completing this exercise. One strategy you can use for these problems is to think first of the phonetic descriptions of each segment (voicing, place and manner for consonants, and height, front/backness, rounding and tense/lax for vowels) and just convert those into the corresponding phonological features. Ultimately, your goal should be to try to include only those features which are necessary to specify the identity of the segments ("natural classes") involved in the rule.

Example: Tongan: /t/ becomes [s] before [i]

Feature Notation:

\[
\begin{align*}
&\{+\text{consonantal} \mid \text{CORONAL} \\
&\quad -\text{voice} \quad +\text{anterior} \quad -\text{continuant}\} \rightarrow \\
&\{+\text{continuant} \mid \text{DORSAL} \\
&\quad +\text{high} \quad +\text{front} \quad -\text{round} \quad +\text{tense}\}
\end{align*}
\]

(Note that C represents any consonant, V represents any vowel, and # is a word boundary.)

1. Micmac: /p/ becomes [b] between two vowels

2. Mokilese: [i] + [u] become voiceless in between two voiceless consonants


5. /n/ \rightarrow [m] / __ [b]

6. /l/ \rightarrow [o] / [i] ___ #

7. /t/ \rightarrow [tʃ] / __ [r]
Distinctive Features and Rules

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Example: Tongan: /t/ becomes [s] before [i]

Feature Notation:

\[
\begin{array}{c}
(+\text{consonantal}) \\
\text{CORONAL} \\
(-\text{voice}) \\
(+\text{anterior}) \\
(-\text{continuant})
\end{array}
\rightarrow \begin{array}{c}
(+\text{continuant}) \\
(+\text{strident})
\end{array} / \begin{array}{c}
(-\text{consonantal}) \\
\text{DORSAL} \\
(+\text{high}) \\
(+\text{front}) \\
(-\text{round}) \\
(+\text{tense})
\end{array}
\]

(Note that C represents any consonant, V represents any vowel, and # is a word boundary.)

1. Micmac: /p/ becomes [b] between two vowels

\[
\begin{array}{c}
(+\text{consonantal}) \\
\text{LABIAL} \\
(-\text{voice}) \\
(-\text{continuant})
\end{array}
\rightarrow \begin{array}{c}
(+\text{voice})
\end{array} / \begin{array}{c}
(-\text{consonantal})
\end{array} \begin{array}{c}
(-\text{consonantal})
\end{array}
\]

\[
\begin{array}{c}
\text{syllabic}
\end{array}
\begin{array}{c}
\text{syllabic}
\end{array}
\]

2. Mokilese: [i] + [u] become voiceless in between two voiceless consonants

\[
\begin{array}{c}
-\text{consonantal} \\
+\text{syllabic} \\
\text{DORSAL} \\
+\text{high} \\
+\text{voice}
\end{array}
\rightarrow
\begin{array}{c}
-\text{voice} \\
\text{+consonantal} \\
-\text{voice}
\end{array}
\begin{array}{c}
\text{+consonantal}
\end{array}
\]


\[
\begin{array}{c}
+\text{consonantal} \\
\text{CORONAL} \\
+\text{anterior} \\
-\text{voice} \\
+\text{continuant} \\
+\text{strident}
\end{array}
\rightarrow
\begin{array}{c}
-\text{anterior} \\
\text{+consonantal} \\
\text{DORSAL} \\
+\text{high} \\
-\text{back} \\
+\text{tense}
\end{array}
\]


\[
\begin{array}{c}
-\text{consonantal} \\
+\text{spreadglottis} \\
+\text{continuant}
\end{array}
\rightarrow
\begin{array}{c}
\text{+consonantal} \\
\text{LABIAL} \\
-\text{round} \\
-\text{spreadglottis}
\end{array}
\begin{array}{c}
-\text{consonantal} \\
\text{+syllabic} \\
\text{DORSAL} \\
+\text{high} \\
+\text{back} \\
\text{LABIAL} \\
+\text{round} \\
+\text{tense}
\end{array}
\]

5. /n/ → [m] / [b]

\[
\begin{array}{c}
+\text{consonantal} \\
\text{CORONAL} \\
+\text{anterior} \\
+\text{voice} \\
+\text{nasal}
\end{array}
\rightarrow
\begin{array}{c}
\text{LABIAL} \\
-\text{round}
\end{array}
\begin{array}{c}
+\text{consonantal} \\
\text{LABIAL} \\
-\text{round} \\
+\text{voice} \\
-\text{nasal} \\
-\text{continuant}
\end{array}
\]

\[
\begin{array}{c}
+\text{consonantal} \\
\text{+syllabic} \\
\text{DORSAL} \\
+\text{high} \\
+\text{back} \\
\text{LABIAL} \\
+\text{round} \\
+\text{tense}
\end{array}
\]

6. /l/ → [ɔ] / [i] ___ #

\[
\begin{array}{c}
+\text{consonantal} \\
\text{CORONAL} \\
+\text{anterior} \\
+\text{continuant} \\
+\text{lateral} \\
+\text{voice} \\
\end{array}
\rightarrow
\begin{array}{c}
-\text{consonantal} \\
+\text{syllabic} \\
\text{DORSAL} \\
+\text{back} \\
\text{LABIAL} \\
+\text{round} \\
-\text{high} \\
-\text{low} \\
+\text{tense} \\
-\text{lateral} \\
\end{array}
\]

7. /t/ → [tʃ] / ___ [r]

\[
\begin{array}{c}
+\text{consonantal} \\
\text{CORONAL} \\
+\text{anterior} \\
-\text{voice} \\
-\text{continuant} \\
-\text{delayedrelease} \\
\end{array}
\rightarrow
\begin{array}{c}
-\text{anterior} \\
+\text{delayedrelease} \\
+\text{strident} \\
\end{array}
\]

\[
\begin{array}{c}
+\text{consonantal} \\
\text{CORONAL} \\
-\text{anterior} \\
+\text{sonorant} \\
+\text{continuant} \\
+\text{voice} \\
\end{array}
\]
1. Syllable Structure

For each of the following words, (i) give an appropriate broad phonetic transcription and then (ii) show how the word is syllabified by clearly labeling the segments in the onset, nucleus and coda of each syllable.

a. Election

b. Frisbee

c. Advertise

d. Demonstrate

e. Confusing
2. Quebec French

In the Quebec French data below, consider the distribution of [t] and [ts] (a voiceless alveolar affricate). State their distribution and determine if they are allophones of one phoneme or of separate phonemes. If you think they contrast, provide evidence that they do. Otherwise, state the environment in which each allophone appears.

Note that Quebec French includes two vowels which are not found in English:

[y] a high, front, tense, rounded vowel
[Y] a high, front, lax, rounded vowel

(Also—the French /r/ is phonetically different from English /r/, but that fact is irrelevant to the solution of this problem.)

<table>
<thead>
<tr>
<th>[tu]</th>
<th>'all'</th>
<th>[telegram]</th>
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</tr>
</thead>
<tbody>
<tr>
<td>[abut][i]</td>
<td>'ended'</td>
<td>[trɛ]</td>
<td>'very'</td>
</tr>
<tr>
<td>[tɛl]</td>
<td>'such'</td>
<td>[kyt][γr]</td>
<td>'culture'</td>
</tr>
<tr>
<td>[tab]</td>
<td>'stamp'</td>
<td>[minYt]</td>
<td>'minute'</td>
</tr>
<tr>
<td>[tʰim1d]</td>
<td>'timid'</td>
<td>[tʰy]</td>
<td>'you'</td>
</tr>
<tr>
<td>[tʰ1t]</td>
<td>'title'</td>
<td>[tʰYb]</td>
<td>'tube'</td>
</tr>
</tbody>
</table>

3. Korean

Consider the sounds [l] and [r] in the data from Korean below and then answer the questions that follow. Note that Korean [l] and [r] are phonetically different from their English counterparts, but this fact is irrelevant to the solution of this problem.

<table>
<thead>
<tr>
<th>[mul]</th>
<th>'water'</th>
<th>[mal]</th>
<th>'horse'</th>
</tr>
</thead>
<tbody>
<tr>
<td>[mulkama]</td>
<td>'place for water'</td>
<td>[malkama]</td>
<td>'place for horse'</td>
</tr>
<tr>
<td>[mure]</td>
<td>'at the water'</td>
<td>[mare]</td>
<td>'at the horse'</td>
</tr>
<tr>
<td>[pal]</td>
<td>'foot'</td>
<td>[pari]</td>
<td>'of the foot'</td>
</tr>
<tr>
<td>[səul]</td>
<td>'Seoul'</td>
<td>[rupi]</td>
<td>'ruby'</td>
</tr>
<tr>
<td>[ilkop]</td>
<td>'seven'</td>
<td>[ratio]</td>
<td>'radio'</td>
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</table>

Are [l] and [r] contrastive sounds, or are they allophones of the same phoneme? If you think they contrast, provide evidence that they do. Otherwise, state the environment in which each allophone appears.
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<td>'very'</td>
</tr>
<tr>
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<td>'such'</td>
<td>[kYl̪ʃyr]</td>
<td>'culture'</td>
</tr>
<tr>
<td>[tab]</td>
<td>'stamp'</td>
<td>[mɪnYt]</td>
<td>'minute'</td>
</tr>
<tr>
<td>[tʰimɪd̪]</td>
<td>'timid'</td>
<td>[tʰy]</td>
<td>'you'</td>
</tr>
<tr>
<td>[tʰɪt̪]</td>
<td>'title'</td>
<td>[tʰɪb]</td>
<td>'tube'</td>
</tr>
</tbody>
</table>

Answer:

[t] and [ts] are allophones of the same phoneme.

Distribution: [ts] appears before [i], [ɪ], [y] and [Y], while [t] appears everywhere else.

Rule: /t/ changes into [ts] in front of high, front vowels.
2. Korean

Consider the sounds [l] and [r] in the data from Korean below and then answer the questions that follow. Note that Korean [l] and [r] are phonetically different from their English counterparts, but this fact is irrelevant to the solution of this problem.

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Are [l] and [r] contrastive sounds, or are they allophones of the same phoneme? If you think they contrast, provide evidence that they do. Otherwise, state the environment in which each allophone appears.

Answer

In Korean, [l] and [r] are allophones of the same phoneme. [l] appears only in syllable codas, while [r] only appears in syllable onsets.