Variability of Languages in Time and Space

Phonological Typology – Syllables – Suprasegmentals

- Syllable structure and patterns
- Syllable repair processes
- Suprasegmentals: Stress, length, tones
- Two linguistic quizzes

Anja Nedoluzhko
SYLLABLE STRUCTURE
A Syllable is:

- Well-recognized unit in linguistic analysis
  - Easy concept: If listeners differ in syllabifying a word, it is generally the case that both possible syllabifications are possible (pastry = past.ry or pas.try)
- Explains the number of rhythmic units
- This number is usually equal to the number of vowels (but little, eagle)
  - Exceptions?
- Open syllables (bar, day) ↔ Closed syllables (bard, tied)
- Which syllable types are permitted in a language
  - Sequencing of segments within syllables (Consonant, Vowel)

BAD
onset
nucleus
coda

C = consonant
V = vowel
Syllable Structures in Languages

CV  V  CVC  CCV  CVCC  …  CCCCVCCCCC

Simple Syllable Structure
Moderately complex syllable structure
Complex syllable structure
Simple Syllable Structures

- CV
- V
- CVC
- CCV
- CVCC
- ...
- CCCVCCCCCC

(C)V: permitted not to have an initial consonant

Mba (Congo): only CV, also Hawaiian

Fijian (Papua New Guinea): (C)V

Yareba (Papua New Guinea): simple syllable structure

Moderately complex syllable structure
There are strict limits on what kinds of combinations are permitted: The second of two consonants is commonly limited to being one of a small set belonging to either “liquids” \( (r, l) \) or “glides” \( ([w] \) in en. wet)
Complex Syllable Structures

Simple Syllable Structure

Moderately complex syllable structure

Complex syllable structure

(C)(C)(C)V(C)(C)(C)(C)(C)

strengths /strɛŋkθs/

texts /tɛksts/

wals.info
<table>
<thead>
<tr>
<th>Value</th>
<th>Representation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple syllable structure</td>
<td>61</td>
</tr>
<tr>
<td>Moderately complex syllable structure</td>
<td>274</td>
</tr>
<tr>
<td>Complex syllable structure</td>
<td>151</td>
</tr>
</tbody>
</table>

Total: 486

Distribution in WALS

http://wals.info/feature/12A#2/16.6/153.1
Canonical Syllable Patterns

• May be different in different positions (in onset vs. in coda)
  – Italian: allows more than one Consonant in the onset position
    *pro.fon.do ‘deep’, tro.no ‘throne’, blat.ta ‘cockroach’*
    but only a single Consonant in the coda position
    *san.to ‘saint’, pal.ko ‘platform’, tor.ta ‘cake’*
  – Khalkha Mongolian: allows only a single Consonant in the onset, but permits
two Consonant in coda position
Canonical Syllable Patterns

- CV – the most basic and frequent syllable, also within a language where other possible combinations are possible
- CV > CCV > CCCV and CV > V (markedness of the onset)
- CVC > CCV > CVCC > CVCCC
- CV > CVC

C = consonant
V = vowel

Dankovičová&Dellwo 2007
Canonical Syllable Patterns

- CV – the most basic and frequent syllable, also within a language where other possible combinations are possible
- CV > CCV > CCCV and CV > V (markedness of the onset)
- CVC > CCV > CVCC > CVCCC
- CV > CVC
- Examples from 16 genetically diverse languages contained in the UCLA Lexical and Syllabic Inventory Database (ULSID)

Gordon (2016)
Correlations Between Syllable Complexity and Other Properties

• Maddieson (2007), based on data from WALS: finds a positive correlation between complexity of syllable structure and the number of consonants such that languages permitting more complex syllable types tend to have a greater number of consonants.

\[
\begin{align*}
\text{small consonant inventories} & \leftrightarrow \text{simple syllable structure} \\
\text{large consonant inventories} & \leftrightarrow \text{complex syllable structures}
\end{align*}
\]

<table>
<thead>
<tr>
<th>Consonants</th>
<th>Simple</th>
<th>Moderate</th>
<th>Complex</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>20</td>
<td>42</td>
<td>16</td>
<td>78</td>
</tr>
<tr>
<td>Mod. small</td>
<td>13</td>
<td>70</td>
<td>17</td>
<td>100</td>
</tr>
<tr>
<td>Average</td>
<td>16</td>
<td>90</td>
<td>55</td>
<td>161</td>
</tr>
<tr>
<td>Mod. large</td>
<td>3</td>
<td>56</td>
<td>37</td>
<td>96</td>
</tr>
<tr>
<td>Large</td>
<td>8</td>
<td>15</td>
<td>23</td>
<td>46</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>60</strong></td>
<td><strong>273</strong></td>
<td><strong>148</strong></td>
<td><strong>481</strong></td>
</tr>
</tbody>
</table>
Many languages have productive processes to ensure that their syllables adhere to language-internal constraints on syllable structure

Most varieties of Arabic have restrictions against complex onsets and codas. In case morpheme concatenation brings together three consonants, an epenthetic /i/ is inserted to break up the clusters.

Location of the epenthetic vowel depends on the dialect

Cairene Arabic
(a) /ʔul-t-l-u/ /katab-t-l-u/  
?ultilu katabtilu ‘I said to him’ ‘I wrote to him’

Iraqi Arabic
(c) /gil-t-l-a/ /katab-t ma-ktuːb/  
gilitla katabit maktuːb ‘I said to him’ ‘I wrote a letter’

Gordon (2016)
Many languages have productive processes to ensure that their syllables adhere to language-internal constraints on syllable structure

- deletion of a segment

A consonant might be deleted if it would otherwise trigger a violation of a constraint against closed syllables or against codas of a certain type.

<table>
<thead>
<tr>
<th>Simple</th>
<th>Perfective</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>api</td>
<td>apit-ia</td>
<td>‘be lodged’</td>
</tr>
<tr>
<td>sopo</td>
<td>sopoʔ-ia</td>
<td>‘go across’</td>
</tr>
<tr>
<td>milo</td>
<td>milos-ia</td>
<td>‘twist’</td>
</tr>
<tr>
<td>oso</td>
<td>osof-ia</td>
<td>‘jump’</td>
</tr>
<tr>
<td>njalo</td>
<td>njalom-ia</td>
<td>‘forget’</td>
</tr>
</tbody>
</table>

*Gordon (2016)*

Austronesian family
Polynesia
redzonansu
oputiminuto
pen
endzin
medo in dz’apan
janki
noto-bukku
supu
n’ujoku-tajmudzu
sekus’on
mota
dokuta
dzigudzagu
tikketto
indakus’on
s’okku
s’oppu
burokku
baransu
uisuki
majru
ojru
surogan
rajburari
ibuningu
bandaridzumu
intab’u
pasento
massadzi
ba
suta
atorakus’hui
oba-koto
supido
dz’anaridzumu
Suprasegmentals

• Vowels and consonants: segments of which speech is composed.
• Segments are composed together to form syllables
• Suprasegmentals (also called *non-segmental or prosodic features*) are superimposed on the syllables. These are other features that are known as:
  – Stress
  – Length
  – Tones
Stress

• Stress is manifested by different acoustic properties
  – increased duration
  – higher fundamental frequency [Hz] (the acoustic analog to the perceptual property of pitch)
  – increased intensity (greater loudness [dB] perceptually)
• Stress is a relative concept
• Stress may cause segmental processes
  – in stressed syllables: Consonants and vowels may undergo fortition processes
  – in unstressed syllables: Consonants and vowels may undergo lenition effects (reduction)
Databases on Stress Patterns

• The majority of languages possess some type of stress system
  – Languages that are reported to lack stress are mostly tonal languages.

• StressTyp, StressTyp2 (Goedemans et al. 2015)
  – a typological database containing information on stress and accent patterns in over 750 of the world's languages with nearly every language family represented
  – http://st2.ullet.net/

• WALS (World Atlas of Language Structures)
  – info on 176 languages
  – In the sample, 141 (roughly 80%) use stress compared to 28 that have only tone or pitch accent.
  – https://wals.info/
Suprasegmentals: Stress

Stress is largely predictable based on phonological properties.

Bounded: the placement of stress is sensitive to properties of syllables.

Unbounded (stress can be anywhere).

Weight-Sensitive (variable) Stress.

Stress is used to contrast lexical items or different morphological forms in a paradigm.
WALS: Fixed Stress Locations
## WALS: Fixed Stress Locations

<table>
<thead>
<tr>
<th>Value</th>
<th>Representation</th>
</tr>
</thead>
<tbody>
<tr>
<td>No fixed stress (mostly weight-sensitive stress)</td>
<td>220</td>
</tr>
<tr>
<td>Initial: stress is on the first syllable</td>
<td>92</td>
</tr>
<tr>
<td>Second: stress is on the second syllable</td>
<td>16</td>
</tr>
<tr>
<td>Third: stress is on the third syllable</td>
<td>1</td>
</tr>
<tr>
<td>Antepenultimate: stress is on the antepenultimate (third from the right) syllable</td>
<td>12</td>
</tr>
<tr>
<td>Penultimate: stress is on the penultimate (second from the right) syllable</td>
<td>110</td>
</tr>
<tr>
<td>Ultimate: stress is on the ultimate (last) syllable</td>
<td>51</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td><strong>502</strong></td>
</tr>
</tbody>
</table>

### Examples

- **Mapudungun**
  - t̪iˈpanto ‘year’
  - eˈlumuˌyu ‘give us’.

- **Winnebago**
  - hochiˈchinik ‘boy’
  - waghiˈghi ‘ball’
Suprasegmentals: Stress

stress is largely predictable based on phonological properties

stress is used to contrast lexical items or different morphological forms in a paradigm

Fixed
- Initial
- Second
- Third
- Antepenultimate
- Penultimate
- Ultimate

Bounded: the placement of stress is sensitive to properties of syllables

Unbounded (stress can be anywhere)

Weight-Sensitive (variable) Stress
Weight-Sensitive Stress

https://wals.info/feature/15A#4/54.68/64.71
Weight-Sensitive Stress: Unbounded

**Russian**

vowel reduction

дорога (doroga)

(1) dorOga /dərOgə/  ‘a road’

(2) dorogA /dərʌgA/  ‘dear’

---

b) to contrast different morphological forms in a paradigm:

mOr’e – ‘a sea’ (Nom.Sg.)
mor’A – ‘seas’ (Nom. Pl)
Weight-Sensitive Stress: Bounded

Alyutor or Alutor is a language of Russia that belongs to the Chukotkan branch of the Chukotko-Kamchatkan languages.

Formulate the stress rules and put the stress for the following words:

- sawat - lasso
- pantawwi - boots
- nǝktǝqin - solid
- nǝminǝm - bouillon
Vowel Length

• Vowel length differs in all languages
  – but only in some languages it makes phonological distinction
• Languages with phonological length distinction
  – Arabic, Czech, Sanskrit, Japanese, Mongolian, Korean, Cantonese, Hebrew, Finnish, Hungarian, Italian, German, etc.
• Languages without phonological length distinction
  – Spanish, French, Portuguese, English, Polish, Russian, Ukrainian etc.
• Within languages that make length distinctions, short segments tend to vastly outnumber their long counterparts.
Vowel Length

• two-values distinction
  – Czech
    • šípku – ‘arrow’
    • šípků – ‘rosehip’ (Gen Sg)
• three-values distinction
  – Estonian
    • saada /saːta/ – ‘to get’
    • saada /saˑta/ – ‘send!’
    • sada /sata/ – ‘hundred’
Tones

- The use of different pitch patterns to distinguish individual words or the grammatical forms of word
- Up to 60–70% of the world’s languages are tone languages
  - surprisingly sharp disagreements
  - WALS: In Maddieson’s (2013) survey of 526 languages, 220 (41.8%) are classified as tonal. In the genetically balanced 100-language WALS survey, 29 of the 97 languages (30%) are tonal
- Relative concept:
  - Ideal tone language: Every syllable in a word is differentiated solely on the basis of tone (Thai);
  - Reality: most tone languages have constraints on the distribution of tones (e.g. limited to roots and certain affixal domains)
- Tone languages are not distributed evenly throughout the world
  - widespread in Africa, Central America, and Southeast Asia
WALS: Tones in languages
Tones

No Tones

Simple tone systems

Complex tone systems

English, Czech, German, Hebrew, Arabic, Finnish, French, ...

/kʰáá/ - ‘to trade’
/kʰ āā/ - ‘to get stuck’
/kàà/ - ‘galangal’
/káá/ - ‘leg’
/káà/ - ‘leg’

Serbian
short falling ⟨í⟩, short rising ⟨i⟩;
long falling ⟨î⟩
long rising ⟨í⟩

+ length,
+ variable stress

ne znam = /nèznām/ - ‘I don’t know’

Lithuanian, Latvian

Stressed syllables containing a long vowel, diphthong, or a sonorant coda—may have one of two tones, falling (acute) tone or rising (circumflex) tone

Thai
Tones in Cantonese

<table>
<thead>
<tr>
<th>Tone</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>High level</td>
<td>詩 ‘poem’ si1</td>
</tr>
<tr>
<td>2</td>
<td>High rising</td>
<td>史 ‘history’ si2</td>
</tr>
<tr>
<td>3</td>
<td>Mid level</td>
<td>試 ‘try’ si3</td>
</tr>
<tr>
<td>4</td>
<td>Mid-low falling</td>
<td>時 ‘time’ si4</td>
</tr>
<tr>
<td>5</td>
<td>Mid-low rising</td>
<td>市 ‘city’ si5</td>
</tr>
<tr>
<td>6</td>
<td>Mid-low level</td>
<td>是 ‘yes’ si6</td>
</tr>
<tr>
<td>7</td>
<td>High stopped</td>
<td>一 ‘one’ jat7</td>
</tr>
<tr>
<td>8</td>
<td>Mid stopped</td>
<td>八 ‘eight’ baat8</td>
</tr>
<tr>
<td>9</td>
<td>Mid-low stopped</td>
<td>日 ‘day’ jat9</td>
</tr>
</tbody>
</table>

6 tones in Cantonese:

1st tone 詩 [si1] = poem
2nd tone 史 [si2] = history
3rd tone 試 [si3] = to try
4th tone 時 [si4] = time
5th tone 市 [si5] = market
6th tone 事 [si6] = matter
References

• Aleš Bičan. Kvantitativní analýza slabiky v českém lexikonu. 2015. Linguistica Brunensia. 63/2
• Thomas Stolz, Nicole Nau, Cornelia Stroh (Eds.) Monosyllables. From Phonology to Typology, Akademie Verlag, 2012.
• Charles Cairns and Eric Raimy (eds), 2011, Handbook of the Syllable.
• Jana Dankovičová & Volker Dellwo, Czech Speech Rhythm and the Rhythm Class Hypothesis.