



SPAU133

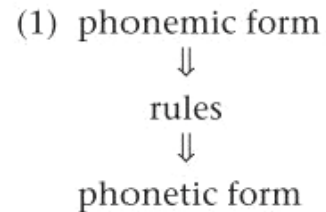
Lecture 13 + Phonology

From the book (pages 122-129)

3.3.1 Phonological Rules

In File 3.2, we discussed the fact that phonemes and (allo)phones belong to different levels of structure in language—that is, phonemes are abstract mental entities, and phones are physical events. In this file we consider the connection between these two levels.

The mapping between phonemic and phonetic elements can be described using **phonological rules** (recall from Section 1.2.3 that a rule of grammar expresses a pattern in a language). A speaker's knowledge of phonological rules allows him or her to “translate” phonemes into actual speech sounds; knowledge of these rules forms part of the speaker's linguistic competence. The mapping between the phonemic form, also called the **underlying form**, and the actual phonetic form of a word by means of phonological rules can be represented with the diagram in (1).



As an example, consider the English words *seat* /sit/ and *loot* /lut/. These words have a final /t/ sound in their phonemic form that is often pronounced as [t], at least in careful speech.¹ Now compare the pronunciation of /t/ in the forms of these words when the suffix *-ed* is added, as shown in (2).²

(2)	seat	[sit]	seated	[sɪəd]
	loot	[lut]	looted	[luəd]

As discussed in File 3.2, the phoneme /t/ is pronounced as the flap [ɾ] when it occurs between two vowels, specifically when the preceding vowel is in a stressed syllable and the following vowel is in an unstressed syllable. This observation about English can be stated as the descriptive rule in (3). (Note that this rule is simplified; as we know from File 3.2, there are more allophones of /t/ than just [t] and [ɾ].)

Another assimilation process is **palatalization**. Palatalization refers to a special type of assimilation in which a consonant becomes like a neighboring palatal. For example, when American English speakers say *Did you?* rapidly, they very often pronounce it as [dɪdʒu]. The sounds [d] (the alveolar stop from the end of *did*) and [j] (the palatal glide from the beginning of *you*) combine to form the post-alveolar affricate [dʒ]. In this case, the palatal nature of the glide has been assimilated by the stop, making it a post-alveolar affricate. High and mid front vowels such as [i] and [e] also cause this change. The most common types of palatalization occur when alveolar, dental, and velar stops or fricatives appear before a front vowel. So the following are all common types of palatalization: [t] → [tʃ]; [d] → [dʒ]; [s] → [ʃ]; [k] → [tʃ]; [g] → [dʒ]. While there are variants on palatalization, and other sounds can be palatalized, the main things to look for are a sound becoming a palatal or post-alveolar and/or a phonological rule conditioned by a high or mid front vowel.

The rules of assimilation that we've discussed so far cause sounds to assimilate to **adjacent** sounds. This is a common way that assimilation occurs. However, long-distance assimilation also exists, and a relatively common type of long-distance assimilation is called **vowel harmony**. This typically causes all the vowels in a word to "harmonize" or agree in some property such as rounding or backness.

Finnish has a common type of vowel harmony rule, which can be stated as follows:

(13) **Vowel harmony** (Finnish): A back vowel becomes front when preceded by a front vowel in the same word.

By this rule, Finnish words have, with few exceptions, either all front vowels or all back vowels, but not both in the same word. We can see the vowel harmony rule in action when a suffix is added to the end of a word. In this case, the suffix vowel changes to match the quality of vowels in the word. For example, the suffix meaning 'in' has the form [-ssa] when added to a word where the last vowel is back, as in [talo] 'house,' [talossa] 'in the house.' However, the suffix takes the form [-ssæ] when it attaches to a word with a final front vowel, as in [metsä] 'forest,' [metsæssæ] 'in the forest.' In cases like this, we can say that the vowel of the suffix harmonizes with, or assimilates to, the preceding vowel.

b. Dissimilation. Unlike assimilation, which makes sounds more similar, rules of **dissimilation** cause two close or adjacent sounds to become less similar with respect to some property, by means of a change in one or both sounds. An example of dissimilation in Greek is the following:

c. Insertion. Phonological rules of **insertion** cause a segment not present at the phonemic level to be added to the phonetic form of a word. An example of this kind of rule from English is voiceless stop insertion.

k/ʌ/ p/

(15) **Voiceless stop insertion** (English): Between a nasal consonant and a voiceless fricative, a voiceless stop with the same place of articulation as the nasal is inserted.

Thus, for instance, the voiceless stop insertion rule may apply to the words *dance* /dæns/ → [dænts], *strength* /stɹɛŋθ/ → [stɹɛŋkθ], and *hamster* /hæmstɹ/ → [hæmpstɹ].

d. Deletion. **Deletion** rules eliminate a sound that was present at the phonemic level. Such rules apply more frequently to unstressed syllables and in casual speech. English examples include:

(16) **/h/-Deletion** (English): /h/ may be deleted in unstressed syllables.

The /h/-deletion rule would apply to a sentence such as *He handed her his hat* /hi hændəd hɪ hɪz hæt/ to yield [hi hændəd ɪz hæt]. Deletion is common in fast speech because it saves time and articulatory effort. Sounds like [h] that are not very perceptible are often the “victims” of deletion because speakers can save time and effort by deleting them without sacrificing much information. That is, the listener may not be relying on these sounds in order to understand what the speaker is saying.

f. Strengthening. Rules of **strengthening** (also called fortition) make sounds stronger. The rule of English aspiration, as stated below, provides an example:

(18) **Aspiration** (English): Voiceless stops become aspirated when they occur at the beginning of a stressed syllable.

The pronunciations of *pat* [p^hæt] and *top* [t^hɒp], as discussed in File 3.2, illustrate the application of the English aspiration rule. Aspirated stops are considered to be stronger sounds than unaspirated stops because the duration of voicelessness is much longer in aspirated stops (since it extends through the period of aspiration).

g. Weakening. Rules of **weakening** (also called lenition) cause sounds to become weaker. The “flapping” rule of English, discussed in 3.3.1, is an example of weakening. [ɾ] is considered to be a weaker sound than [t] or [d] because it is shorter and it obstructs air less.

(19) **Flapping** (English): An alveolar (oral) stop is realized as [ɾ] when it occurs after a stressed vowel and before an unstressed vowel.

Note that voicing assimilation is also involved in the change of /t/ to [ɾ]: the /t/ takes on the “voicedness” of the vowels surrounding it.

Another common weakening process in English is the reduction of unstressed vowels. As we saw in Chapter 2, in unstressed syllables vowels are often pronounced as the mid central [ə], or the syllable’s nucleus becomes a syllabic consonant. We have seen many examples of this already, but note in particular the pronunciation of, for example, the words *atom* /ætəm/ → [ˈæɾm] and *atomic* /ætəˈmɪk/ → [æˈtʰəˌmɪk], in which vowel reduction can be seen, along with flapping or aspiration of /t/, depending on which syllable is stressed.

3.3.4 Multiple Rule Application

To this point we have mostly talked about examples where only one phonological rule applies. In reality, there is often more than one process that occurs between a given phonemic form and the phonetic output. This can be seen particularly easily with regard to the English rules that involve stress, such as flapping, aspiration, /h/-deletion, and vowel reduction. In most of these cases, since the processes are independent of each other, we can conceive of multiple rules applying at the same time without a problem. For example, in (20) we can see that there is no need to order flapping and vowel reduction with respect to each other in the pronunciation of *photograph*. Since flapping does not affect the environment in which vowel reduction takes place, nor vowel reduction the environment in which flapping takes place, applying one rule before the other does not change the outcome.

- (20) a. **phonemic form:** /'fɒtəʊɡræf/
 flapping: 'fɒrəʊɡræf
 vowel reduction: 'fɒrə,ɡræf
 phonetic form: ['fɒrə,ɡræf]
- b. **phonemic form:** /'fɒtəʊɡræf/
 vowel reduction: 'fɒtə,ɡræf
 flapping: 'fɒrə,ɡræf
 phonetic form: ['fɒrə,ɡræf]