The syllable
• Early generative phonology didn't recognize the syllable as a relevant unit.
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• But, some processes refer to the syllable
• Nasal assimilation in Spanish

- Assimilation occurs
  • [um beso] a kiss
  • [uŋ gato] a cat
  • [uŋ tʃarko] a puddle
  • [uŋ weβo] an egg
Nasal assimilation in Spanish

- Assimilation occurs
  
  • [um beso] a kiss
  • [uŋ gato] a cat
  • [uŋ tʃarko] a puddle
  • [uŋ weβo] an egg

- Assimilation doesn't occur
  
  • [mweβo] not *[ŋweβo] I move
  • [nweβo] not *[ŋweβo] new
• Nasal assimilation in Spanish
  - Maybe assimilation only occurs word-finally
    • [uŋ gato] a cat
    • [uŋ tʃarko] a puddle
• Nasal assimilation in Spanish
  - Maybe assimilation only occurs word-finally
    • [uɲ gato] a cat
    • [uɲ tʃarko] a puddle
  - Actually it occurs word-internally too
    • [uŋgaro] Hungarian
    • [aŋʧo] wide
• Nasal assimilation in Spanish
  - But if it occurs between words and within words, why doesn't it apply within words to:
    • [mweβo] not *[ŋweβo]
    • [nweβo] not *[ŋweβo]
    • I move
    • new
• Nasal assimilation in Spanish
  - But if it occurs between words and within words, why doesn't it apply within words to:
    • [mweβo] not *[ŋweβo] I move
    • [nweβo] not *[ŋweβo] new
  - To explain this we need to look at syllabification
• Nasal assimilation in Spanish
  - Nasals in syllable final position assimilate
    • [uŋ.ga.to] a cat
    • [uŋ.we.βo] an egg
    • [uŋ.ga.ro] Hungarian
    • [aŋ.tʃo] wide
Nasal assimilation in Spanish

- Nasals in syllable final position assimilate
  - [uŋ.ga.to] a cat
  - [uŋ.we.βo] an egg
  - [uŋ.ga.ro] Hungarian
  - [aŋ.ʧo] wide

- Nasals in syllable initial position don't assimilate
  - [mwe.βo] not *[ŋwe.βo] I move
  - [nwe.βo] not *[ŋwe.βo] new
• Nasal assimilation in Spanish
  - Nasals in syllable final position assimilate
    • [uŋ.ga.to] a cat
    • [uŋ.we.βo] an egg
    • [uŋ.ga.ro] Hungarian
    • [aɲ.tʃo] wide
  - Nasals in syllable initial position don't assimilate
    • [mwe.βo] not *[ŋwe.βo] I move
    • [nwe.βo] not *[ŋwe.βo] new
  - You can't explain this without invoking syllables
• /s/ voicing in Spanish
  - /s/ > [z] before voiced non-vowels
    • /bejsβol/ > [beizβol] (within a word)
    • /los weβos/ > [loz weβos] (across words)
    • /los jates/ > [loz jates] (across words)
• /s/ voicing in Spanish
  - /s/ > [z] before voiced non-vowels
    • /bejβol/ > [beizβol] (within a word)
    • /los weβos/ > [loz weβos] (across words)
    • /los jates/ > [loz jates] (across words)
  - But it doesn't apply within some words
    • /ðe.sjer.to/ > *[ðe.zjer.to] (within a word)
• /s/ voicing in Spanish
  - So what's the difference? Syllabification
  - /s/ > /z/ across syllables not within a syllable
    • /bejs.βol/ > [beiz.βol] (within a word)
    • /los.we.βos/ > [loz.we.βos] (across words)
    • /los.ja.tes/ > [loz.ja.tes] (across words)
    • /ðe.sjer.to/ > *[ðe.zjer.to] (within a word)
    • /ðes.ðe/ > [ðez.ðe] (within a word)
• /s/ voicing in Spanish
  - Aren't linguists just putting syllable boundaries in places to make this work?
  - No, Spanish speakers will syllabify the words this way
    • Desde is des.de
    • Desierto is de.sier.to
Internal syllable structure
- Most languages have this structure
• Internal syllable structure
  - Most language have this structure
  - Some have this structure (Korean)
• Evidence for the rime
  - Breakfast + lunch = brunch (rimes are in red)
    • Rimes are kept intact
  - Breakfast + lunch = *breach (rimes are in red)
    • Rimes are broken up ea-k and un-ch
  - Sm[ow]ke + f[alpha]g = sm[alpha]g
    • Rimes are kept intact
  - Sm[ow]ke + f[alpha]g = *sm[ow]g (rimes are in red)
    • Rimes are broken up: [ow]-ke and [alpha]-g
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.  

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

\[ \text{[b]} \quad \text{[d]} \quad \text{low sonority} \]
Sonority and Syllables

- [blænd] works well, too.

[æ] [n] [l]

[b] [d]

high sonority

low sonority
Technical Terms

- [æ] (sonority peak)
- [l] (low sonority)
- [n] (low sonority)
- [b] (low sonority)
- [d] (low sonority)
- [i] (high sonority)
Technical Terms

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

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• The sounds that precede the nucleus form the syllable **onset**.
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**.

\[
\begin{align*}
&[\text{high sonority}] \\
&[\text{low sonority}]
\end{align*}
\]
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**.
Syllable Formation
• In order to figure out how to organize a word into syllables, first identify the syllable nuclei
  • = vowels and any syllabic consonants
• Example: “America”

• Then identify any potential onsets to each syllable
  • = consonants preceding the nuclei
Phonotactics

• **Phonotactic constraints** determine what sounds can be put together to form the different parts of a syllable 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”?
Let’s Try Another…

Note 1: both halves of a diphthong combine into one nucleus

Note 2: [rk] is not a possible onset!

⇒The [r] has to form the coda of the preceding syllable

So, Step 3 = remaining consonants go into codas.
The Possibilities are not Endless

• Q: What combination of consonants can form a possible onset?

• A: Any combo that can be found at the beginning of a word.

• [θr] can start a word (“three”), so “arthritic” is syllabified like this:

\[
\begin{align*}
\sigma & \quad \sigma \\
N & \quad O & \quad O \\
C & \quad N & \quad N \\
[a] & \quad \theta & \quad O \\
r & \quad r & \quad t \\
& \quad I & \quad I \\
& \quad [k] & \quad C
\end{align*}
\]
The Possibilities are not Endless

• [tl] and [nt] cannot start words (in English), so they cannot form legal syllable onsets.

• Check out the syllabification for “Atlantic”:

```
\[ S
  | N C
  | \epsilon t
  | O N C
  | I \alpha e n
  | O N C
  | t I k
```
Interesting Patterns

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

• When is the first vowel a [ʌ]? 
• Is there a difference between the /t/ in ‘atrocious’ and the /t/ in ‘Atlantic’? 
• Why?