

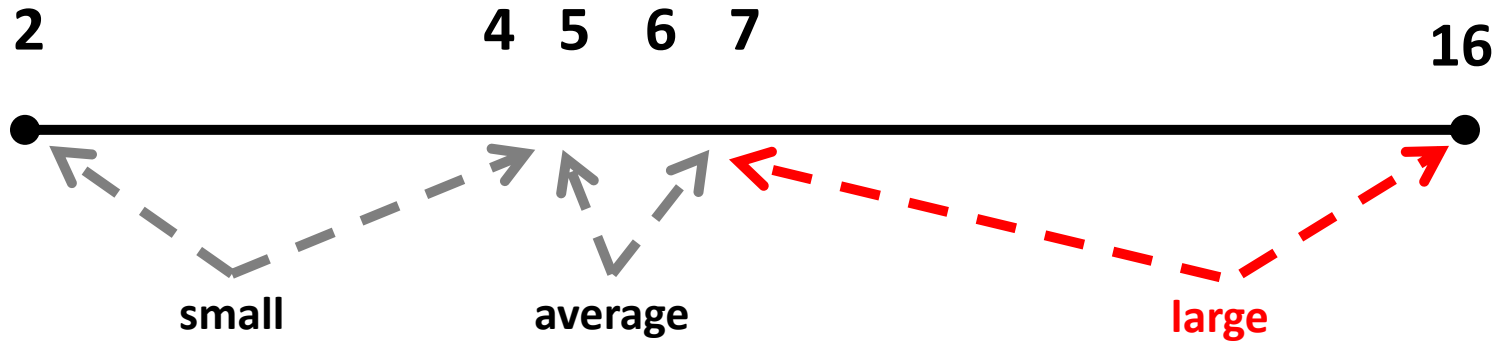
Variability of Languages in Time and Space

Phonological Typology – Syllables – Suprasegmentals

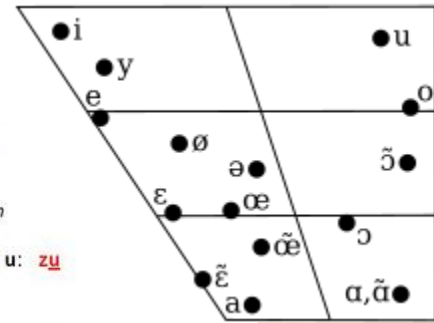
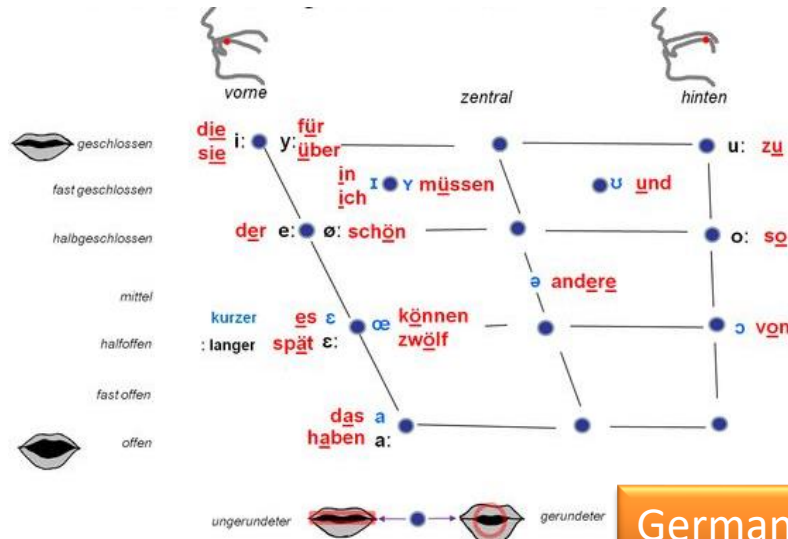
- Some resty from minule
- Syllable structure and patterns
- Syllable repair processes
- Suprasegmentals: Stress, length, tones
- Some linguistic quizzes

Anja Nedoluzhko

Vowel Quality Inventories



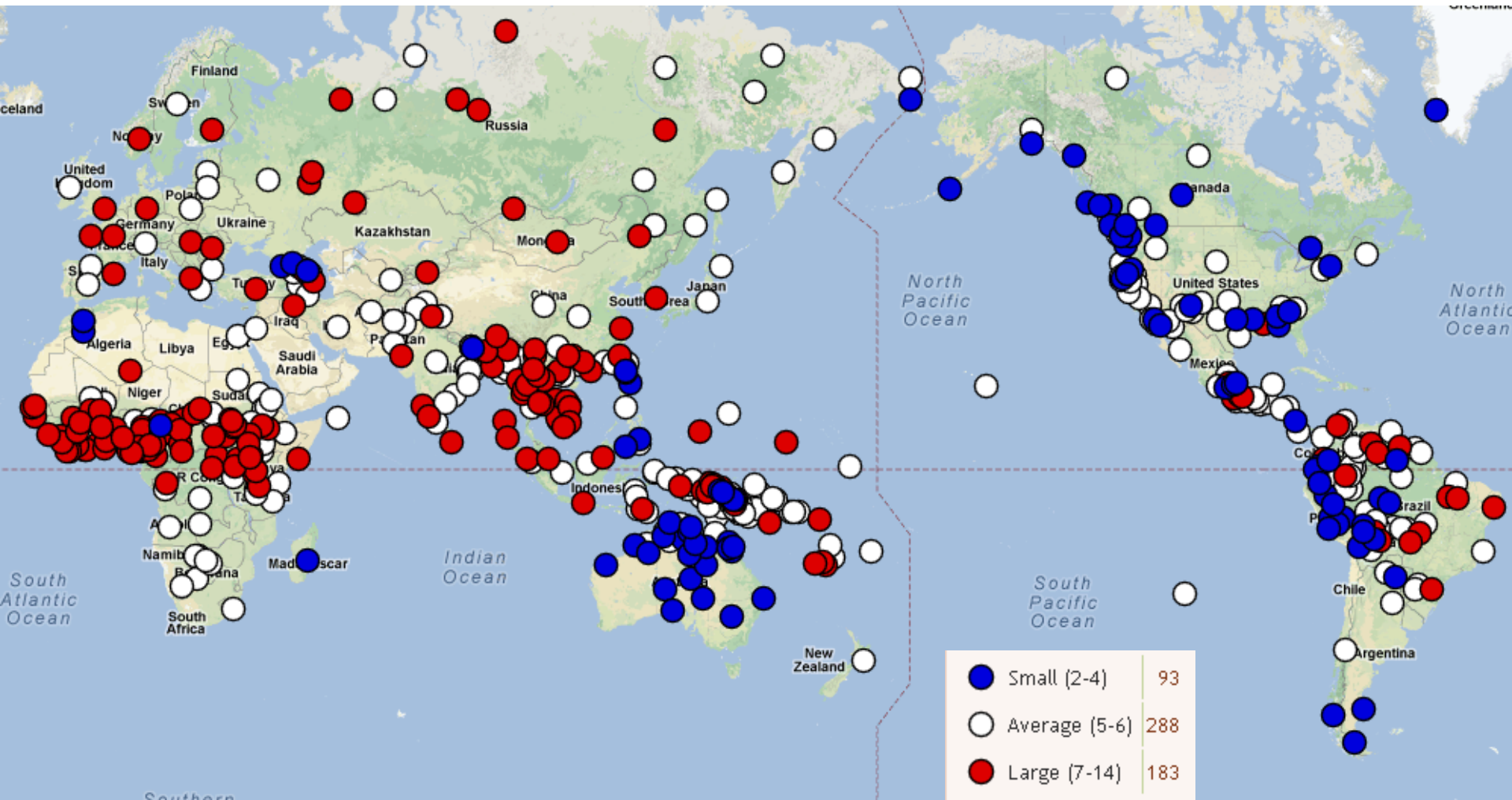
Yimas (Papua New Guinea): 2



French

German

Vowel Quality Inventories

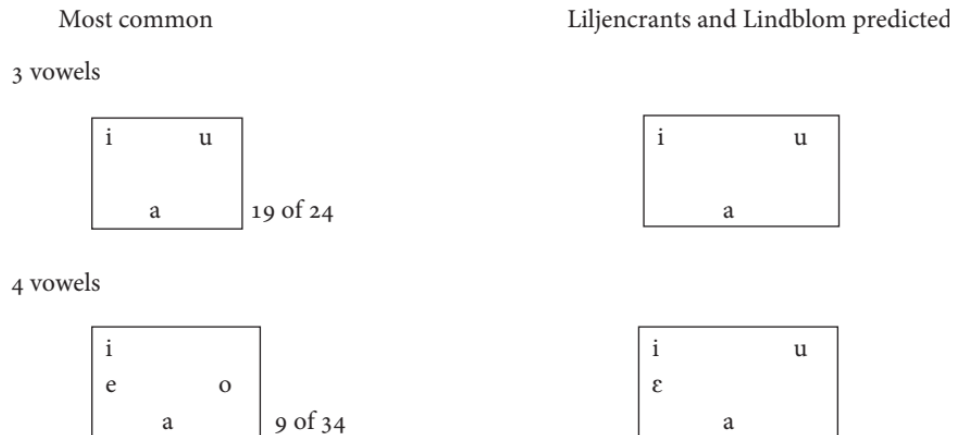




Why such inventories and not others?

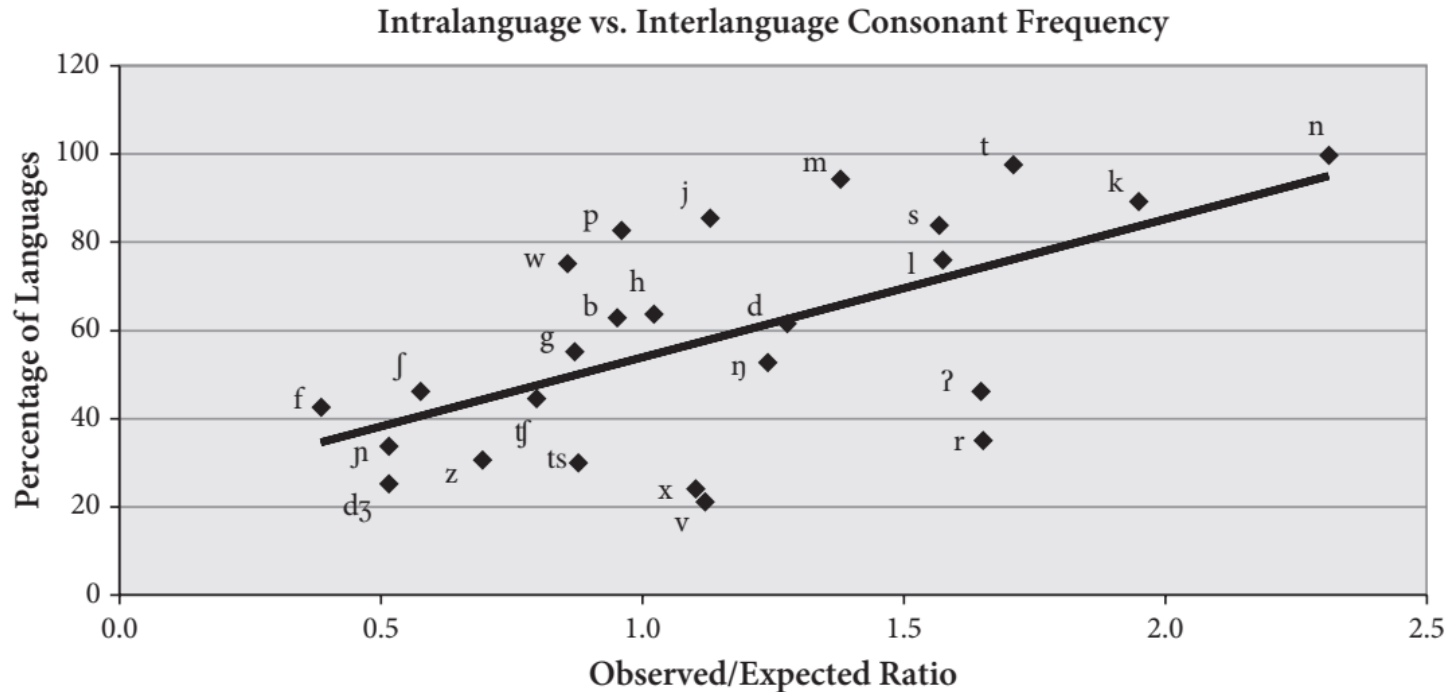
- Why are phoneme inventories such as they are?
- Most of research proposes explanations based on speech production and/or perception
 - *Perceptual factors*
 - *Articulatory factors* } often compete (*maximization of perceptual distinctness and minimization of articulatory effort*)
- Liljencrants and Lindblom (1972): Adaptive Dispersion Theory

Phoneme inventories are preferable to the extent they possess contrasts that are maximally distinct in the perceptual domain.



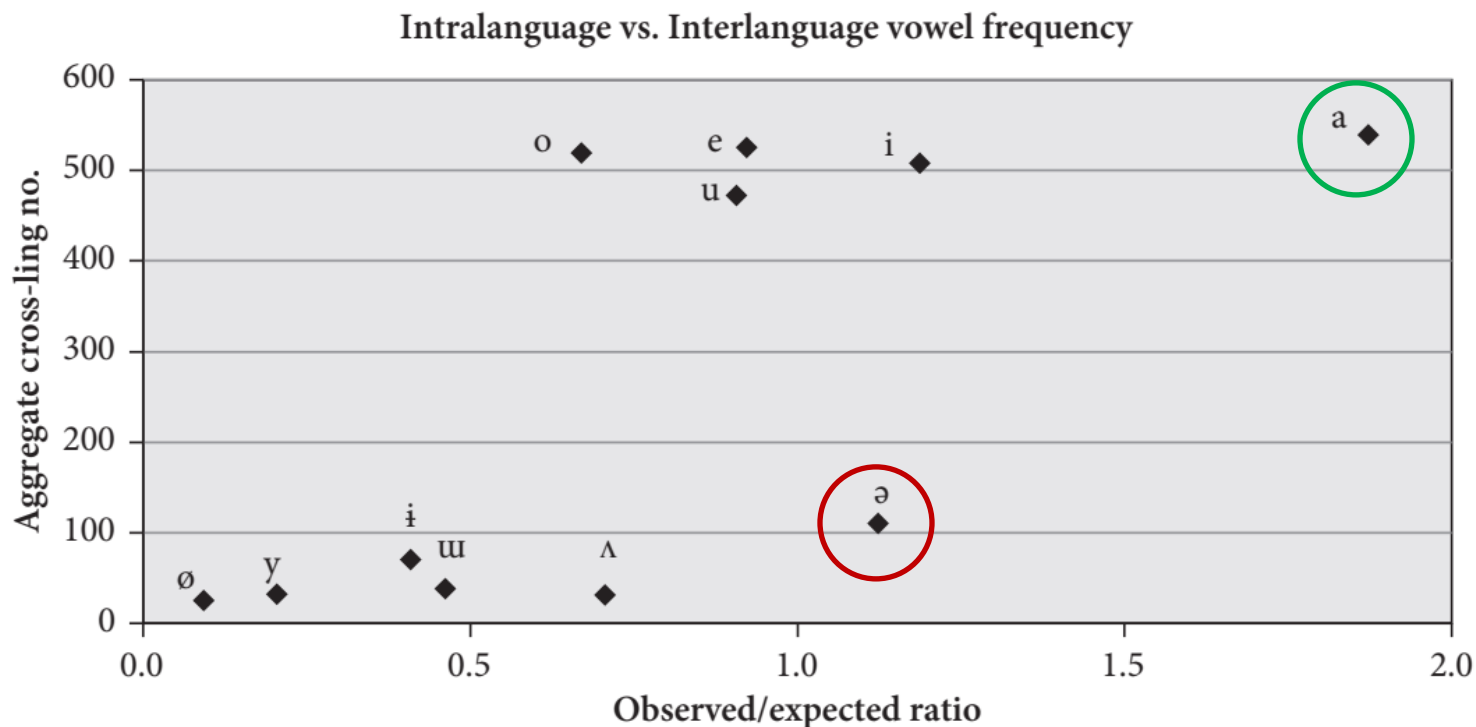
Frequency Distributions Within Languages: Consonants

- There is a strong correlation between the typologically most common consonants and their frequency within languages



Frequency Distributions Within Languages: Vowels

- [a] is frequent both with and between languages
- schwa [ə] occurs with greater frequency within languages than three of the cardinal vowels /e, o, u/, even though schwa is considerably less common across languages



Phonological Rule Typology: Segmental Processes

- Assimilation (*bags* [bægz])
- Long-distance assimilation (e.g. harmony)
- Dissimilation (*pilgrim* ← lat. *peregrinus*)
- Fortition, Lenition, Deletion and compensatory lengthening (*p[ə]'tato*, *p[∅]'tato*)
- Epenthesis (e.g. *oputimisuto* in Japanese as syllable repair, etc.)
- Metathesis (more sporadic, more diachronic)

Nom. sg.	Dim. (nom.sg.)	Loc.sg.	
stol	stolʲik	stolʲe	'table'

VC metathesis in Late Common Slavic (Townsend and Janda 1996: 60–1)

<i>Late Common Slavic</i>	<i>Gloss</i>	<i>Polish</i>	<i>Bulgarian</i>
<i>gôrdŭ</i>	'enclosure'	<i>grod</i>	<i>grad</i>
<i>golvá</i>	'head'	<i>gwowa</i>	<i>glavá</i>
<i>sólma</i>	'straw'	<i>wwoma</i>	<i>sláma</i>
<i>melkó</i>	'milk'	<i>mleko</i>	<i>mljáko</i>

Example of Long-distance Assimilation: Vowel Harmony

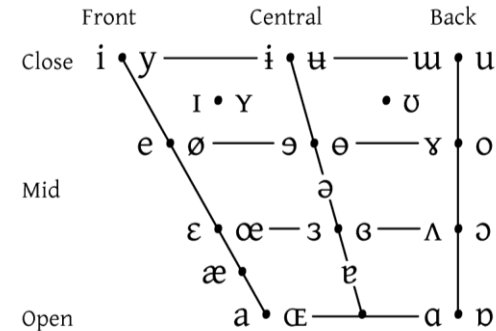
- A vowel or vowels in a word are changed to sound similarly, "in harmony".
- There are **constraints** on which vowels may be found near each other.
- typical for many agglutinative languages
- *Example:* In Turkish, the plural suffix vowel changes according the place of the articulation of the vowel in the root (LAR/LER)

	Unrounded		Rounded	
	open	closed	open	closed
front	e	i	ö	ü
back	a	ı	o	u

	Singular	Plural
<i>day</i>	gün	gün <u>ler</u>
<i>month</i>	ay	ay <u>lar</u>

Vowel Harmony

- Vowel harmony
 - Front-back (Turkish, Hungarian)
 - Height (N. Salentino)
 - Rounding (Turkish)
- Variations in Rounding Harmony
 - Kirghiz – all vowels assimilate in rounding to preceding vowels except that [a] does not assimilate to [u]
 - Turkish – only high vowels undergo, all round vowels trigger
 - Sakha (Yakut) – high vowels undergo, round vowels trigger; nonhigh vowels undergo if same height as trigger
 - Mongolian – only nonhigh vowels undergo, only nonhigh vowels trigger
 - Yawelmani – vowels undergo if same height as trigger



Phonological Rule Typology: Segmental Processes

- A more complex problem than segment inventory typology, requires more language-particular commentary and analysis.
- All spoken languages have phonological rules, but not all rules are found in every language.
 - may be in certain language families but not in the others, e.g. rounding harmony common in Turkic languages
- Most phenomena affecting segments may be explained by minimizing articulating effort and enhancing perceptual salience.

Vowel Harmony in Hungarian

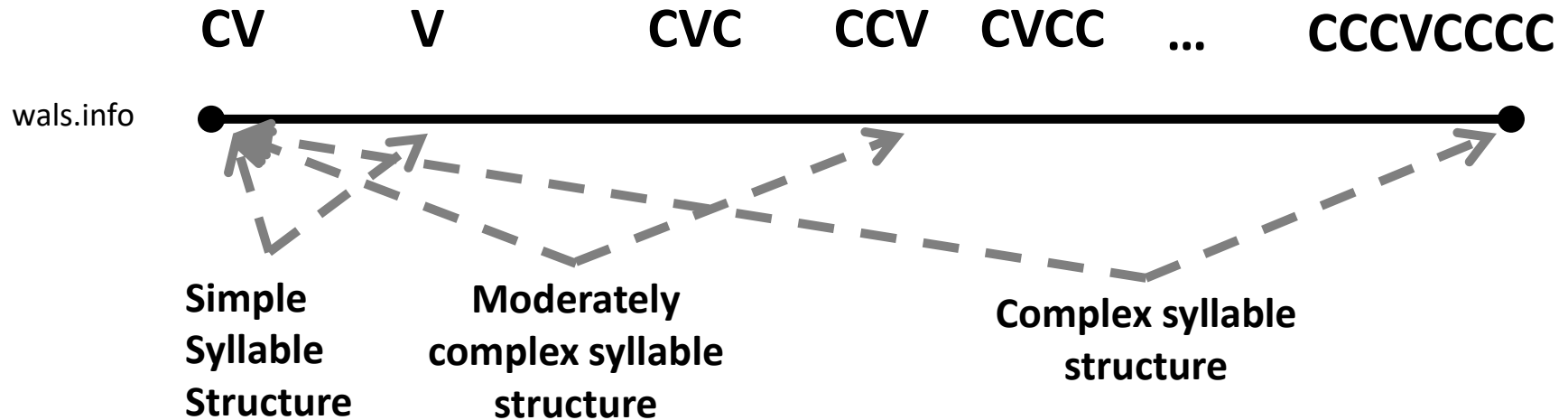
- Which words are compounds and why?

háború		'war'	körút		'ring way'
háborúról		'about war'	körről		'about ring'
bűn		'guilt'	bátor		'brave'
bűntelen		'guiltless'	bátorságról		'about braveness'
bűnről		'about guilt'	bátortalan		'not brave'
út		'way'	föld		'field'
útról	-	'about way'	földtelen	-	'fieldless'
keserű	-	'bitter'	burgonya	-	'potato'
keserűség	-	'bitterness'	burgonyaföld	-	'potato field'
keserűsó	-	'bitter salt'	sötét	-	'dark'
kör	-	'ring'	sötétség	-	'darkness'

SYLLABLE STRUCTURE



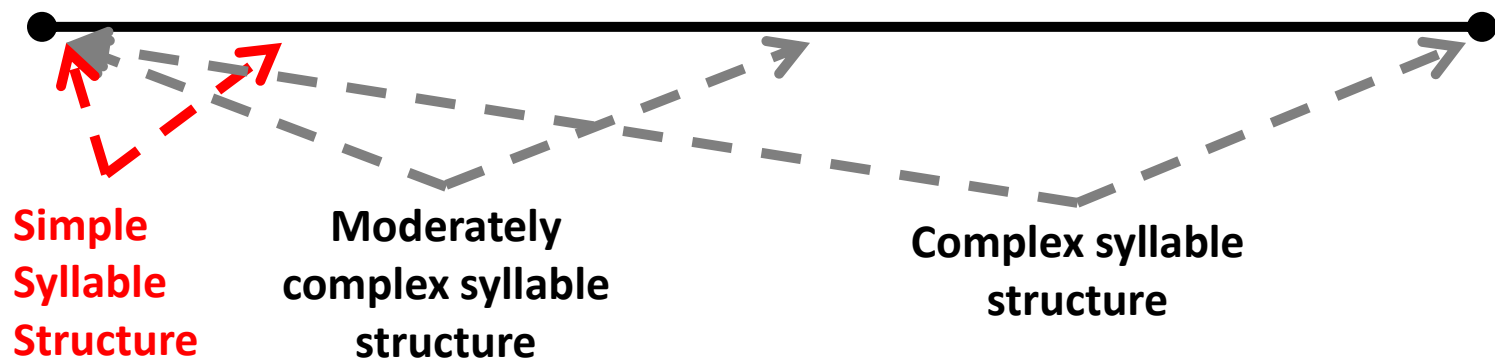
Syllable Structures in Languages



Simple Syllable Structures

CV V CVC CCV CVCC ... CCCVCCCC

wals.info

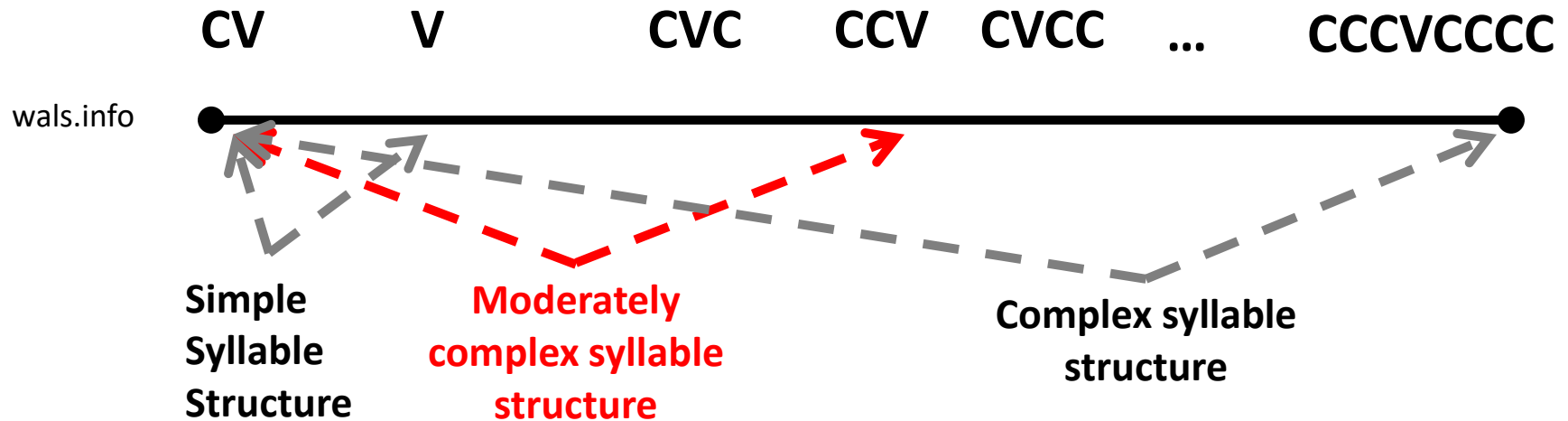


(C)V: permitted not to have an initial consonant

only CV, also Hawaiian



Moderately Complex Structures



the most elaborate syllable permitted is CCVC

/bwak/ '(his) father'

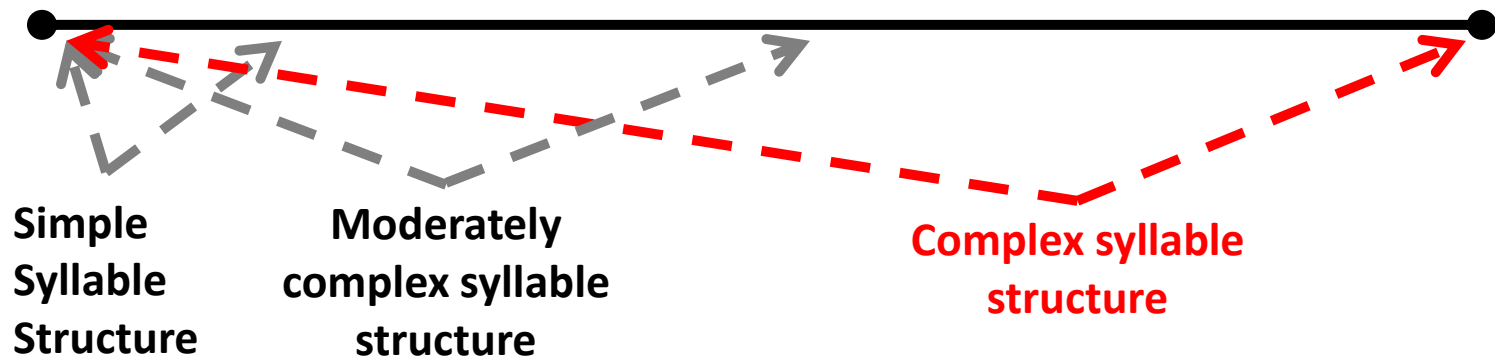
the only possible second consonant in a sequence of two is /w/

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

CV V CVC CCV CVCC ... CCCVCCCC

wals.info



English

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

strengths /stɹɛŋkθs/

Distribution in WALS

<http://wals.info/feature/12A#2/16.6/153.1>

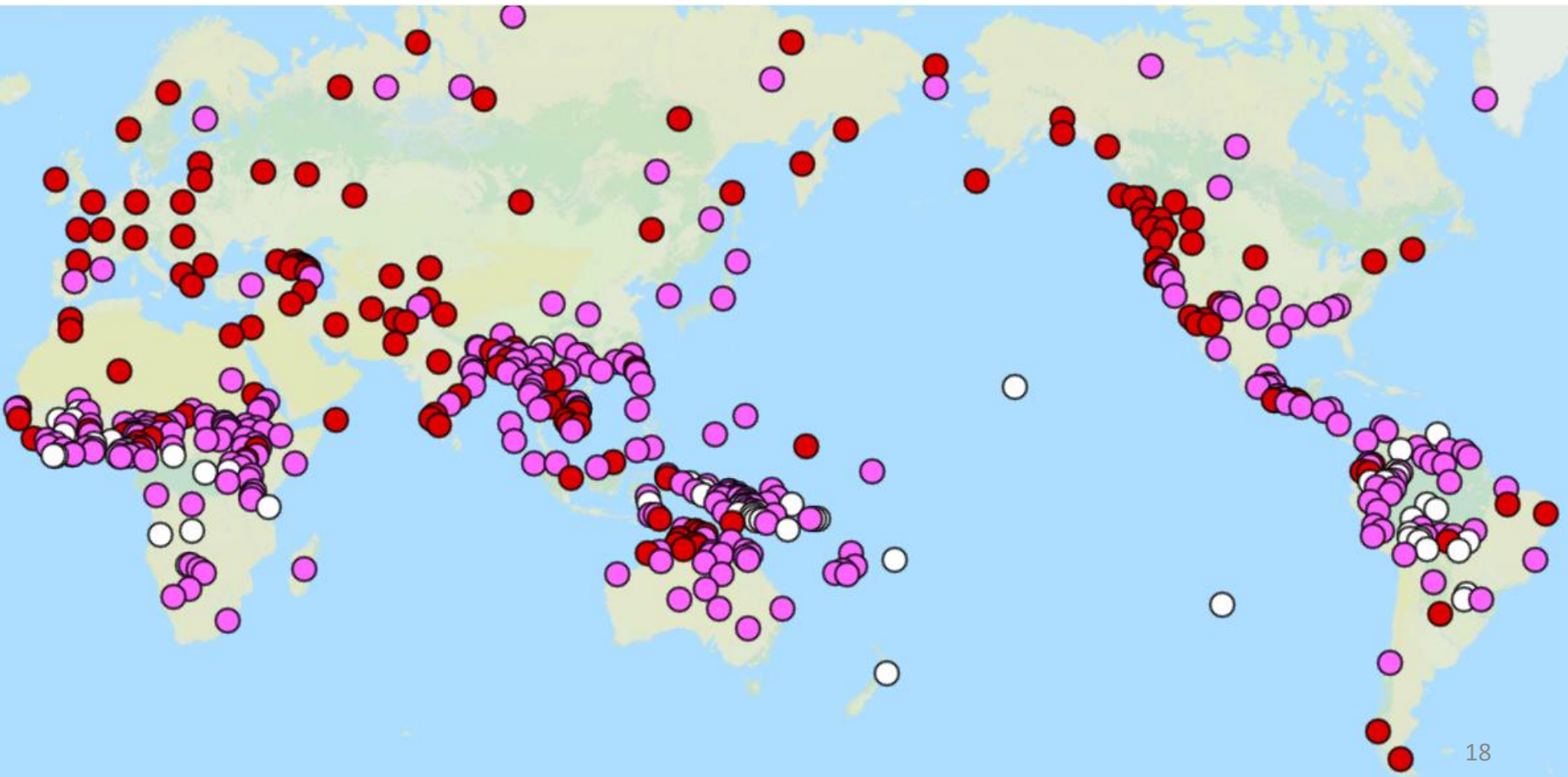
Value	Representation
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○ Simple syllable structure	61
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● Moderately complex syllable structure	274
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● Complex syllable structure	151
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Total:	486
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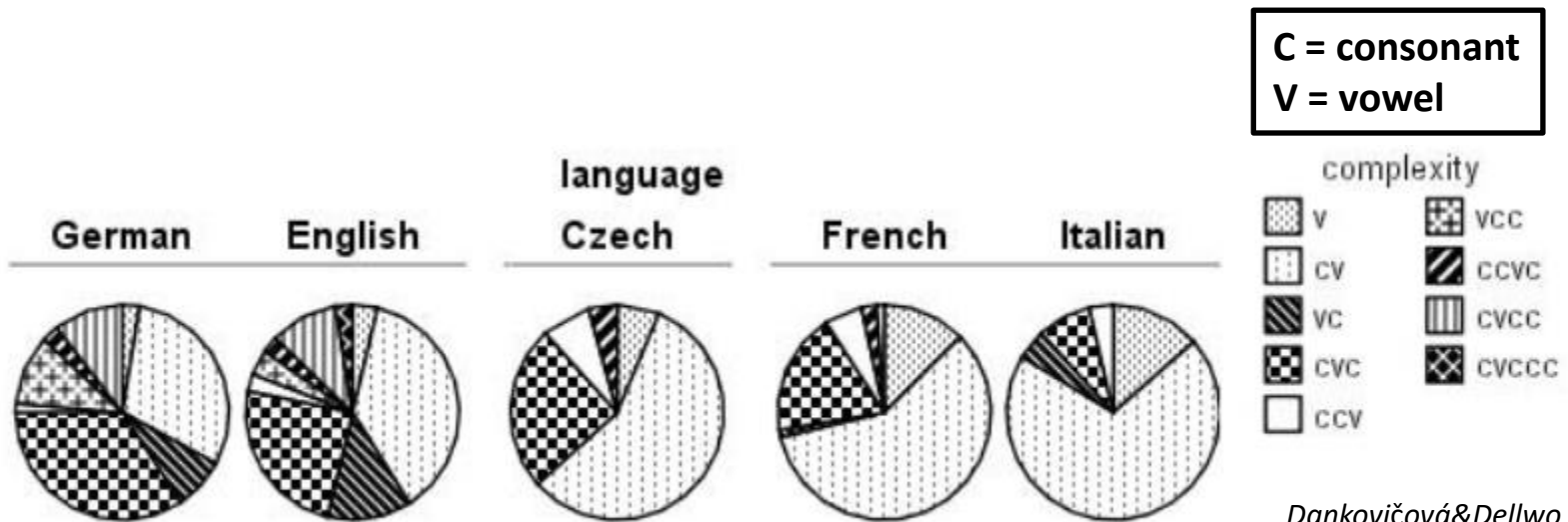


Canonical Syllable Patterns

- May be different in different positions (in onset vs. in coda)
 - Italian: allows more than one **C**onsonant in the onset position
pro.fon.do ‘deep’, *tro.no* ‘throne’, *blat.ta* ‘cockroach’
but only a single **C**onsonant in the coda position
san.to ‘saint’, *pal.ko* ‘platform’, *tor.ta* ‘cake’
 - Khalkha Mongolian: allows only a single **C**onsonant in the onset, but permits two **C**onsonant in coda position
*mai**ɮ**s* ‘cypress’, *ɔim**s*** ‘sock’, *nomx-t^h* ‘to become tame’, *i**ɮ**s-t^h* ‘sandy’, *farx-t^h*
‘coroner’, *taws-t^h* ‘salty’

Canonical Syllable Patterns

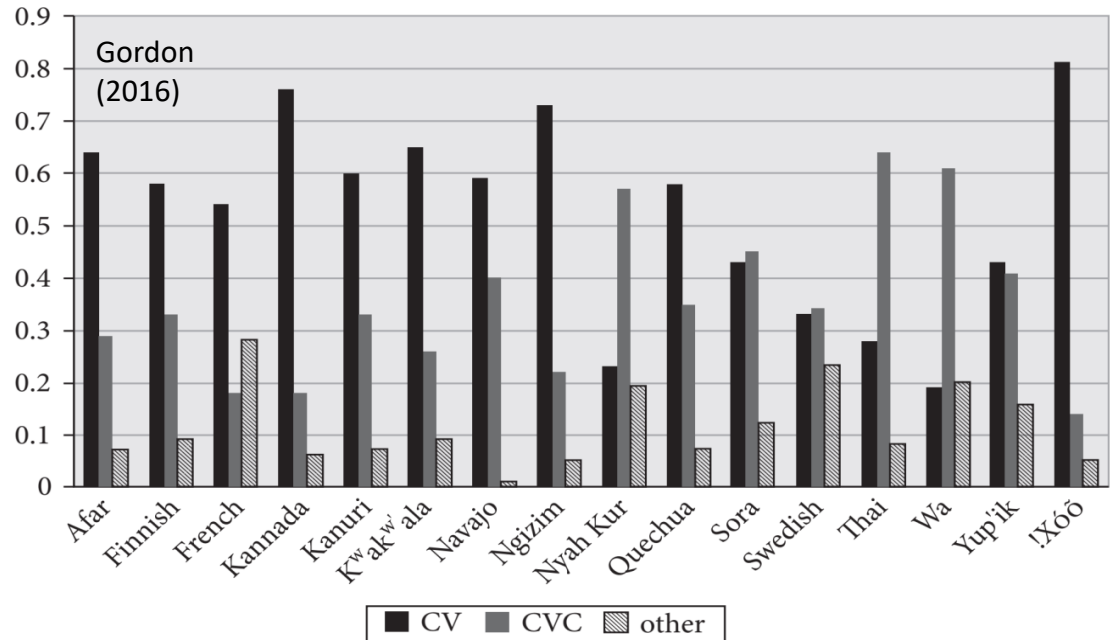
- CV – the most basic and frequent syllable, also within a language where other possible combinations are possible
- CV > CCV > CCCV and CV > V (markedness of the onset)
- CVC > CCV > CVCC > CVCCC
- CV > CVC



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)



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
 - Languages permitting more complex syllable types tend to have a greater number of consonants.

small consonant inventories ↔ simple syllable structure

large consonant inventories ↔ complex syllable structures

		Syllable structure			<i>Total</i>
		Simple	Moderate	Complex	
Consonants	Small	20	42	16	78
	Mod. small	13	70	17	100
	Average	16	90	55	161
	Mod. large	3	56	37	96
	Large	8	15	23	46
	<i>Total</i>	60	273	148	481

Syllable Repair Processes

- Many languages have productive processes to ensure that their syllables adhere to language-internal constraints on syllable structure.
 - insertion of epistemic vowels
 - 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.
 - 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.

<i>Simple</i>	<i>Perfective</i>	<i>Gloss</i>
api	apit-ia	'be lodged'
sopo	sopoʔ-ia	'go across'
milo	milos-ia	'twist'
oso	osof-ia	'jump'
ŋalo	ŋalom-ia	'forget'

Gordon (2016)



Austronesian family, Polynesia

redzonansu
oputimisuto
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'on
oba-koto
supido
dz'anaridzumu

SUPRASEGMENTALS

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

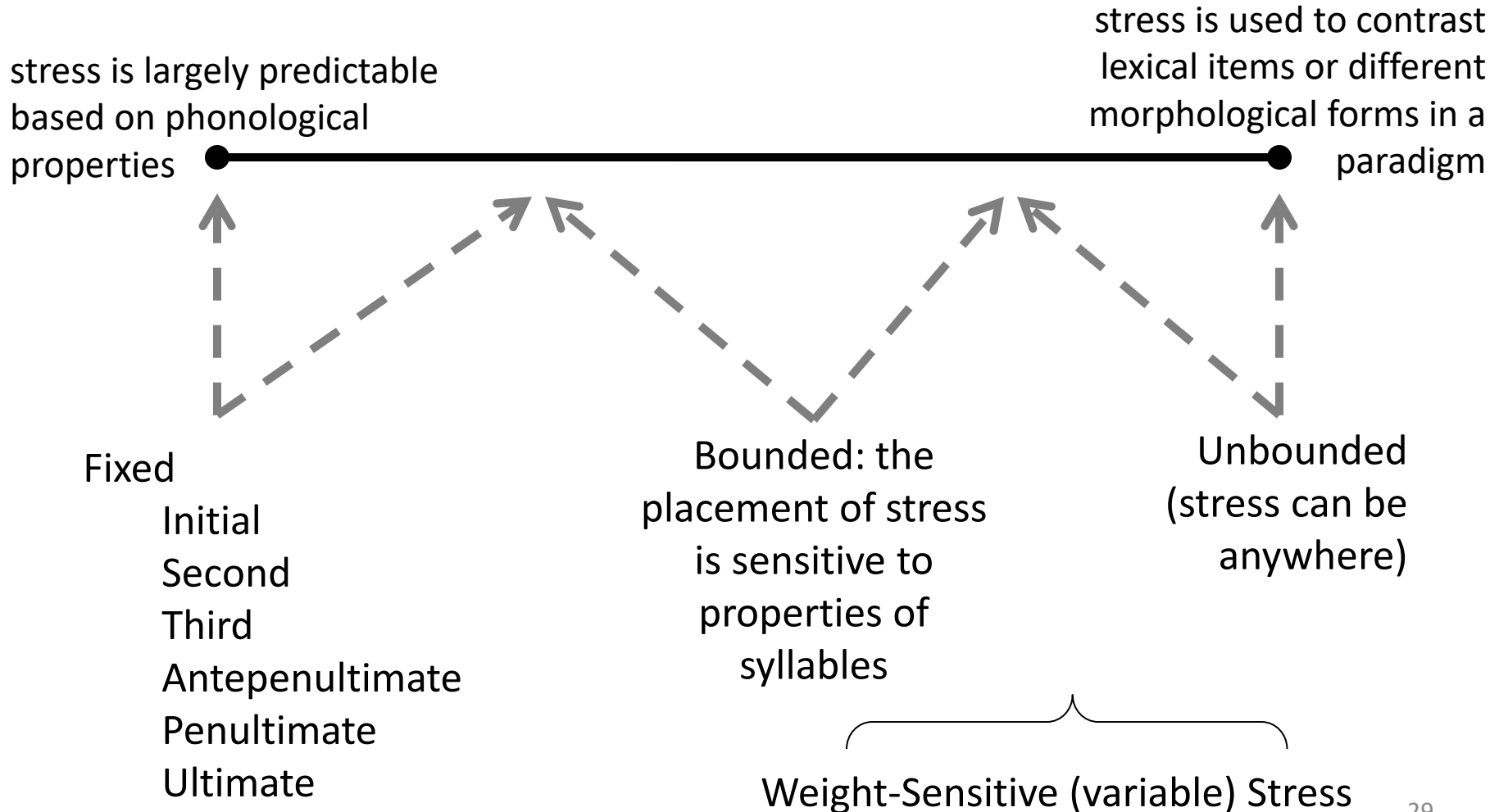
Stress

- 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

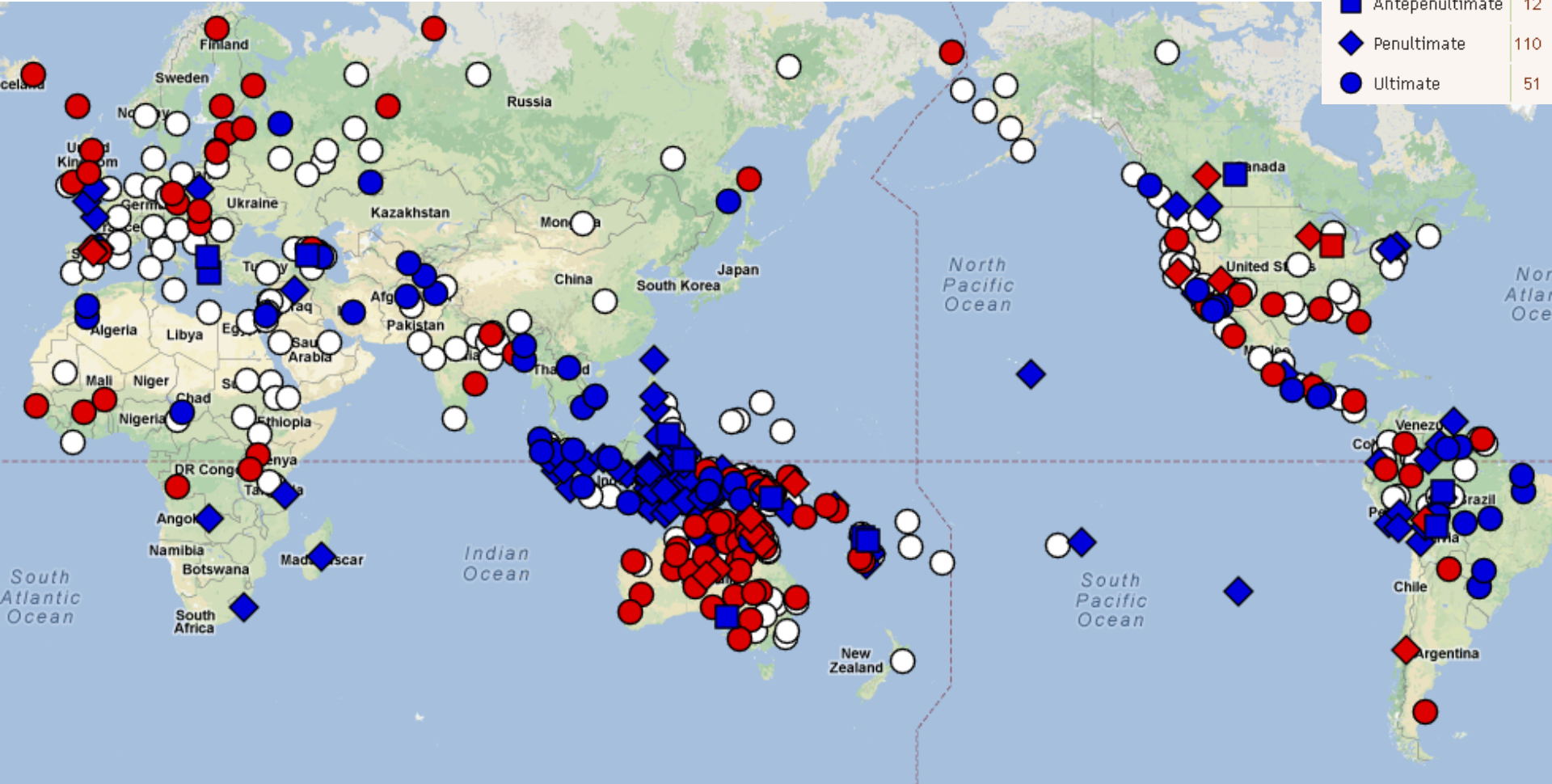
- The majority of languages possess some type of stress system
 - Languages that are reported to lack stress are mostly tonal languages.
- StressTyp , **StressTyp2** (Goedemans et al. 2015)
 - a typological database containing information on stress and accent patterns in over 750 of the world's languages with nearly every language family represented
 - <http://st2.uliet.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



WALS: Fixed Stress Locations








○ No fixed stress	220
● Initial	92
◆ Second	16
■ Third	1
■ Antepenultimate	12
◆ Penultimate	110
● Ultimate	51





WALS: Fixed Stress Locations

-  Czech
-  Finnish
-  Icelandic
-  Hungarian
-  Greek
-  Macedonian
-  Polish
-  Welsh

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



t̪i'panto 'year'
e'lumu,yu 'give us'.

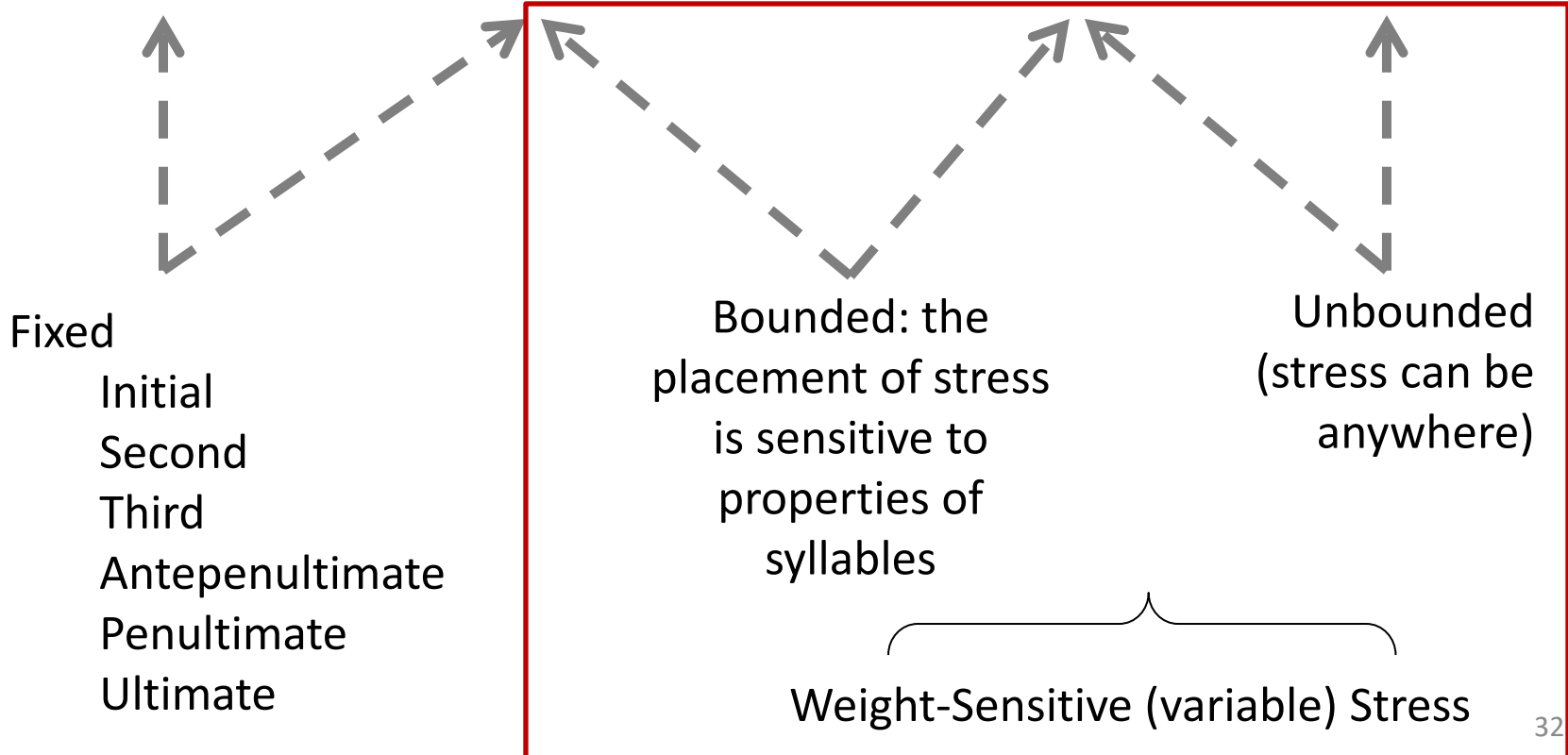
hochi'chinik 'boy'
waghi'ghi 'ball'



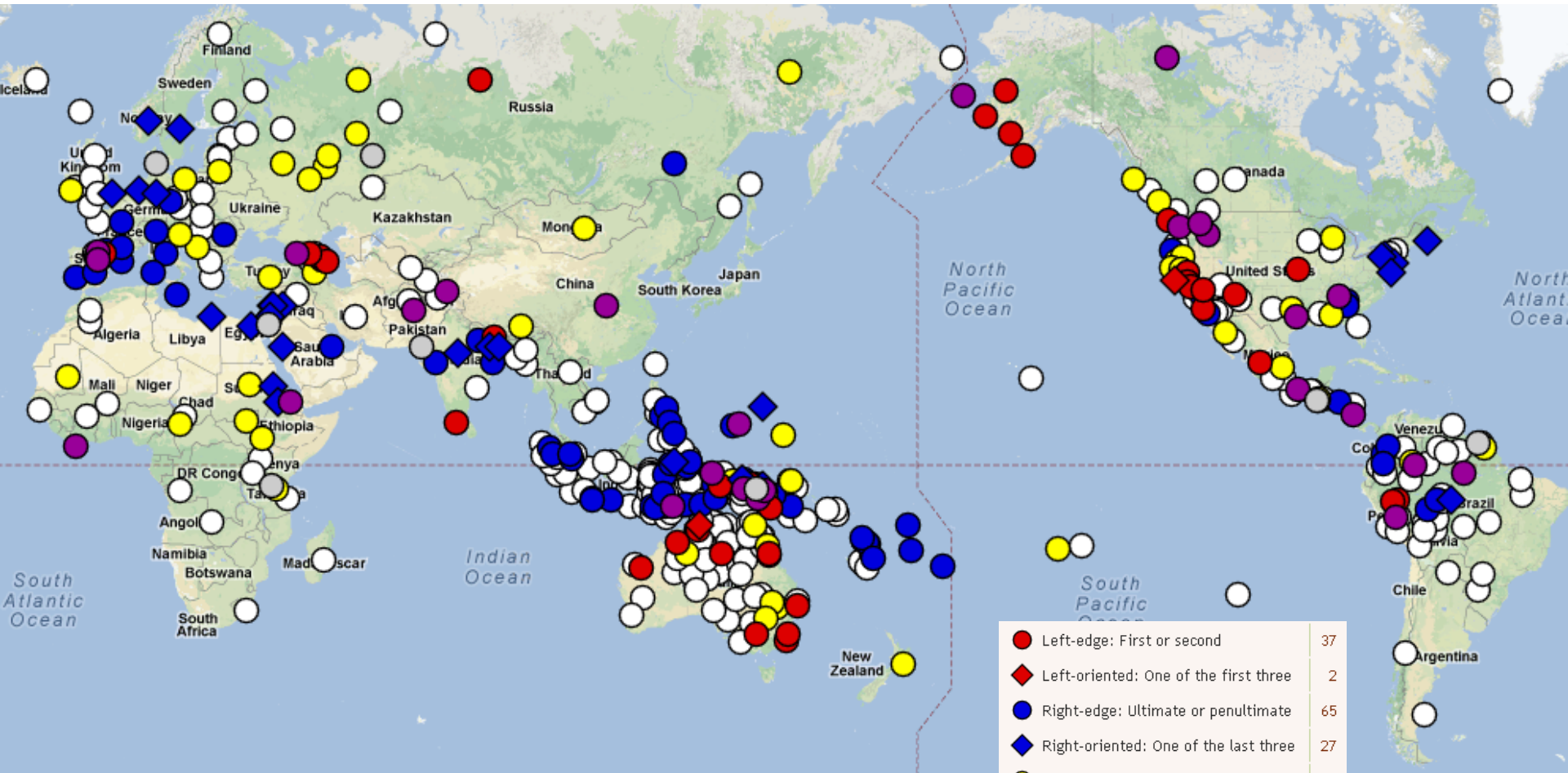
Suprasegmentals: Stress

stress is largely predictable based on phonological properties

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



Weight-Sensitive Stress



<https://wals.info/feature/15A#4/54.68/64.71>

Weight-Sensitive Stress: Unbounded

Russian

a) to contrast lexical items

vowel reduction

doroga (*doroga*)

(1) dorOga /dərOgə/

'a road'

(2) dorogA /dərlgA/

'dear'

b) to contrast different morphological forms in a paradigm:

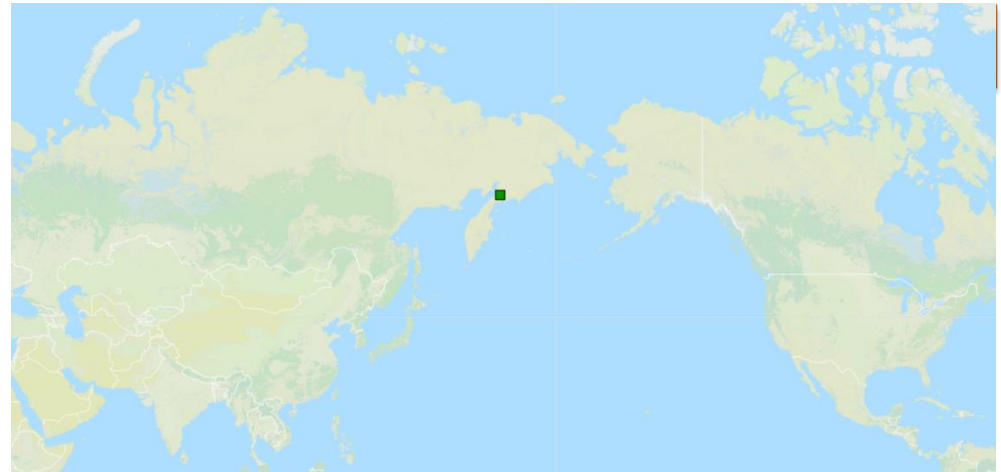
mOr'e – 'a sea' (Nom.Sg.)
 mor'A – 'seas' (Nom. Pl)

		а	б	с	д	е	ф
Единственное число	И	■ о карта	□ стол	■ о море	□ вина	■ о волк	□ губа
	Р	■ о карты	□ стола	■ о моря	□ вина	■ о волка	□ губы
	Д	■ о карте	□ столу	■ о морю	□ вину	■ о волку	□ губе
	В	■ о карту	□ стол	■ о море	□ вина	■ о волка	□ губу
	Т	■ о картой	□ столом	■ о морем	□ вином	■ о волком	□ губой
	П	■ о о карте	□ о столе	■ о о море	□ о вине	■ о о волке	□ о губе
Множественное число	И	■ о карты	□ столы	□ моря	■ о вцна	■ о волки	■ о губы
	Р	■ о карт	□ столов	□ морей	■ о вин	□ волков	□ губ
	Д	■ о картам	□ столом	□ морям	■ о вцнам	□ волкам	□ губам
	Т	■ о картами	□ столами	□ морями	■ о вцнами	□ волками	□ губами
	П	■ о о картах	□ о столах	□ о морях	■ о о вцнах	□ о волках	□ о губах

Weight-Sensitive Stress: Bounded

tátul	- fox
nətyəlqin	- hot
nuráqin	- far
yəlyən	- skin
néqəqin	- quick
nəsəqqin	- cold
tapláŋətkən	- he sews shoes
kəmyətək	- roll up
ʔítək	- be
paqətkuk	- run
nilyəqinat	- white
púnta	- liver
qetúmyən	- relative
píwtak	- fall
nəmítqin	- skillful
túmyətum	- friend
tátka	- walrus
kəttil	- forehead
qalpúqal	- rainbow
kəpírik	- hold in arms
təvítatətkən	- I work
píntəvəlhək	- throw at each other

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

nəktəqin - solid

nəminəm - 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.

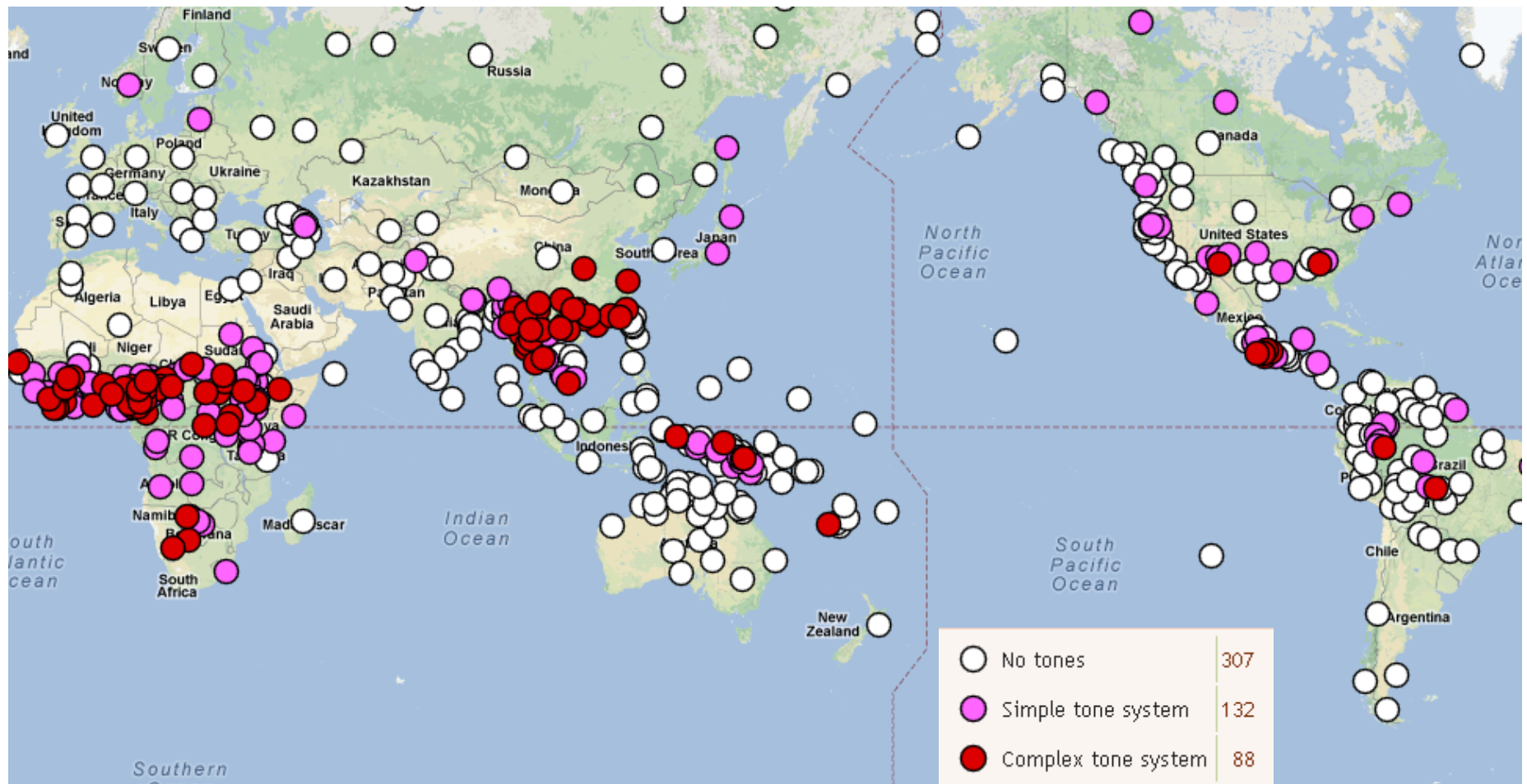
Vowel Length

- two-values distinction
 - Czech
 - šipku – ‘arrow’
 - šípku – ‘rosehip’ (Gen Sg)
- three-values distinction
 - Estonian
 - saada /sa:ta/ – ‘to get’
 - saada /sa·ta/ – ‘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
 - WAL: In Maddieson's (2013) survey of 526 languages, 220 (41.8%) are classified as tonal. In the genetically balanced 100-language WAL 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

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

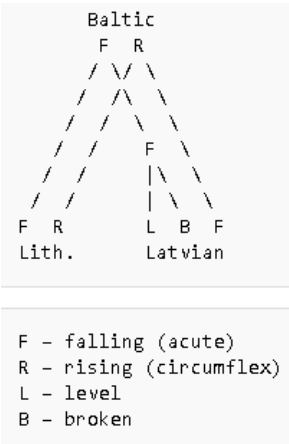
Serbian

+ length,
+ variable stress

short falling ⟨î̂⟩,
short rising ⟨î̇⟩;
long falling ⟨î̂̄⟩
long rising ⟨î̇̄⟩

ne znam = /nèznām/ -
'I don't know'

Simple tone systems



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

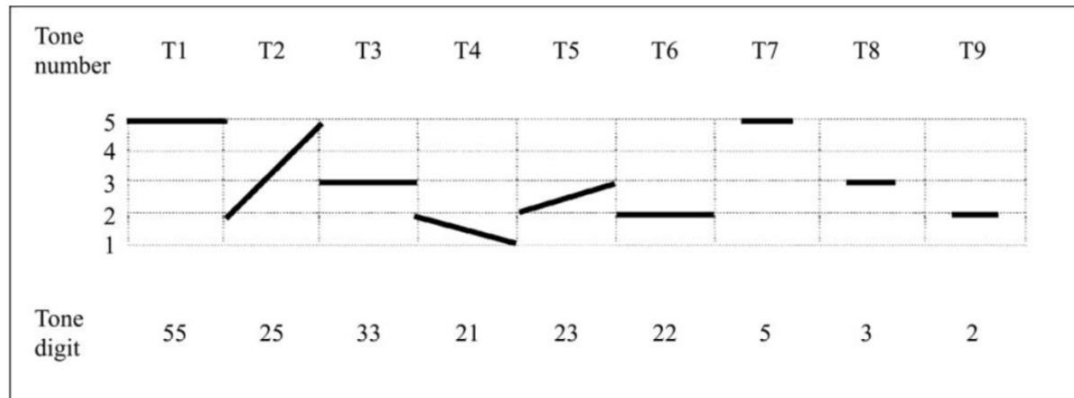
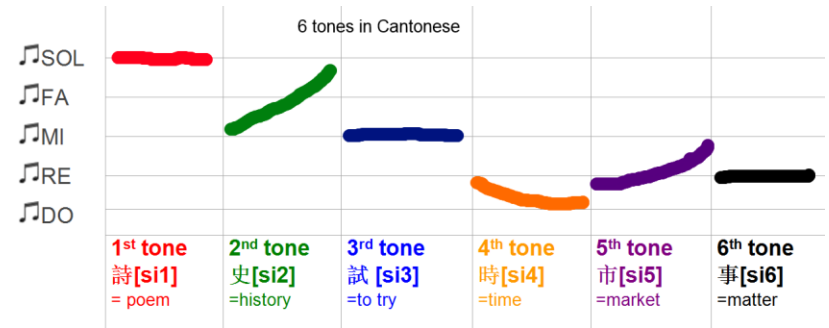
Complex tone systems

/k^háá/ - 'to trade'
/k^hāā/ - 'to get stuck'
/kàà/ - 'galangal'
/kàá/ - 'leg'
/káà/ - 'leg'

Thai

Tones in Cantonese

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



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