Variability of languages in time and space

Linguistic Typology - Phonology

Anja Nedoluzhko
phomenic inventories

• all families
  – The Stanford Project on Language Universals leading to the database “Stanford Phonology Archive” (SPA)
  – The **UCLA Phonological Segment Inventory Database** (or **UPSID**) is a statistical survey of the phoneme inventories in 451 of the world's languages - [http://web.phonetik.uni-frankfurt.de/upsid.html](http://web.phonetik.uni-frankfurt.de/upsid.html)

• selected families
  – Namkung (1998), Phonological Inventories of Tibeto-Burman Languages
  – Ramaswamy (1999), Common linguistic features in Indian languages: Phonetics
  – Phonemic Inventories Across Languages ([http://www.asha.org/practice/multicultural/Phono/](http://www.asha.org/practice/multicultural/Phono/)) – Arabic, English, Korean, Mandarin etc.
phonemes

- *pin, tin, kin, fin, thin, sin, shin*
- *dim, din, ding, did, dig, dish*
- *pin, pen, pan, pun, pain, pine, pawn*
phonemes

• \textit{pin, tin, kin, fin, thin, sin, shin}
• \textit{dim, din, ding, did, dig, dish}
• \textit{pin, pen, pan, pun, pain, pine, pawn}

at the beginnings and ends of syllables vs. in the middle

consonants and vowels
phonemes - consonants

- consonants (WALS)
  - small (6 to 14)
  - moderately small (15-18)
  - average (19-25)
  - moderately large (26-33),
  - large (34 or more consonants)
consonants

http://wals.info/feature/1A#2/19.3/152.8
<table>
<thead>
<tr>
<th>Size</th>
<th>Count</th>
</tr>
</thead>
<tbody>
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<td>Small</td>
<td>89</td>
</tr>
<tr>
<td>Moderately small</td>
<td>122</td>
</tr>
<tr>
<td>Average</td>
<td>201</td>
</tr>
<tr>
<td>Moderately large</td>
<td>94</td>
</tr>
<tr>
<td>Large</td>
<td>57</td>
</tr>
</tbody>
</table>

Only 6 consonants: (/p, t, k, b, d, g/)

Rotokas
(West Bougainville; Papua New Guinea)

References:
<table>
<thead>
<tr>
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<th>Count</th>
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<tbody>
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<td>94</td>
</tr>
<tr>
<td>Large</td>
<td>57</td>
</tr>
</tbody>
</table>

!Xóõ
(spooken in Botswana)

122 consonants
(mainly because it has a very large number of different click sounds with which a word may begin)

Click sounds? How to pronounce them?
https://www.youtube.com/watch?v=31zzMb3U0iY
phonemes - vowels

• vowels (according to WALS)
  – small (2 to 4)
  – average (5-6)
  – large (7-14)
vowel quality inventories

https://wals.info/chapter/2
phonemes - vowels

- vowels (according to WALS)
  - small (2 to 4)
  - average (5-6)
  - large (7-14)
- slightly correlated to consonant inventories
- conventionality
### Russian vowel inventories ratio in WALS

<table>
<thead>
<tr>
<th>Obstruents</th>
<th>Labial</th>
<th>Labiodental</th>
<th>Dental</th>
<th>Alveolar</th>
<th>Palatal</th>
<th>Velar</th>
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<tbody>
<tr>
<td>Stop</td>
<td>Unvoiced</td>
<td>p</td>
<td>pʰ</td>
<td>t</td>
<td>tʰ</td>
<td>k</td>
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<tr>
<td></td>
<td>Voices</td>
<td>b</td>
<td>bʰ</td>
<td>d</td>
<td>dʰ</td>
<td>g</td>
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<tr>
<td>Affricates</td>
<td>Unvoiced</td>
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<td>tsʰ</td>
<td>tʃ</td>
<td>tʃʰ</td>
<td>z</td>
</tr>
<tr>
<td></td>
<td>Voiced</td>
<td>dз</td>
<td>dзʰ</td>
<td>s</td>
<td>sʰ</td>
<td>ʃ</td>
</tr>
<tr>
<td>Fricatives</td>
<td>Unvoiced</td>
<td>f</td>
<td>fʰ</td>
<td>s</td>
<td>sʰ</td>
<td>ʃ</td>
</tr>
<tr>
<td></td>
<td>Voiced</td>
<td>v</td>
<td>vʰ</td>
<td>z</td>
<td>zʰ</td>
<td>ʒ</td>
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<tr>
<td>Sonorants</td>
<td>Trills</td>
<td>Voiced</td>
<td>r</td>
<td>rʰ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nasals</td>
<td>Voiced</td>
<td>m</td>
<td>mʰ</td>
<td>n</td>
<td>nʰ</td>
<td></td>
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<tr>
<td>Liquids</td>
<td>Voiced</td>
<td>ɻ</td>
<td>ɻʰ</td>
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</table>

### Русский язык: зоны образования

<table>
<thead>
<tr>
<th>Подъем</th>
<th>Зона образования</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Передняя</td>
</tr>
<tr>
<td>Верхний</td>
<td>и</td>
</tr>
<tr>
<td></td>
<td>е́ (е)</td>
</tr>
<tr>
<td>Средний</td>
<td>е́</td>
</tr>
<tr>
<td>Нижний</td>
<td>ă</td>
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</tbody>
</table>

### Русский язык: ряды

<table>
<thead>
<tr>
<th>Подъем</th>
<th>Передний</th>
<th>Средний</th>
<th>Задний</th>
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<td>Верхний</td>
<td>ь</td>
<td>ь</td>
<td>ь*</td>
</tr>
<tr>
<td>Верхне-средний</td>
<td>ь*</td>
<td>ь*</td>
<td></td>
</tr>
<tr>
<td>Средне-верхний</td>
<td>ь*</td>
<td>ь*</td>
<td></td>
</tr>
<tr>
<td>Средний</td>
<td>ə</td>
<td>ə</td>
<td>ə</td>
</tr>
<tr>
<td>Нижний</td>
<td>ă</td>
<td>а</td>
<td></td>
</tr>
</tbody>
</table>
phonemes - vowels

<table>
<thead>
<tr>
<th>Type</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small (2-4)</td>
<td>93</td>
</tr>
<tr>
<td>Average (5-6)</td>
<td>287</td>
</tr>
<tr>
<td>Large (7-14)</td>
<td>184</td>
</tr>
</tbody>
</table>

Yimas (Papua New Guinea): 2

French: 16

German: 14

Das Vokalsystem des Deutschen
Vowel harmony

• a type of long-distance assimilatory phonological process involving vowels
• A vowel or vowels in a word are changed to sound the same (thus "in harmony.")
• In languages with vowel harmony, there are constraints on which vowels may be found near each other.

\[ V_a C V_b C V_b C \rightarrow V_a C V_a C V_a C \]

• Many agglutinative languages have vowel harmony.
Vowel harmony

Finnish

Vowel backness: (front or back)

\[ \text{in'} = ss \frac{A}{Ä} \]

talo 'house' – talossa 'in the house'
metsä 'forest' – metsässä 'in the forest'
venäläinen 'Russian' –
kuva 'picture' –
sieni 'mushroom' –
työpaikka 'workplace' –

Turkish

\[ \text{plural affix} = \frac{LAR}{LER} \]

aslan 'a lion' – aslanlar 'lions'
tilki 'a fox' – tilkiler 'foxes'

\[ \begin{align*}
\text{backness} & : a, i \rightarrow i \\
\text{roundedness} & : e, i \rightarrow i
\end{align*} \]

akıllı 'clever' – ben akıllıyı 'I'm clever'
erkek 'man' – sen erkeksin 'you are a man'
tuzlu 'salty' – deniz tuzludur 'the sea is salty'
düşük 'low' – derece düşkürtür 'low temperature'

\[ \begin{align*}
o, u \rightarrow u \\
ö, ü \rightarrow ü
\end{align*} \]
1. Which words are compounds and why?

<table>
<thead>
<tr>
<th>Hungarian</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>háború</td>
<td>‘war’</td>
</tr>
<tr>
<td>háborúról</td>
<td>‘about war’</td>
</tr>
<tr>
<td>bűn</td>
<td>‘guilt’</td>
</tr>
<tr>
<td>bűntelen</td>
<td>‘guiltless’</td>
</tr>
<tr>
<td>bűnről</td>
<td>‘about guilt’</td>
</tr>
<tr>
<td>út</td>
<td>‘way’</td>
</tr>
<tr>
<td>útról</td>
<td>‘about way’</td>
</tr>
<tr>
<td>keserű</td>
<td>‘bitter’</td>
</tr>
<tr>
<td>keserűség</td>
<td>‘bitterness’</td>
</tr>
<tr>
<td>keserűsó</td>
<td>‘bitter salt’</td>
</tr>
<tr>
<td>kör</td>
<td>‘ring’</td>
</tr>
<tr>
<td>körü</td>
<td>‘ring way’</td>
</tr>
<tr>
<td>kőrről</td>
<td>‘about ring’</td>
</tr>
<tr>
<td>bátor</td>
<td>‘brave’</td>
</tr>
<tr>
<td>bátorságról</td>
<td>‘about braveness’</td>
</tr>
<tr>
<td>bátortalan</td>
<td>‘not brave’</td>
</tr>
<tr>
<td>föld</td>
<td>‘field’</td>
</tr>
<tr>
<td>földtelen</td>
<td>‘fieldless’</td>
</tr>
<tr>
<td>burgonya</td>
<td>‘potato’</td>
</tr>
<tr>
<td>burgonyaföld</td>
<td>‘potato field’</td>
</tr>
<tr>
<td>sötét</td>
<td>‘dark’</td>
</tr>
<tr>
<td>sötétség</td>
<td>‘darkness’</td>
</tr>
</tbody>
</table>

2. Find the compounds

földtan, földnek, háborúellenes, Budapest, burgonyalevés, óraütés, hőálló, bűnöző.

3. Translate into Hungarian

guiltlessness, about field, about potato, wayless
Vowels - Suprasegmentals

stress

length

tones

samohláskä
Stress in Languages

• A relative emphasis that is given to a certain syllable in a word

• Caused by increased vowel length, loudness, full articulation of the vowel
<table>
<thead>
<tr>
<th>Language</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Czech</td>
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<tr>
<td>Croatian</td>
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<td>Estonian</td>
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<tr>
<td>English</td>
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<tr>
<td>Finnish</td>
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<tr>
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<tr>
<td>Greek</td>
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<tr>
<td>German</td>
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<tr>
<td>Hungarian</td>
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<tr>
<td>Icelandic</td>
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<tr>
<td>Italian</td>
<td></td>
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<tr>
<td>Macedonian</td>
<td></td>
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<tr>
<td>Polish</td>
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<tr>
<td>Russian</td>
<td></td>
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<tr>
<td>Spanish</td>
<td></td>
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<tr>
<td>Slovene</td>
<td></td>
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<tr>
<td>Serbian</td>
<td></td>
</tr>
<tr>
<td>Welsh</td>
<td></td>
</tr>
</tbody>
</table>
Fixed Stress

• The stress falls on a particular syllable of the word

MÁMA
Fixed Stress Locations

Czech: krabička ‘box’

Finnish, Estonian, Czech, Icelandic, Hungarian, …
Fixed Stress Locations

- Mapudungun/Araucanian, ...  
  \( \text{\textipa{\textsc{t}i'panto}} \) ‘year’, \( \text{e\'lumu\textsc{yu}} \) ‘give us’.
Fixed Stress Locations

Winnebago Siouan language family

hochiˈchinik ‘boy’, waghiˈghi ‘ball’
Fixed Stress Locations


Greek, Macedonian, …
Polish: pudętko ‘box’

Bashkir, Uzber, Tajik, Berber
Vowels - stress

- **fixed**
  - Initial: stress is on the first syllable
  - Second: stress is on the second syllable
  - Third: stress is on the third syllable
  - Antepenultimate: stress is on the antepenultimate (third from the right) syllable
  - Penultimate: stress is on the penultimate (second from the right) syllable
  - Ultimate: stress is on the ultimate (first from the right) syllable

- **variable**
  - bounded (the placement of stress is sensitive, for example, to properties of syllables)
  - unbounded (stress can be anywhere)
Weight-Sensitive Stress
| Alyutor or Alutor is a language of Russia that belongs to the Chukotkan branch of the Chukotko-Kamchatkan languages |
|---|---|
| tátul | fox |
| nətyélqin | hot |
| nuraqin | far |
| yólyen | skin |
| néqəqin | quick |
| nəsqəqin | cold |
| taplánətken | he sews shoes |
| kómyətək | roll up |
| ?ítək | be |
| paqótkuk | run |
| nilyaqinat | white |
| púnta | liver |
| qetúmyən | relative |
| píwtak | fall |
| nəmítqin | skillful |
| túmyətəm | friend |
| tótka | walrus |
| kóttik | forehead |
| qalpúqal | rainbow |
| kəpírik | hold in arms |
| təvítatətkən | I work |
| píntəvelŋək | throw at each other |

Alyutor or Alutor is a language of Russia that belongs to the Chukotkan branch of the Chukotko-Kamchatkan languages.
Vowels – Unbounded Stress
Variable stress in Russian

дорога
Variable stress in Russian

догорга
‘a road’
Variable stress in Russian

dорога

дорOga
‘a road’

dорогA
‘dear’
Variable stress in Russian

дорога

dorOga /dərOgə/
‘a road’

dorogA /dərɔgA/
‘dear’

vowel reduction
Variable stress in Russian

<table>
<thead>
<tr>
<th></th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
<th>f</th>
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</thead>
<tbody>
<tr>
<td><strong>И</strong></td>
<td>карта</td>
<td>стол</td>
<td>море</td>
<td>вино</td>
<td>волк</td>
<td>губа</td>
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<tr>
<td><strong>Р</strong></td>
<td>карты</td>
<td>стола</td>
<td>моря</td>
<td>вина</td>
<td>волка</td>
<td>губы</td>
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<td><strong>Д</strong></td>
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<td>столов</td>
<td>морем</td>
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<td>волкам</td>
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<td><strong>B</strong></td>
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<td>морем</td>
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<td>губам</td>
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<td><strong>П</strong></td>
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<td>о столе</td>
<td>о море</td>
<td>о вине</td>
<td>о волке</td>
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<td>вина</td>
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<td>волками</td>
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<td>морями</td>
<td>вими</td>
<td>волками</td>
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<td>морями</td>
<td>вими</td>
<td>волками</td>
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<td>о столах</td>
<td>о морях</td>
<td>о винах</td>
<td>о волках</td>
<td>о губах</td>
</tr>
</tbody>
</table>
Vowels - Suprasegmentals

stress

length

tones

samohláska
## Vowels – length

<table>
<thead>
<tr>
<th>Language</th>
<th>Word</th>
<th>Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estonian</td>
<td>saada /saːta/</td>
<td>‘to get’</td>
</tr>
<tr>
<td>Czech</td>
<td>šipka – ‘arrow’</td>
<td></td>
</tr>
<tr>
<td>Estonian</td>
<td>saada /sa·ta/</td>
<td>‘send!’</td>
</tr>
<tr>
<td>Czech</td>
<td>šípka – ‘rosehip’ (Gen, SG)</td>
<td></td>
</tr>
<tr>
<td>Estonian</td>
<td>sada /sata/</td>
<td>‘hundred’</td>
</tr>
</tbody>
</table>

Arabic, Sanskrit, Japanese, Hebrew, Finnish, Hungarian, Kannada, Italian, etc.

What about vowel length in English, German, Russian, etc.?
Vowels - Suprasegmentals

stress length tones

samohláška
Vowels – tones

/kʰáá/ - ‘to trade’
/kʰāā/ - ‘to get stuck’
/kʰàà/ - ‘galangal’
/kʰàá/ - ‘leg’
/kʰáà/ - *politeness particle*
Vowels – tones

Thai

/kʰáá/ - ‘to trade’
/kʰāā/ - ‘to get stuck’
/kʰàà/ - ‘galangal’
/kʰáá/ - ‘leg’
/kʰàà/ - politeness particle

Norwegian

skriver

accent 1

'ı write' (pres.1sg)

accent 2

'ı writer'

Japanese

箸 - hashi (хаси; палочки для еды) и 橋 hashi (хаси; мост)

雨 - ame (амэ; дождь) и 饴 ame (амэ; конфета, ириска)

神 - kami (ками; Бог) и 紙 kami (ками; бумага)

Lithuanian, Latvian

"acute" or "circumflex"
Vowels – tones

Old Slavic
*acute (rising)
*circumflex
*“new acut”

**i-e. *dorgh. → o.sl.*dőrg-

rus, ukr.
дорога (vs. дорогá)
srb.
дрàга (vs. drahá)
cs.
dráha (vs. drahá)
Vowels – tones

Old Slavic
*acute (rising)
*circumflex
*“new acut“

**i-e. *dorh. → o.sl.*dôrg-

rus, ukr.
doróga (vs. дорогá)
srb. 
đrâga
(cs.
dráha (vs. drahá)

Neoštokavian idiom used for the basis of standard Bosnian, Croatian and Serbian

Pitch accent:
short falling ⟨ɨ⟩,
short rising ⟨i⟩;
long falling ⟨î⟩
long rising ⟨í⟩

ne znam = /nēznām/ - ‘I don’t know’;

+ length,
+variable stress
### Serbian – Russian accents and tones

<table>
<thead>
<tr>
<th>Serbian</th>
<th>Russian</th>
</tr>
</thead>
<tbody>
<tr>
<td>говорити</td>
<td>говорить [govoriti] ‘speak’</td>
</tr>
<tr>
<td>мухоловка</td>
<td>мухоловка [mucholovka] ‘flytrap’</td>
</tr>
<tr>
<td>мёд</td>
<td>мед [mjed] ‘honey’</td>
</tr>
<tr>
<td>брёд</td>
<td>брёд [brod] ‘ford’</td>
</tr>
<tr>
<td>брёда</td>
<td>брёда [broda] ‘ford’, GSG</td>
</tr>
<tr>
<td>брда</td>
<td>брда [boroda] ‘beard’</td>
</tr>
<tr>
<td>брэв</td>
<td>брэв [borov] ‘hog’</td>
</tr>
<tr>
<td>красо́та</td>
<td>красота [krasota] ‘beauty’</td>
</tr>
<tr>
<td>блáто</td>
<td>болото [boloto] ‘bog’</td>
</tr>
<tr>
<td>злáто</td>
<td>золото [zoloto] ‘gold’</td>
</tr>
<tr>
<td>голору́кий</td>
<td>голору́кий [golorukij] ‘barehanded’</td>
</tr>
<tr>
<td>золоторо́гий</td>
<td>золоторо́гий [zolotorogij] ‘gold-horned’</td>
</tr>
<tr>
<td>коло́да</td>
<td>коло́да [koloda] ‘block’</td>
</tr>
<tr>
<td>бесголово́й</td>
<td>бесголово́й [bezgolovyj] ‘headless’</td>
</tr>
<tr>
<td>глóтать</td>
<td>глóтать [glotat’] ‘swallow’</td>
</tr>
<tr>
<td>сестра</td>
<td>сестра [sestra] ‘sister’</td>
</tr>
</tbody>
</table>

1. Translate from Russian into Serbian:

| город [gorod]            | город [gorod] ‘town’ |
| голова [golova]         | голова [golova] ‘head’ |
| колода [koloda]         | колода [koloda] ‘block’ |
| безголовый [bezgolovyj] | безголовый [bezgolovyj] ‘headless’ |
| глотать [glotat’]       | глотать [glotat’] ‘swallow’ |
| сестра [sestra]         | сестра [sestra] ‘sister’ |

2. Translate from Serbian into Russian:

| врёна                   | врёна |
| вёдро                   | вёдро |
| замка                   | замка |
| обрезати                | обрезати |
| нёбо                    | нёбо |
| носки                   | носки |