Phonology: Syllable Structure I

1 Overview

• Syllable structure (onset, rime, nucleus, coda)

• Complex onset
  – Sonority Sequencing Generalisation
  – Minimal Sonority Distance
  – OCP

• Onset first

2 Syllable structure

Sounds in natural languages are not just a string of phones, but they constitute a hierarchical structure. The structure is called syllable (notated as \( \sigma \)) and thought to take the following form:

\[ \sigma \]

\[
\begin{array}{c}
\text{Onset} \\
\hline
\text{Nucleus} \\
\hline
\text{Rime} \\
\hline
\text{Coda}
\end{array}
\]

The initial and final consonants are called onset and coda respectively. The core part of the syllable structure is nucleus which is filled by a vowel. The combination of nucleus and coda is Rime (or Rhyme) (cf. (2)).

(2)  
  a. pat, bat, cat, fat: sharing nucleus and coda (rhyme)
  b. pat, pan, pad, pack: sharing onset and nucleus (nothing special)
c. *pat*, *pit*, *pot*, *put*: sharing onset and coda (nothing special)

One word can contain more than one syllable:

(3) *captain, active, septic* and *rustic*

\[\sigma\]
\[O\]
\[R\]
\[O\]
\[R\]
\[N\]
\[Cd\]
\[N\]
\[Cd\]
\[k\]
\[æ\]
\[p\]
\[t\]
\[n\]

Note that not all syllables are CVC, i.e. they may lack onset or coda (*law, lawn, awl* and *awe*):

(4) a. \[\sigma\]
\[O\]
\[R\]
\[O\]
\[R\]
\[N\]
\[Cd\]
\[∅\]
\[∅\]

b. \[\sigma\]
\[O\]
\[R\]
\[O\]
\[R\]
\[N\]
\[Cd\]
\[n\]
\[∅\]
\[∅\]

c. \[\sigma\]
\[O\]
\[R\]
\[O\]
\[R\]
\[N\]
\[Cd\]
\[∅\]
\[1\]
\[∅\]

3 Onset

3.1 Complex onset in English

(5) \[\sigma\]
\[O\]
\[R\]
\[N\]
\[p\]
\[e\]
\[l\]

(6) a. Possible complex onset:
\[[pl],[bl],[fl],[sl],[kl],[gl],[p\rm],[b\rm],[f\rm],[\emptyset\alpha],[\emptyset\eta],[\emptyset\iota],[\emptyset\alpha],[\emptyset\eta],[\emptyset\iota],[\emptyset\alpha],[\emptyset\eta],[\emptyset\iota],[\emptyset\alpha],[\emptyset\eta],[\emptyset\iota]]

b. Impossible complex onset:
\[*[lp],[am]* etc.

- A native speaker of English knows whether the combination (*phonotactics*) of consonants is possible for an onset or not.

- Possible combinations of English onset are regulated by *phonological constraints.*
(7) Sonority scale:

<table>
<thead>
<tr>
<th>Position</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most sonorous</td>
<td>5 Non-high vowels</td>
</tr>
<tr>
<td></td>
<td>4 High-vowels (Glides)</td>
</tr>
<tr>
<td></td>
<td>3 Liquids</td>
</tr>
<tr>
<td></td>
<td>2 Nasals</td>
</tr>
<tr>
<td>Least sonorous</td>
<td>1 Obstruents</td>
</tr>
</tbody>
</table>

(8) Sonority profile

```
5  *  5  *
4  4
3  *  3  *
2  2
1  *  1  *
   p  l  et  1  p  et
```

(9) **Sonority Sequencing Generalisation:**

The sonority profile of the syllable must rise until it peaks, and then fall.

(Roca and Johnson 1999:255)

Some puzzles: why are the following complex onsets unacceptable even though their sonority rises?

(10) obstruent (stop) + nasal (1 → 2):

* *[pn], *[pm], *[gm], *[kn] etc.

Another phonological constraint:

(11) **Minimal Sonority Distance:**

The sonority distance between the two elements of a complex onset must be far enough (2 in English).

More puzzles: why are the followings unacceptable even though their sonority rises and the distance is far enough?

(12) *[pw], *[bw], *[fw], *[tl], *[dl], *[ðl]

One more constraint:

(13) **Obligatory Contour Principle (OCP):**

Two adjacent segments must not be similar.

That is, the places of articulation in (12) are too close.

3.2 **Onset fulfillment**

(14) a. *traffic [tæfɪk], lattice [lætɪs], moving [muvɪŋ]*
Why is (14b), not (14c), the correct syllable structure for [tœfik]?

(15) **Minimal Onset Satisfaction:**
Minimal satisfaction of onsets takes priority over satisfaction of codas.

Roca and Johnson (1999:279)

(16)  
\[
\begin{align*}
\text{a.} & \quad \text{actress} \ [æktœs], \ \text{comply} \ [kœmplai], \ \text{compress} \ [kœmpœs] \\
\text{b.} & \quad \sigma \quad \sigma \\
& \quad R \quad O \quad R \\
& \quad N \quad Cd \quad N \quad Cd \\
& \quad æ \quad k \quad t \quad œ \quad s \\
\text{c.} & \quad * \quad \sigma \\
& \quad R \quad O \quad R \\
& \quad N \quad Cd \quad N \quad Cd \\
& \quad æ \quad k \quad t \quad œ \quad s
\end{align*}
\]

Why is (16b), not (16c), the correct syllable structure, though both satisfy the Minimal Onset Satisfaction?

(17) **Onset Maximasation Principle:**
Maximal formation of onsets takes priority over formation of codas.

Roca and Johnson (1999:283)

**References**


Exercises

(1) Draw the sonority profiles of the following words. Identify the nuclei and the syllable boundaries (Roca and Johnson 1999:259):

a. compass
b. cocoa
c. trigger

(2) Break the following words into syllables, and, applying the Maximal Onset Principle, identify the onsets, nuclei and codas by providing a diagram such as that in (14, 16) (Radford et al. 1999:102).

a. comfortable
b. confessional
c. cooperative
d. existentialism