Phonological Processes
Example 1 - Can

- I can ask  
  \[\text{[aɪ kən æsk]}\]

- I can see  
  \[\text{[aɪ kən siː]}\]

- I can bake  
  \[\text{[aɪ kəm beɪk]}\]

- I can play  
  \[\text{[aɪ kəm plɛɪ]}\]

- I can go  
  \[\text{[aɪ kəŋ ɡəʊ]}\]

- I can come  
  \[\text{[aɪ kəŋ kəm]}\]
Listen to the difference in the vowels in each of the following groups of words:

- pick pig pin ping pink
- peck peg
- lend length send strength
- back bag ban bang
- rack rag ran rang rank
Phonological processes (descriptive or ‘informal’ version):

- /n/ is pronounced as [m] before a labial plosive
- /n/ is pronounced as [ŋ] before a dorsal plosive
- /n/ is pronounced as [n] elsewhere
Example 2

- Consider the word *please*. A speaker will store this word in memory as the string of phonemes /pliːz/, but when he or she utters the word it appears as the sequence of sounds [pʰliy۸z].

- What are the particular phonological rules required to derive [pʰliy۸z] from /pliːz/?
Example 2 (cont.)

- Aspiration
- Liquid and Glide Devoicing
- Vowel Lengthening

- What are these?
Phonology is not a static system in which an established unit remains unchanged in all its occurrences. Rather, it is a dynamic system in which units change as they come into contact with other units in the system. We refer to such changes as phonological processes.
Ultimately, the modification of sounds seems to follow natural principles related to physiological and psychological strategies. Some phonological processes may be explained as muscle coordination within the vocal mechanism. Others may be due to perceptual strategies that enhance effective communication.
Some rules make sequences of sounds *easier to pronounce*. When we say [kæm bi:] instead of [kæn bi:], we produce two bilabial sounds in a row (using a single lip gesture) instead of making an alveolar [n] and then a bilabial [b] (using two different gestures).

Some rules make sounds *easier to perceive*, as when voiceless stops are aspirated at the beginning of a stressed syllable.
Types of phonological processes

- Assimilation
- Dissimilation
- deletion (elision)
- insertion (epenthesis)
- metathesis
Assimilation

- One of the most common types of processes found in language is assimilation, in which a sound takes on the characteristics of a neighboring sound. … There are two necessary components that define assimilation: first, a sound that changes (the assimilating sound) and second, the sound that causes the change (the conditioning sound).
- Rules involving assimilation cause a sound to become more like a neighboring sound with respect to some feature.
impotent, immature
i[ŋk]onclusive, i[ŋɡ]ratitude
/kæn/ vs. [kən æsk], [kəm beyk], [kəŋ gow]
house-shoe, spaceship, butcher’s shop
Voicing assimilated

- cat[s], tap[s], pack[s] vs. cab[z], lid[z], tag[z]
- pick[t], rap[t], pass[t] vs. brag[d], razz[d], rib[d]
- have/has to, of course, newspaper, lobster, his son, width
- the shop's open, that's all
Dissimilation

Whereas assimilation refers to the process in which segments take on the character of neighboring segments, dissimilation refers to the process in which segments change to become less like a neighboring segments.

On the whole, dissimilation is much rarer than assimilation …
Dissimilation: examples

- fifth /fɪfθ/ → [fɪft]
- sixth /sɪksθ/ → [sɪkst]
- In some varieties of English, the deletion of \( r \) may be accounted for in terms of a dissimilation process.
  - suprise for surprise, libary for library, govenor for governor
Neutralization

- Particular processes that result in the cancellation of contrasts between phonological units are often described by the term neutralization.
- Two or more units that ordinarily contrast lost that contrast in certain environments. Normally, the process changes the form of one unit to that of the other.
Neutralization (cont.)

- X
- Y
- contrasting phonological unit
- neutralization

- English vowel reduction
English vowel reduction

- [téləgæf] vs. [təlɛɡrəfɪ]
- [fɔwɛtɛɡræf] vs. [fətɑɡrəfɪ]

[ə] [ɛ] [æ] [ɔw] [a]

vowel reduction

[ɔ]
More on vowel reduction

- abolish vs. abolition
- interrogate vs. interrogation vs. interrogative
- reveal vs. revelation
- person vs. personify
- impose vs. imposition
- graduate (noun or adjective) vs. graduate (verb)
- advocate (adjective) vs. advocate (verb)
Deletion

- Consonant deletion
  - Consonant Cluster Simplification
  - [h]-deletion in unstressed syllables
- Vowel deletion
  - Deletion of a vowel in an unstressed syllable
- Other cases
Consonant Deletion

- Consonant Cluster Simplification
  - coast guard, west side, chestnut, cracked pot, directly, exactly
  - standpoint, handbag, grandma
  - stained glass, stringed musical instrument
  - frosts, tempts, lifts, facts
  - pumpkin, jump suit, dump truck, asked
  - depths, sixths, fifths, months, lengths, eighths, clothes
- [h]-deletion in unstressed syllables
  - He handed her his hat.
Unstressed vowel deletion

Voiceless stop insertion:

- Between a nasal and a voiceless fricative, a voiceless stop with the same place of articulation as the nasal is inserted.
- dance, strength, hamster
- Dollars & Sense
Plural forms and regular past tense

- bugs [bʌɡz]    begs [bɛɡz]
- rocks [rɒks]    picks [pɪks]
- buses [bʌsɪz]   buzzes [bʌzɪz]
Metathesis

- It is possible to change the linear order of segments by permutations of one type or another. When two segments reverse positions, the process is known as metathesis.
  
- /æstərɪks/ for asterisk
- /kʌmftəbəl/ for comfortable
- /ɪntərdjus/ for introduce
- /njʊkʃələr/ for nuclear
- /prəti/ for pretty
Rules for English Allophones

- Aspiration
- Flapping
- Devoicing
- Length
- Release
- Glottalization
- Syllabic consonants
- Dental assimilation
- Deletion or shortening
- Insertion
- Velar fronting
- Velarization
- Nasalization
Voiceless stops /p, t, k/ are aspirated when they are syllable initial.

- *pip, test, kick*
Unaspirated voiceless stops

- Voiceless stops /p, t, k/ are unaspirated after /s/ at the beginning of a syllable.
  - *spew, stew, skew*
Alveolar stops /t, d, n/ (and alveolar nasal plus stop sequences) become voiced taps when they occur between two vowels, the second of which is unstressed.

- fatty, data; divinity (cf. mutton [mʌtŋ])
Aspirated / Unaspirated stops and flap: between words

- at all
- about it
- stop it
- look out
- check it out
- take a look at it
- it was a rip-off
Approximant Devoicing

- The approximants /w, j, r, l/ are devoiced after initial /p, t, k/.

- play, twin, cue
Voiceless Unstressed Vowels

- A reduced (or unstressed) vowel may be voiceless when it occurs after a voiceless stop.

  - potato, catastrophe
  - permission, tomato, compare
Syllables are completely voiceless when the unstressed vowel follows a voiceless stop cluster with /r/ or /l/.

- preparatory, spectrograph, introduction
- replicate, complicate
Voiced obstruents (stops and fricatives) are not fully voiced throughout the articulation when they occur at the end of an utterance or before a voiceless sound. *(improve, add two)*
Consonants are longer when they occur at the end of a phrase. (don vs. nod)

Voiceless consonants are longer than the corresponding voiced consonants when at the end of a syllable. (back vs. bag)
Length-related Rules (Vowels)

- A given vowel is longest in an open syllable, next longest in a syllable closed by a voiced consonant, and shortest in a syllable closed by a voiceless consonant. *(see vs. seed, seat; sigh vs. side, site)*

- Vowels are longest in monosyllabic words, next longest in words with two syllables, and shortest in words with more than two syllables. *(speed, speedy, speedily)*

- Vowels are longer in stressed syllables *(belów vs. bíllow)*
Stops are unexploded before another stop.

apt, act
Glottalization

- /t/ may be completely replaced by a glottal stop before a syllabic nasal consonant. (*beaten* [biɾə])
Syllabic Nasals

- Nasals are syllabic at the end of a word when immediately after an obstruent consonant.

- *leaden*, *chasm*
Lateral and retroflex are 'liquids.'

- Liquids may be syllabic when at the end of a word and immediately after another consonant.

- *paddle*, *whistle*; *kennel*, *channel*
- *sabre*, *razor*, *hammer*, *tailor*
Dental /t, d, n, l/

- Alveolar consonants become dental before a dental consonant.

- *eighth* [eɪθ], *tenth*, *wealth*
Alveolar stops are deleted when between two consonants.

- **most** _people_, **sand** _paper_, **best** _game_, **grand** _master_, **coast** _guard_, **west** _side_, **chest** _nut_, **stained** _glass_
A consonant is shortened when it is before an identical consonant. (*big game, top post*)

It is usually not true to say that one of these consonants is dropped; even in casual speech, most people would distinguish between “stray tissue, straight issue, straight tissue.”
Epenthetic Stops

- A voiceless stop may be inserted after a nasal and before a voiceless fricative followed by an unstressed vowel.

- *something* [sampθɪŋ], *youngster* [jʌŋkstər]
- *tense* vs. *tents*; *prince* vs. *prints*
- *cόncert* vs. *concérted, concérn*
Velar Fronting

- Velar stops become more front as the following vowel in the same syllable becomes more front.
  - cap, kept, kit, key
  - gap, get, give, geese
A lateral consonant is velarized when after a vowel and before another consonant or the end of a word.

- file vs. life
- talc vs. clap
Nasalization

- Vowels are nasalized before a nasal consonant.

- *ban* [bãːn]