The Docket, revisited

• Today:
  • Some common phonological rules
  • Rule ordering
  • Syllable structure
  • Phonotactics
• Next Monday: some more phonology practice exercises
• Next Wednesday: Phonology Homework will be due at the beginning of class.
  • Homework will be posted to course web page later today.
The Usual Suspects

• One common phonological process we’ve seen so far is assimilation.
  • = one sound becoming like another in its environment

• One distinction: total vs. partial assimilation

• Partial assimilation: only part (e.g., one feature) of the target sound changes.
  • English: /in-/ + /probable/ = improbable

• Total assimilation: the entire target sound changes to match another sound in its environment.
  • Arabic: /?al/ + /da:r/ = [?ad da:r] “the house”
The Usual Suspects

• **Assimilation** processes can also affect sounds in different directions.

• **Regressive** assimilation: features spread backward in time.
  
  • Place assimilation in English: *improbable*

• **Progressive** assimilation: features spread forward in time.
  
  • Ex: voicing assimilation for English plural marker.
    
Insertion

• The phonetic shape of the plural marker in English also depends on another phonological rule…

• The following English plurals:
  
  matches [mætʃɪz]  
  hoses [həʊzɪz]  
  judges [dʒʌdʒɪz]  
  passes [pæsɪz]

• …and others like them exhibit an **insertion** rule.

• **Insertion**: nothing → something / in some environment

• Specifically: [i] insertion.
  
  • Ø → [i] / [+strident] ___ [+strident]

• Another name for insertion is **epenthesis**.
Insertion

• Another example of an insertion rule in English:
  ‘dance’  becomes  [dænts]
  ‘strength’  becomes  [strεŋkθ]
  ‘hamster’  becomes  [hæmpstr]

• Rule:
  \[ \emptyset \rightarrow [-\text{continuant}] / [+\text{nasal}] \quad \_\_\_\_\_\_ \quad [+\text{continuant}] \]
  \[ [-\text{nasal}] \quad [\alpha\text{PLACE}] \quad [-\text{voice}] \]
  \[ [\alpha\text{PLACE}] \]
  \[ [-\text{voice}] \]

• This is voiceless stop insertion.
Deletion

• **Deletion**: something $\rightarrow$ nothing / in some environment

• English example (casual speech):
  
  ‘fifth’ /fɪfθ/ $\rightarrow$ [fɪθ]

• English example (casual speech):
  
  ‘probably’ $\rightarrow$ [prabli]
  ‘suppose’ $\rightarrow$ [spowz]

• This also applies to /r/-dropping dialects…

• and the deletion of final consonants in Hawaiian Creole.
  
  • “paint” $\rightarrow$ [pen]
  • “old” $\rightarrow$ [ol]
Dissimilation

• **Dissimilation**: a change is made to a sound that makes it _less similar_ to a sound in its environment.

• Example (from Greek):

  `/ep\text{pta}/ \rightarrow [\text{efta}]` ‘seven’

  Rule: [-continuant] \(\rightarrow\) [+continuant] / ____ [-continuant]

• Example (from English, casual speech):

  ‘sixth’ `/s\text{iks}\theta/ \rightarrow [\text{sikst}]`

  Rule: [+continuant] \(\rightarrow\) [-continuant] / [+continuant] ____

• These particular rules exhibit **manner dissimilation**.

• Dissimilation is relatively rare in the world’s languages.
Metathesis

- Metathesis: the order of two segments is changed.
- Example (Leti):
  
  `/danat/ + /kviali/ → [dantakviali]`
- Example (various English dialects):
  
  ‘ask’ → [æks]
- From kids’ speech:
  
  ‘spaghetti’ → [pəskɛri]
- From adults’ speech:
  
  ‘comfortable’ → [kʌmfɛrəbl]
- For some reason, metathesis seems to be more common in speech errors than in regular phonology.
Reduction

• Reduction: phonemic contrasts can be lost in particular phonetic environments.

• Ex: English *vowel reduction*.
  • vowels → [ə]/ unstressed syllables
  • [kælgərɪ]  ~  [kælgɛrɪən]
  • [kænərə]  ~  [kənɛjriən]

• Rule of thumb:
  • phonemic representations should include all of the *unpredictable* information about the sounds in a word form.

• Phonological rules account for the *predictable* phonetic information.
Deep Thoughts

• Let’s say that the basic allophone for the plural marker is /z/.
  • it’s voiceless after [-voice] segments
  • an [ɪ] is inserted after [+strident] segments
  • it’s voiced [z] everywhere else
• Two rules have to apply to account for this pattern:
  • voicing assimilation
  • [ɪ] insertion
• Does it matter which order they apply in?
The Wrong Way

• Here’s what can happen if we apply the voicing assimilation rule first, in forming the plural for ‘pass’.

  phonemic form: /pæs + z/
  voicing assimilation: pʰæss
  [ɪ] insertion: pʰæsɪs
  phonetic form: *[pʰæsɪs]

• This is wrong, because the phonemic /z/ has been devoiced in [ɪs].
The Right Way

• Here’s what happens if we apply the schwa insertion rule first, in forming the plural for ‘pass’.

  phonemic form: \( /pæs + z / \)

  [ɪ] insertion: \( p^hæsɪz \)

  voicing assimilation: \( p^hæsɪz \) (no change)

  phonetic form: \( [p^hæsɪz] \)

• When the rules apply in this order, we get the appropriate phonetic form.

• Moral: when more than one phonological rule can apply, you must make sure they apply in the correct order.
Terminology

• Since phonemic forms can sometimes not be seen directly, they are often referred to as underlying representations.

• In contrast, the phonetic forms are referred to as surface representations.
  
  • (we can see them directly)

• The process by which phonological rules convert phonemic forms to phonetic forms is called a derivation.

• The application of the rules can often take place in ordered steps.
  
  • (although sometimes the order doesn’t matter…)
More Evidence

• We also know that phonology is going on underneath the surface because...
  
  • Sometimes, we see the results of rules even after the conditions for applying them have disappeared

• /t/ flapping in (North American) English

  “batter” [bæər]  
  “petal” [pɛəl]  
  “atom” [æəm]

• Rule: /t/ becomes a **voiced** flap at the start of an unstressed syllable
More Evidence

• Flapping happens to /d/ in English, too.

• /d/ flapping in (North American) English

  “madder”  [mæərə]
  “medal”    [mɛdəl]
  “ridden”   [rɪnd]

• /d/ becomes a (voiced) flap at the beginning of an unstressed syllable

• Sometimes, /t/ and /d/ can become indistinguishable:
  • “madder”    [mæərə]
  • “matter”    [mæərə]
Another Rule

• Remember Canadian Raising? It only occurs in certain environments:
  • “house” [hʌwз]  “loud” [lawd]
  • “write” [rʌjt]  “ride” [rajd]
  • “pipe” [pʰʌjp]  “bribe” [brajb]
  • “like” [laɪk]

• [aj] and [aw] “raise” whenever they appear before a voiceless consonant.
True Patriot Sounds

• Canadian English is unique in that it has the following combination of phonological rules:

  • Flapping
    • alveolar stops becomes voiced flaps at the beginning of unstressed syllables

  • Raising
    • /aj/ → [∧j] / ___ [-voice]
    • /aw/ → [∧w] / ____ [-voice]

• It turns out there are cases where both rules might apply--
  • Ex: the word “writer”
  • In these cases, which one should apply first?
The Right Way(s)

- “write” + “-er” = “writer”  (one who writes)
  phonemic form:  /rajt/ + /r/
  raising:  [rájtr]
  flapping:  [rájrr]
  phonetic form:  [rájrr]

- “ride” + “-er” = “rider”  (one who rides)
  phonemic form:  /rajd/ + /r/
  raising:  [rájdr]  (does not apply)
  flapping:  [rájrr]
  phonetic form:  [rájrr]
The Wrong Way

• “write” + “-er” = “writer”  (one who writes)
  phonemic level:  /rajt/ + /r/
  flapping          [rāj̃r]
  raising:          [rāj̃r]  (does not apply)
  phonetic level:   * [rāj̃r]

• The diphthong in “writer” is [ʌj], even though it is followed by a voiced sound

• ⇒ Raising had to apply before flapping

• Raising applied to units which don’t appear in the phonetic form!
By the way...

• The technical term for this phenomenon is **opacity**.
  • You *can’t see* the environment for a phonological rule
  • You can only see its results
• This is another example of structure in language that is not apparent on the surface…
  • remember “unlockable”?
  • = morphological ambiguity
• (Note: we’ll see it again)
And now for something completely different.

• A (very) long time ago…
  • I talked about the fact that there are some strings of (English) sounds which don’t sound like they could possibly be English words.

• Possible English words:
  • plab forch beeg shump staz hibber crong trab

• Unpossible English words:
  • fmort glsik rmak msile vlash zpin ngotch ptud

• The unpossible English words violate what are called the **phonotactic** rules of the language.
Syllable Structure

• In order to understand phonotactics, it is necessary to first take a look at syllables and syllable structure.

• Syllables are suprasegmental units;
  • they organize segments into minimal-sized utterances in a language.

• Syllables have three sub-parts:
  • the onset
  • the nucleus
  • the coda

• Together, the nucleus and coda form the rhyme.
Sonority and Syllables

- Syllables are generally organized around a phonological property called **sonority**.
  - basically: sonority = perceived loudness
- Sonorants (vowels, liquids, nasals, glides) have lots of sonority;
  - obstruents (stops and fricatives) have less.
- Basic idea: the most sonorous segments in a syllable form the “peak” or **nucleus** of the syllable.
  - vowels make good peaks;
  - sonorant consonants are second-best;
  - obstruents are really bad…
For Example

• [bæd] is a well-formed syllable in English.

\[
\text{[\text{æ}]} \quad \text{high sonority}
\]

\[
\begin{align*}
\text{[b]} & \quad \text{low sonority} \\
\text{[d]} & \quad \text{low sonority}
\end{align*}
\]
Sonority and Syllables

- [blænd] works well, too.

- [æ]
  - [l]
  - [n]

- [b]  [d]

- high sonority
- low sonority
Technical Terms

sonority peak

[æ]

l n

[b] [d]

high sonority

low sonority
Technical Terms

- The sonority peak forms the **nucleus** of the syllable.
Technical Terms

• The sonority peak forms the **nucleus** of the syllable.
• The sounds that precede the nucleus form the syllable **onset**.

![Diagram showing the sonority peak, nucleus, and onset with examples of sounds such as [b], [l], [æ], [n], [d], and arrows indicating high and low sonority.](image)
Technical Terms

• The sonority peak forms the **nucleus** of the syllable.
• The sounds that precede the nucleus form the syllable **onset**.
• The sounds that follow the nucleus form the syllable **coda**.

![Diagram with symbols and labels representing sonority levels and syllable components](image-url)
Technical Terms

- The sonority peak forms the **nucleus** of the syllable.
- The sounds that precede the nucleus form the syllable **onset**.
- The sounds that follow the nucleus form the syllable **coda**.
- Together, the nucleus and coda form the syllable **rhyme**.
Phonotactics

- **Phonotactic constraints** determine what sounds can be put together to form syllables in a language.

- Ex: English onsets
  
  `/kl/ is okay: “clean” “clamp”`
  `/pl/ is okay: “play” “plaque”`
  `/tl/ is not okay: *tlay *tlamp`

- If we ever encounter a word that starts with `/tl/`, we have to do something about it.

- How do you say “Tlingit”?

- Or “Dmitri”? 
Interesting Patterns

• Check out the following words:
  - Atlantic
  - atrocius
  - America
  - arcade
  - astronomy
  - arthritic

• When is the first vowel a [ə]?

It seems to have something to do with the letter [ɛ], for it seems to change the way it is pronounced. However, I am completely confused about the pattern. I have found this quick and write the hardest one yet! AAAH! :(
Linguistics 201

Quick Write #17: Syllable Structure

Consider the following English words:

Atlantic atroclesious
America arcade
astronomy arthritis

Each one of these words begins with the letter "a". When is this "a" pronounced (phonetically) with a [ə], and when is it pronounced with a different vowel? Is there a pattern you can see which determines when it is pronounced with one vowel or the other?

NO.
Quick Write #17: Syllable Structure

Consider the following English words:

Atlantic, atrocious
America, arcade
astronomy, arthritic

Each one of these words begins with the letter "a". When is this "a" pronounced (phonetically) with a [ə], and when is it pronounced with a different vowel? Is there a pattern you can see which determines when it is pronounced with one vowel or the other?

"When "a" makes a syllable all by itself, it is pronounced differently than when it is compounded with another consonant."

• Is there a difference between the /t/ in ‘atrocious’ and the /t/ in ‘Atlantic’?

• Why?
Other Languages

• Phonotactic constraints may become active when words cross language boundaries

• In Spanish, the following consonant clusters cannot start a syllable or a word:
  */sp/
  */st/
  */sk/

• Example Spanish pronunciation of English:
  • “student” → [ɛstʊdɛnt]
Sound Substitution

• In borrowings, languages often substitute native sounds for non-native sounds.

• They may also break up sound sequences to satisfy native phonotactics.

• Example:

  English “birth control” [bɹθ kəntʰrɒl]
  Japanese: [baːsu kontoroːru]

• Or Hawaiian: [mele kelikimaka] for “Merry Christmas”