Class Notes: Tsujimura (2007), Ch. 3. Phonology (1), pp. 22-50

1. Phonological rules in Japanese
1.1. Devoicing of high vowels

What are high vowels in JPN?
\( /i/ \) and \( /u/ \)

How do you indicate devoiced vowels?
\( [\ i], [\ u] \)

Does devoicing NOT occur with vowels other than high vowels?
\( \rightarrow \) It does occur with other vowels, but high vowels most frequently undergo devoicing.

Does devoicing equally occur in all dialects of JPN?
\( \rightarrow \) No, it is wide-spread in the Tokyo dialect, but not common in the Kansai dialect (e.g. Osaka, Kyoto).

How do you write a phonological rule, for example?
A \( \rightarrow \) B / X ___ means “A changes to B when it follows X.”
A \( \rightarrow \) B / ___ Y means “A changes to B when it precedes Y.”
A \( \rightarrow \) B / X ___ Y means “A changes to B when it appears between X and Y.”

Write the rule for high vowel devoicing.
\[
V \rightarrow V / C ___ \{ C \}^{[-vd]} \{ [-vd] \}^# 
\]

NOTE: “V”: vowel; “C”: consonant; “hi”: high; “vd”: voiced; “/”: when; “#”: word boundary; \{ \} : alternatives

What are the allophones of \( /i/ \) and \( /u/ \), respectively?
\( \rightarrow \) Allophones of \( /i/ \): [i] and [i’]; allophones of \( /u/ \): [u] and [u’]
1.2. Nasal Assimilation

What's happening in the pronunciation of the underlined parts of the English words intolerable, incoherent, & impossible?
→

What is 'assimilation'?
→ A phenomenon in which adjacent sounds become phonetically similar n abstract CONTRASTIVE unit of speech sound.

How can you account for the different pronunciations of /n/ in a-c?
  a. /sanmai/ [sammai], /sanpo/ [sampo], /sanba/ [samba]
  b. /sanno/ [sanno:], /santa/ [santa], /sansatu/ [sansat'u]
  c. /sankai/ [sangai], /sango/ [sango:]

→ a. /n/ → [m] / ___ C [bilabial]
   b. /n/ → [n] / ___ C [alvelar]
   c. /n/ → [n] / ___ C [velar]

Can we collapse the above rules a-c? → Yes!
  d. /n/ → nasal / ___ C
     [\x place] [\x place]

   NOTE: [\x place] under two sounds means that the place of articulation of the two sounds is identical.

Rule d. is actually not sufficient. Cf. /san/ [saN], /nihon/ [nifoN],
How should we write a rule to account for these?
→ e. /n/ → [N] / ___ #

Combine rules d & e; i.e. write the nasal assimilation rule.
/n/ → nasal / ___ C
     [\x place] [\x place]
     → [N] / ___ #

Tsujimura (2007), Ch. 3(1), page 3 of 10

Should we assume that [m] is always an allophone of /n/ in JPN?
→ No, the distribution of syllable-INITIAL [m] and [n] is NOT predictable, and there are many MINIMAL PAIRS involving [m].
Cf. (17a), p. 29

NOTE: “Minimal pairs” means pairs of words that differ in only one phonological element
  e.g. [mat'u] ‘wait’ vs. [mat'u] ‘summer’
     [ika] ‘squid’ vs. [ike] ‘pond’
     [t'uki] ‘moon’ vs. [t'ugi] ‘next’

What is the status of [m], then?
→ Syllable-final [m] should be regarded as allophones of /n/, but other instances of [m] reflect its phoneme status.

pp. 29-30
Can the same be said of [n] in JPN?
→ No, there is no phoneme /n/ in JPN; all instances of [n] are allophones.
  (1) Syllable-finally, [n] is an allophone of /n/ preceding a velar sound.
  (2) Between vowels, [n] is an allophone of /gl/.

What does it meant to say [n] and [g] are in “free variation”?
→ It makes no difference whether one pronounces a word one way or the other.
  e.g. /kage/ ‘shadow’ can be pronounced [kage] or [kaŋe].
     This is represented as [kage] ~ [kaŋe].

What are the allophones of /n/?
→ [n] [m] [n] [N]
1.3. Aleveolar Alternations

Write a rule to account for the allophones of /t/ in (18), p. 30.

\[ /t/ \rightarrow [t^*] / __ [u] \]  \(=(21), \) p. 31

Write a rule to account for the allophones of /t/ in (23), p. 32.

\[ /t/ \rightarrow [\check{e}] / __ [i] \]  \(=(26), \) p. 32

Combine the above two rules.

\[ /t/ \rightarrow [t^*] / __ [u] \]
\[ \rightarrow [\check{e}] / __ [i] \]

Write a rule to account for the allophones of /d/.\[
\[ /d/ \rightarrow [d^*] / __ [u] \]
\[ \rightarrow [\check{e}] / __ [i] \]

Write a rule to account for the allophones of /s/ in (27), p. 33.

\[ /s/ \rightarrow [\check{s}] / __ [i] \]  \(=(29b), \) p. 33

Write a rule to account for the allophones of /z/ in (28), p. 33.

\[ /z/ \rightarrow [\check{e}] / __ [i] \]  \(=(30b), \) p. 34

REVIEW:

What are the allophones of /t/?  \[\rightarrow [t^*] [\check{e}]\]
What are the allophones of /d/?  \[\rightarrow [d^*] [\check{e}]\]
What are the allophones of /s/?  \[\rightarrow [\check{s}] [\check{e}]\]
What are the allophones of /z/?  \[\rightarrow [\check{e}] [\check{e}]\]

1.4. /h//φ//ç Alternations

Write rules to account for the allophones of /h/ in (31), p. 34.

\[ /h/ \rightarrow [\phi] / __ [u] \]  \(=(33a), \) p. 35
\[ /h/ \rightarrow [ç] / __ [i] \]  \(=(33b), \) p. 35

What are the allophones of /h/?  \[\rightarrow [h] [\phi] [ç]\]

1.5. Digression on the Phoneme Status of [t^*, č, š, ĵ, φ, ç]

Can any of the sounds [t^*, č, š, ĵ, φ, ç] occur in environments other than the ones specified in the rules above? If yes, give examples.\[ \rightarrow \text{Yes, in loan and Sino-Japanese words and some contracted native words, as shown in (35)-(40), p. 36.}\]

What does that mean?\[ \rightarrow \text{That [t^*, č, š, ĵ, φ, ç] MAY all be separate phonemes, rather than allophones.}\]

Would it be reasonable to analyze that they are separate phonemes in JPN?\[ \rightarrow \text{No, because any consonant should be able to appear before any vowel in the language at least at the PHONOEMIC level.}\]

What is an additional piece of evidence for regarding [t^*, č, š, ĵ, φ, ç] as allophones?\[ \rightarrow \text{Verbal conjugation; e.g. /mat+anai/ /mat+imasu/ /mat+u/ /mat+eru/ /mat+oo/ [matanai] [mačimasu] [matu] [mateba] [matoo]}\]

NOTE: "+" morpheme boundary
What do these facts mean?  
→ In certain instances, [tʰ, ç, š, j, φ, ç] are allophones of the phonemes /t/, /s/, /z/, /h/ (e.g. in verbal conjugation), while in other instances they should be regarded as separate phonemes, /tʰ/, /ç/, /š/, /j/, /φ/, /ç/ (e.g. (35)-(40), p.36).

NOTE: The status of /tʰ/ as a phoneme is marginal because it occurs infrequently preceding a vowel other than [u], and mainly in loan words.

### 1.6. Verbal Conjugation Rules

Why should we look at verbal conjugation?  
→ Because it displays intriguing sound changes.

What are “morphophonological changes”?  
→ Phonological changes triggered by the addition of particular morphemes, e.g. verbal endings.

“Morphophonology”: The study of the combinatory phonic modifications of morphemes which happen when they are combined.

What is a “verbal root”?  
→ The most basic meaningful form to which various endings are added.

What type of verbs takes the endings in the A column in (42), p. 38, and what type takes those in the B column?  
→ A verb whose root ends in a consonant takes the endings in the A column, and a verb whose root ends in a vowel takes those in the B column.

Write a rule to account for the data in (46), p. 40.  
\[ r/ \rightarrow [l]/___ + ta \]

Write rules to account for the data in (47), p. 40.  
\[ a. \ /b/ \rightarrow [n]/___ + ta \quad (=52a), \ p. 41 \]
\[ b. \ /l/ \rightarrow [d]/n + ___ \quad (=52b), \ p. 41 \]

Write rules to account for the data in (48), p. 40.  
\[ a. \ /m/ \rightarrow [n]/___ + ta \quad (=54a), \ p. 41 \]
\[ b. \ /y/ \rightarrow [d]/n + ___ \quad (=54b), \ p. 41 \]

Collapse the rules for (47) & (48) into one.  
\[ C \rightarrow \quad C \quad /___ + ta \]

[voiced] [alveolar]  
[bilabial] [nasal]  
[stop]  

Why is the collapsed rule better than the separate ones?  
→ Because the collapsed rule applies more broadly/generally.

To account for a change like /kak+ta/ → [kaita], why should you NOT posit a rule like “k → i / ___ + ta”?

(1) It is unnatural to posit a rule in which a consonant changes to a vowel (or vice versa).
(2) /kaki+ta/ has been historically attested indicating that /k/ & /i/ are separate segments, rather than that one is derived from the other.

What should we do, then?  
→ Posp 2 rules, “insertion” & “deletion.”

Insertion: \[ \emptyset \rightarrow [i]/k + ___ + ta \]
Deletion: \[ k \rightarrow \emptyset /___i + ta \]
Write rules to account for the data in (57), p. 42.

Voicing: \( /\text{i}/ \rightarrow [\text{d}] / g + \) 
Insertion: \( \varnothing \rightarrow [\text{i}] / g \) \_\_\_ + da 
Deletion: \( /\text{g}/ \rightarrow \varnothing / \_\_\_ i + da \)

NOTE: The voicing rule is a type of “assimilation.”

Where possible, combine rules in the above 2 descriptions so that the rules will be more general.

Insertion: \( \varnothing \rightarrow [\text{i}] / C \_\_\_ + C \) \_\_\_ \[velar\] \[alveolar stop\] (=70a), p.45

Deletion: \( C \rightarrow \varnothing / \_\_\_ i + C \) \_\_\_ \[velar\] \[alveolar stop\] (=70b), p.45

NOTE: The above two rules would actually generate wrong forms, as well as correct forms, but don’t worry about it for now.

/kak+ta/ \( \rightarrow *[kai+ta] \) ‘want to write (intended)’

\( \) correct form: [kaki+ta]

/oyog+ta/ \( \rightarrow *[oyoi+da] \) ‘want to swim (intended)’

\( \) correct form: [oyogi+ta]

1.7. Rule Ordering

Recall the 2 rules for the past tense form of verbs ending with /\text{b}/.

Nasalization: \( /\text{b}/ \rightarrow [\text{n}] / \_\_\_ + \text{ta} \) (=52a), p. 46

Voicing: \( /\text{i}/ \rightarrow [\text{d}] / \text{n} + \_\_\_ \) (=52b), p. 46

Write the derivation of /ukab+ta/ ‘floated’ applying these rules.

Underlying form: ukab + ta 
Nasalization: ukan + ta 
Voicing: ukan + da 
Surface form: [ukanda] ‘floated’

What would happen if you applied the rules in the reverse order?

Underlying form: ukab + ta
Voicing: DNA (or N/A ‘does not apply’)
Nasalization: ukan + ta
Surface form: *[ukan]

\( \rightarrow \) A wrong form is generated. In other words, the rule ordering is important here.

Recall the 3 rules for the past tense form of verbs ending with /\text{g}/.

Voicing: \( /\text{i}/ \rightarrow [\text{d}] / g + \) 
Insertion: \( \varnothing \rightarrow [\text{i}] / C \_\_\_ + C \) \_\_\_ \[velar\] \[alveolar stop\] (=73a), p.47

Deletion: \( C \rightarrow \varnothing / \_\_\_ i + C \) \_\_\_ \[velar\] \[alveolar stop\] (=73b), p.47

Deletion: \( C \rightarrow \varnothing / \_\_\_ i + C \) \_\_\_ \[velar\] \[alveolar stop\] (=73c), p.47

Write the derivation of /tog+ta/ ‘sharpened’ applying these rules.

Underlying form: tog + ta
Voicing: tog + da
Insertion: togi + da
Deletion: toi + da
Surface form: [toida] ‘sharpened’

Try all the other possible rule orderings, and see what happens.

What does this indicate?

\( \rightarrow \) That the 3 rules must be ordered: voicing-insertion-deletion.

For verbs like /tug+ta/ ‘poured,’ is the ordering of the allophonic rule “t \( \rightarrow t’\) crucial in relation to the voicing, insertion, and deletion rules?

\( \rightarrow \) No, the ordering of the allophonic rule is unimportant in this case. See (82)-(85), p. 49