1 Syllables

1.1 What are syllables?

Syllables are phonological units that are hypothesized to

1. span multiple segments
2. have internal constituent structure
3. simplify the description of phonological processes and cross-linguistic facts.

The big questions w.r.t. syllables should be familiar:

1. What is the right representation at the surface?
2. What is the right representation underlyingly (if any)?
3. What is the nature of syllabification as a phonological process?

1.2 Representing syllables

Syllables are represented in the surface forms in two ways. One is just by placing periods between the syllable boundaries. For example, the word *creaky* could be written [kri.ki]. This notation is ambiguous in the following sense. First it implies a linear structure (in contrast to what we will see below.) Second, it is often considered an acceptable shorthand for a more hierarchial structure, which reveals the internal syllable structure.

Syllables are assumed to have a **nucleus**, which is usually a vowel, or some other sonorous speech sound. Any consonants before the nucleus are called the **onset** of the syllable and any consonants after the nucleus are called the **coda**. The **rime** refers to both the nucleus and the coda. When words have onsets, codas or nuclei that span more than one segment, they are said to be **complex**. Sometimes these are also called **branching**.

Here is an example showing showing a syllable in terms of a hierarchial representation for the word *trance*. 
So there are at least two ways, syllables can be represented at the surface, and much research is devoted to examining which of these offers the best explanation.

We might also wonder how syllabification is represented underlyingly. If underlying differences in syllabification were allowed to surface, this would mean that syllabification could be *contrastive* in languages. If syllabification were contrastive, it would mean that there could be a language where [mɪs.tɪ] from [mɪ.stɪ] would be different words with different meanings.

Many scholars maintain that syllabification is *predictable* in every language, and therefore does not need to be included as information in the lexicon. More specifically, syllabic information is not included in the underlying form. Instead there is a *process of syllabification* by which the syllable boundaries or syllable structure is added as part of the mapping from underlying to surface forms. This is the standard view, though of course a couple of potential exceptions have been noted. We will return to this after first discussing some cross-linguistic tendencies.

## 2 Cross-linguistic tendencies

### 2.1 A generalization about syllables: sonority

One school of thought claims the basis for syllables lies in the notion of *sonority*. It has been observed in many different languages that within a syllable the segments are not distributed arbitrarily.
The **Sonority Sequencing Principle** (SSP) says that, within onsets, sounds *increase* in sonority from left to right and that, within codas, sounds *decrease* in sonority from left to right. In other words, as sounds get closer to the nucleus, sonority increases.

★ What is the obvious exception to this in English?

### 2.2 A generalization about syllables: Maximal onsets

It has also been claimed that the possible onsets in a language are only those found at the beginnings of words. This can be used to help determine *word-internal* syllables. According to this principle, English *rustic* ought to be syllabified as *ru.stic* and not *rus.tic* since *st* is a possible onset word initially. Similarly, the English word *mad.ly* must be syllabied as *mad.ly* and not *ma.dly* since *dl* is not a possible onset at the beginnings of words in English (although it does obey the SSP).

### 2.3 More cross-linguistic generalizations

These typological facts come from Blevins (1995) and exclude complex onsets and codas.

<table>
<thead>
<tr>
<th>Languages</th>
<th>onsets</th>
<th>codas</th>
<th>possible syllables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arabela, Siona, Piro, Hua</td>
<td>required</td>
<td>forbidden</td>
<td>CV</td>
</tr>
<tr>
<td>Totonac, Klamath, Nisqually, Tunic, Sedang, Dakota, Thargari</td>
<td>required</td>
<td>allowed, but not required</td>
<td>CV, CVC</td>
</tr>
<tr>
<td>Pirahâ, Mazateco, Fijian, Cayuvava</td>
<td>allowed, but not required</td>
<td>forbidden</td>
<td>V, CV</td>
</tr>
<tr>
<td>English, Gilyak, Finnish, Tamazight Berber, Cairene Arabic, Spanish, Italian, Mokilese, Cuna</td>
<td>allowed, but not required</td>
<td>allowed, but not required</td>
<td>V, CV, VC, CVC</td>
</tr>
</tbody>
</table>

These typological facts suggest that

1. Onsets are preferred because they may be required, and are never forbidden.
2. Codas are dispreferred because they are never required, and may be forbidden.

and raises the following questions:

1. Why are onsets preferred cross-linguistically?
2. Why are codas dispreferred cross-linguistically?

3. What does it mean for something to be (dis)preferred cross-linguistically?

When typological gaps are observed (i.e. a logically possible language type is unattested), either this is accidental or there is a principled explanation for the gap.

2.4 A perceptual-based explanation

Recently, a generalization has been discussed which aims to replace the SSP with a phonetically-grounded explanation. (This position has been articulated by Donca Steriade and her colleagues.) This competitor hypothesis argues that speech sounds tend to be distributed in such a way such that they can be most easily perceived. Here are some examples of the kinds of explanations offered.

1. Obstruent codas are dispreferred because the cues for identifying the place of articulation of a stop are often in its release. Coda position means there is no release. The same reasoning can explain why onsets are preferred locations for obstruents: they are followed by more sonorous sounds which allows the cues in the release to be present and available to the listener.

2. Fricatives like [s] are often exceptions to the SSP because unlike other sounds, these sounds have strong internal cues which allow them to be recognized.

3 Syllabification as a process (in rule-based theories)

We now turn to the process of syllabification itself.

In SPE-style analyses, instead of rules, syllables are determined by a very simple procedure.

1. Scanning from left to right identify the most sonorous sounds (usually vowels) in the word, and project a syllable node from them. These vowels are syllable nuclei.

2. For each syllable node, link to a consonant to the left of the vowel (if there is one). This consonant is (part of) the onset.

3. Then, for each syllable node, link to a consonant to the right of the vowel (if there is one). This consonant is (part of) the coda.

4. Unlinked segments are linked to existing syllable nodes provided they respect the Sonority Sequencing Principle and the Maximum Onset principle wherever possible.

5. Finally, if any sounds remain unlinked they can be marked as being “unsyllabified” speech segments.

This basic analysis can be modified on a language specific basis as needed. The most articulated theory of syllabification in a rule-based framework is given by Frampton (2011).
3.1 Allowing rules to refer to syllables simplifies rules

Consider the generalization that could be made for Sierra Popoluca (Kenstowicz and Kisseberth, 1979, p. 42) that nongeminate stops aspirate in coda position.

\[
\begin{align*}
/petkuy/ & \rightarrow [\text{pet}^{h}\text{kuy}] \text{ ‘broom’} \\
/\text{petta}:p/ & \rightarrow [\text{petta}:p^{h}] \text{ ‘it is being swept’} \\
/mok/ & \rightarrow [\text{mok}^{h}] \text{ ‘corn’}
\end{align*}
\]

In this analysis, I will assume that geminates are a single consonant distinguished with the feature \([\text{long}]\).

Without reference to syllables we would write

\[
\left[\begin{array}{c}
-k\text{ontinuant} \\
-k\text{delayedrelease}
\end{array}\right] \rightarrow [+\text{spread glottis}] / \underline{\{C, \#\}}
\]

With syllables we can write:

\[
\left[\begin{array}{c}
-k\text{ontinuant} \\
-k\text{delayedrelease}
\end{array}\right] \rightarrow [+\text{spread glottis}] / \underline{\{\sigma}\}
\]

The notion of syllables unifies the environments \underline{C} and \underline{\#}.

★ In order for this rule to make sense, when does syllabification have to occur?

Let’s examine Tibetan numerals again in light of this (Halle and Clements, 1983).

\[
\begin{align*}
\text{d}3\text{u} & \text{ ‘ten’} \\
\text{d}3\text{ig} & \text{ ‘one’} \\
\text{d}3\text{u}g\text{d}3\text{ig} & \text{ ‘eleven’} \\
\text{f}1 & \text{ ‘four’} \\
\text{d}3\text{ub}f\text{i} & \text{ ‘fourteen’} \\
\text{f}ib\text{d}3\text{u} & \text{ ‘forty’} \\
\text{gu} & \text{ ‘nine’} \\
\text{d}3\text{ur}g\text{u} & \text{ ‘nineteen’} \\
\text{gub}\text{d}3\text{u} & \text{ ‘ninety’} \\
\eta\text{a} & \text{ ‘five’} \\
\text{d}3\text{u}\eta\text{a} & \text{ ‘fifteen’} \\
\text{nd}ab\text{d}3\text{u} & \text{ ‘fifty’}
\end{align*}
\]
References


